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APRIL, 1938

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ASTOUNDING

SCIENCE-FICTION

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By THOMAS CALVERT McCLARY

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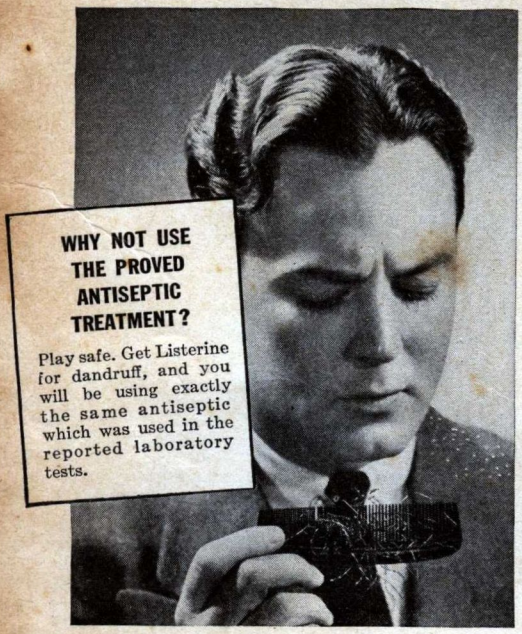

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Title Registered U. S. Patent Office

Volume XXI Number 2

APRIL, 1938

A Street & Smith Publication

NOTICE—This magazine contains new stories only. No reprints are used.

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Science Features:

Readers' Departments:

Cover by Brown. Illustrations by Brown, Binder, Dold, Schneeman, and Wesso.

Single Copy, 20 Cents Yearly Subscription, $2.00

Monthly publication issued by Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y. Artemas Holmes, President; Ormond V. Gould, Vice President and Treasurer; Henry W. Ralston, Vice President; Gerald H. Smith, Secretary; A. Lawrance Holmes, Assistant Secretary. Copyright, 1938, by Street & Smith Publications, Inc., New York. Copyright, 1938, by Street & Smith Publications, Inc., Great Britain. Entered as Second-class Matter, September 13, 1933, at the Post Office at New York, N. Y., under Act of Congress of March 3, 1879. Subscriptions to Cuba, Dom. Republic, Haiti, Spain, Central and South American Countries, except The Guianas and British Honduras, $2.25 per year. To all other Foreign Countries, including The Guianas and British Honduras, $2.75 per year.

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

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

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

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

OUT WENT THE LIGHTS!

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

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

(*Signed*) Harry E. Reece"

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

NATIONAL CARBON COMPANY, INC., 30 EAST 42nd STREET, NEW YORK, N. Y.

IN TIMES TO COME

LAST month's suggestion can be confirmed. Jack Williamson's new story, ***The Legion of Probability,*** is on my desk. It more than lives up to the outline Williamson promised. ***The Legion of Probability*** will be our first ***mutant,*** new-concept story. When I announced that first ***mutant,*** and published the astronomical cover, it had a double significance; it was itself a mutation, and I hoped to stimulate ***mutant*** stories in the minds of our authors. That hope has been fulfilled. Williamson, always a good writer, has produced a story of Time embodying a completely new fundamental idea, an idea that permits of dozens of other plots. ***The Legion of Probability*** starts in the May issue, and will run through three months, but within the first installment the new concept is developed. And a story, excellent in itself, develops around it.

BE certain of that issue, for I'm genuinely proud of what it will have to offer. Not only the ***mutant*** Williamson story, but Thomas Calvert McClary's ***Three Thousand Years!*** begins the building of a new world on the ruins of the old. And—Dr. E. E. Smith, Ph.D. will have his first—and I think Astounding's best—article in that issue.

ANY one of those features would be a genuine accomplishment. Another thing I want you to notice: McClary's story ranks in merit second only to ***Rebirth.*** But I did not call that a ***mutant*** story. It is an extraordinarily fine piece of writing. But I promised you—and you will see I meant it—that only basically new concepts, ideas, constituted mutations. When I do announce that a ***mutant*** will appear, you can count on it being just that.

THAT ***mutants*** will appear within three months of each other ordinarily, I doubt. Probably, it was partly that first announcement that aided in this early production of such a story. I suspect it will be as much as six months before ***Astounding*** will find another.

The Editor.

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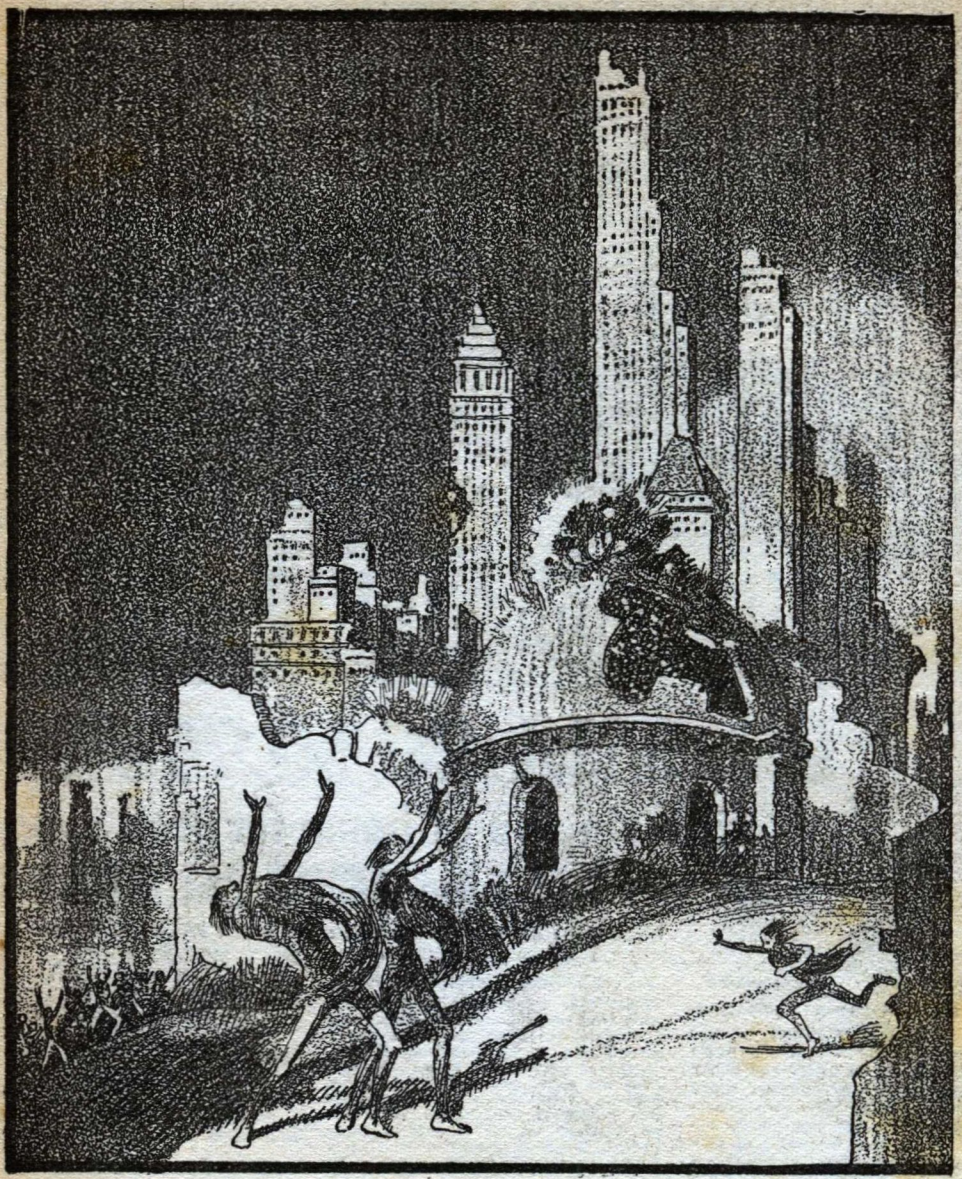
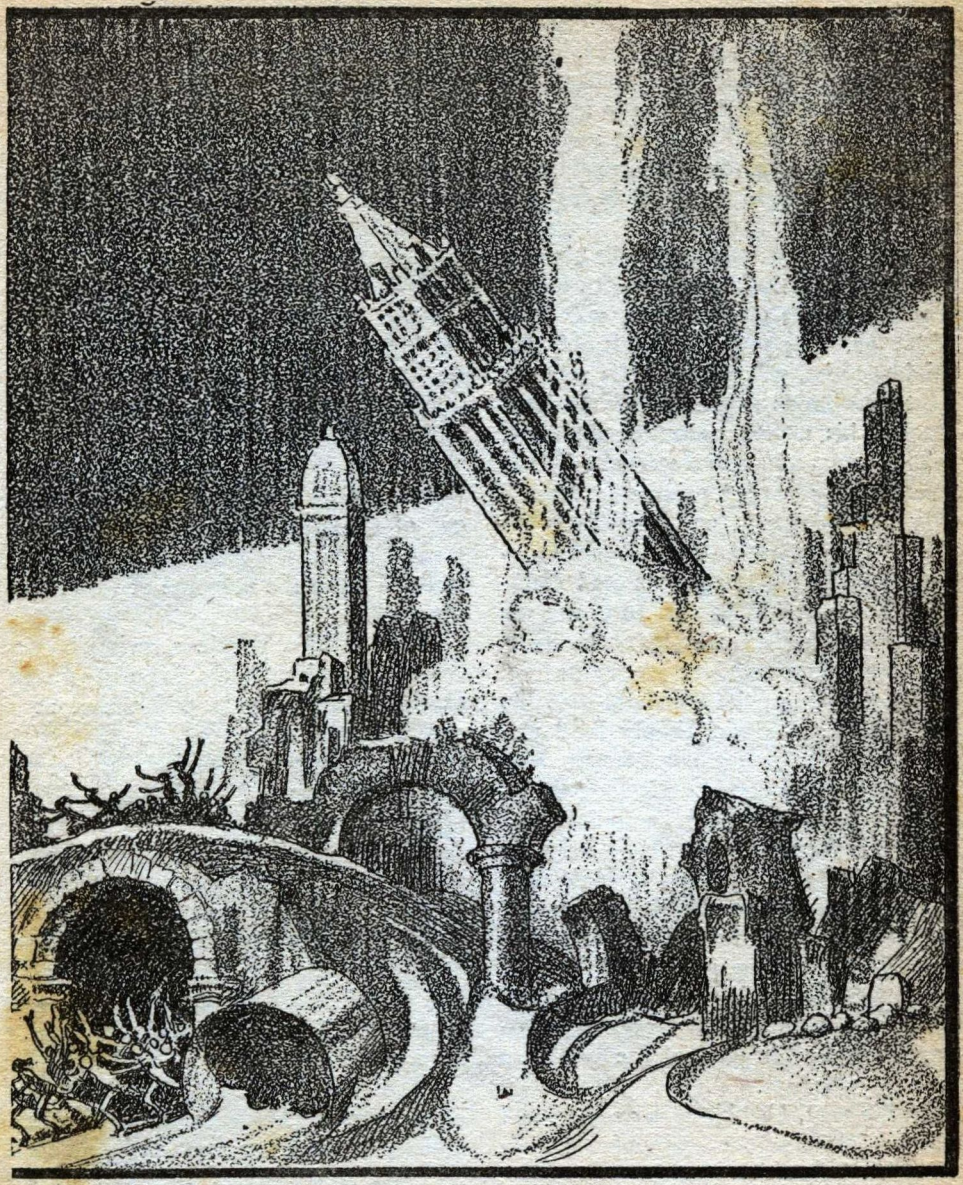


"Three Thousand

The author of "Rebirth" brings another story——



Years!"——

by THOMAS CALVERT McCLARY

a story as great as his earlier tale of wrecked civilization!

FOR six hours the two men fought bitterly across the table. The quarrel had become violent, and now they crouched like angry animals, stripped of the cool judgment and analytical detachment which had made each the greatest man in the world in his own field.

Vincent Drega, who had built his way solid and sure from water boy to power behind a dozen governments, was livid with rage. Dynamic Simon Gamble, his chief scientist, was white. His was the most murderous anger and would have shocked his normal scientific aloofness.

The quarrel had started lightly enough, an everyday private conference over unemployment and the effects on the vast Drega interests. Interests so vast that, like governments and countries, Drega might be said to create the very wealth which was spent to make his companies profitable.

Drega was not the merciless man the world said. He was simply hard and unheroic. He was a construction boss grown to world power. He took things —materials or men—as he found them and made the most of it. He did not attempt to crusade. When a single man is responsible for lives and incomes and spending and saving and debts of perhaps fifteen million people, he has not much time to think of theoretical ideas for world betterment. Drega was too busy keeping his part of the world as well off as it was.

In his way, Gamble was as hard and aloof. His was the brain of the pure scientist. Starving people hurt him; but it hurt the scientist's mind, it did not touch ordinary human chords. "Five hundred years in advance of contemporary science," insiders said of Gamble's superelectronics. And in his world of cold science, there was little room for ordinary human emotions. He scoffed at inefficiency due to human compromise and conflict. Why compromise when there was only one *true answer* to a problem? To Gamble, the world appeared in black and white—truth and untruth.

He was not compromising now, but he was being more human than he knew. The quarrel had gotten beyond the abstract questions involved, had turned bitter with the ego of two great men fighting for dominance. Cold theory and recognition of human incompetence faced each other across that table. But driving those two abstracts were the personal egos of the men. Each was angered that the other would flatly challenge his own opinion.

And while the two men fought, a world and an economic system evolved out of ten thousand years of trial and error hung in the balance. Civilization teetered upon the outcome of those battling wills.

"Five million people starving," gritted the scientist, "while I can grow pigs as large as elephants and wheat at a cent a bushel!"

"Your process takes infinitely cheap power and tons of gold wire," Drega growled.

"I can produce power and gold cheaper than natural gas and tin!"

DREGA went white around the lips. "Destroy the value of power and gold and you destroy the economic systems of the world! The world isn't ready for a science civilization, Gamble!"

"Economic systems!" Gamble shouted scathingly. "The cancer of civilization! Gold was the great resource of savages. Science is the great resource of today!"

Drega crashed the table. "The economic system—any economic system—under which a civilization lives is the greatest resource it has! Strip that and you leave raw wealth and no factory! Let things rest a few years. In time, things will take care of themselves."

Gamble leaped to his feet shaking with fury, his voice a bare whisper. "You

mean you'll take care of things when you have to, Drega—*with a war!* Five million people won't be fed—*they'll be obliterated!*"

"In all building and progress there is waste," Drega snapped. "Waste is better than national disintegration."

Gamble controlled his shaking with difficulty. His face was bloodless, his lips blue. "All right, Drega, take your waste! Take your cracking systems and rotten governments and bloodshed and stupidity. But I will give the world the food it needs. If it shatters every economic system into atoms, what of it? Science will supply a new system!"

"For scientists," Drega added unhappily.

He watched Gamble stalk from the room with misgivings. There was no doubt the electronocist could do what he claimed. Heaven knew, their vaults were loaded with secret formulas Drega did not dare release because of the economic chaos which would ensue. Certainly they were progress! One would wipe out the Bessemer steel industry overnight. Another would crash the wool, cotton and pulp wood industries in weeks.

He thought of gold produced cheaper than tin and sweat broke on his brow. Gold was not human, but a thing was endowed with actual life by centuries of mankind's blood and sweat and worship and tradition. *Gold* was what people believed in—not *money.* It was a symbol—a symbol as necessary to the builder as "+" or "—" to the scientist.

Almost automatically, Drega issued orders to sell short on wheat.

With sincere fervor, Gamble issued his story. He was bitter at the financiers and politicians of the world. Millions starved—but he would feed them! Let economic systems crash. What mattered broken-down systems? In his dream of cheap food, he was lifted to godlike heights.

But the world could not reach those heights, nor grasp that vision. Newspapers played up cheap wheat without mention of gold. Next day the wheat market crashed. It carried farm machinery and housing products with it. Steel wavered and broke and the banks began to go. By the end of the week, seven million workers were threatened with lay-offs. Politicians and financiers were frenzied and bewildered. Farmers marched on the capital. Gamble's house was surrounded by maddened workers. He was called crazy, insane, a maniac and menace. Even if his idea for cheap wheat were practical, look at what had already happened.

Besieged and damned by the very people he had meant to help, Gamble rushed away in misunderstood bitterness. Never since that day had he made public an invention, nor appeared before the world.

He never realized he was acting very human.

TEN YEARS later, to the day, "Lucky" Flagherty sat on his publisher's desk flicking ashes over a bronze bust of the president. "Chief, this series would be hot! The pyramidologists predict world catastrophe or something worse. We can give a picture of the 'something worse' part that will give the world insomnia for a week!"

Lucius Prescott put on his dignified air. "Rhhh-mmmph," he said ponderously. "War, revolutions, famine, unemployed, a dust storm and two floods, a threatened market crash——" he mused.

"Then it's a go? I write it?"

"I think it might be good to get the public's mind off all these real troubles. Nothing like a thrill to make people forget."

"And to boost circulation," Lucky grinned.

Prescott sometimes wondered why he didn't fire his star reporter. He said, "This series is filled with dynamite.

Get names to cover it—big names. And let me know if any of them say anything important."

Lucky came into Prescott's office after his first day's interviews. "I'm a natural charm!" he admitted unblushingly. "Interviewed both Drega and Gamble." The glint in his eyes belied his grin. "Know what, chief? I told Drega the pyramidologists predicted world catastrophe at three-thirty p.m. E.S.T. on March 15th—*and he went white!* He asked me three separate times the exact time and date predicted."

Prescott dropped all abstraction. "Then what?"

"Then he caught himself and began kidding. When I asked what the worst thing which could happen was, he said—'Rain.'"

Prescott puckered his lips and repeated, "Rain, eh?"

"Now that was screwy enough, but then I went up the river and saw Gamble at that science hermitage of his. He pooh-poohed the idea of any prediction being worth a damn. But when I said Drega asked the date three times, Gamble shut up like a clam. So I sprang the same question at him. Suddenly he grinned. And he answered—'Rain!'"

"Amazing!" Prescott murmured. He caught Lucky's shrewd glance and said, "Tell our weather man."

But as Lucky went out, Prescott's face settled into heavy lines. He opened a drawer and looked at a page of notations. If another war broke out, the spark would be lighter in Exestheenland. The elections in that country would be held on March 15th. And the only known antidote for national riots was—*Rain!*

Lucius Prescott acted very human. He dictated a lengthy editorial against war. Then he telephoned his broker to buy war stocks. He realized unhappily that he lived in the world as it existed—not as it should exist.

Lucky rambled off his story at the next typewriter to the irrespressible Lulu Belle. "Great guy, that Gamble! Gold for a couple of dollars a pound. Can you imagine what the world would be like without money? No debts—no salary to worry about?"

"I can't imagine how you'd buy me a wedding ring with nothing to pay for it with!" Lulu Belle said pointedly.

THE IDES of March was a great day for calamity howlers. Lurid stories of what might happen held an exciting note. At three twenty-five, Lucky Flagherty stood beside his city editor and looked at the last edition. WORLD'S END—OR RAIN. Outside, the sun shone brightly. Gamble had said it would.

Lucky glanced carelessly at the early reports of the Exestheenland election. Riots, disorders, the hint of serious trouble. It crossed his mind that the next war might really throw the world into bloody chaos. But at the moment he was more interested in his final story, predicting every form of catastrophe from world explosion to the conquest of civilization by spiders. The editor hung up the phone and gave Lucky the fisheye.

"Did the world's greatest news sleuth have any trouble selling this cockeyed scare series to the boss?"

"It was my persuasive personality," Lucky admitted.

"Well, the governor of the state has one of those things, too. He just persuaded the boss that he may go to the clink for inciting mob violence out in the slums! And fourteen phony cult racketeers are getting rich reading your story to suckers and promising them a special train through the pearly gates—for a price."

"I suspect the ax," said Lucky.

"Oh, you might not be fired," the editor said with rare good humor. "If

the world ends, you turn out to be the great scoop journalist!"

"The circulation of the paper sky-rockets and I get the gate for gross genius!" Lucky yelped.

"Genius?" the editor barked. "Listen, Doomsday, that was the phoniest series of——"

HE STOPPED to cough, just then. His throat was tight and stuffy, queerly dry.

"Hell, you're fi——" He stopped again, batting his eyes with the strange sensation.

It was difficult to open them the last time. They felt leaden. His mind was thick. He glared savagely, determined to read the riot act if it killed him!

Then he gaped. He thought wildly, "Jumping crimps, he isn't fired!"

A black-bodied, naked Lucky Flagherty stood before him. *He was made of mud!*

II.

THE CLOCK crawled toward three-thirty on the afternoon of March 15th. A surrealist painter sat in a field surrounded by society women. "Life is simply the way you look at it," he said complacently. "For instance, you can call those cows trees."

He withheld laughter behind an intellectual expression. Startled, he looked again. Then he yelled. The cows *were* trees!

A PSYCHIATRIST sat with a "client" overlooking a green inland valley. His client was under the delusion that there was no world except the imagination.

"If your theory were correct," the psychiatrist explained simply, "we could imagine that the ocean rolled up to the foot of this cliff and it would be there."

"Well," insisted the client simply, "it is."

The psychiatrist smiled tolerantly. His smile froze. From the foot of the cliff came the hollow thunder of surf. A sea broke in mottled spume.

AT A FAMED university a renowned scientist held indignantly, "Prophecies are rubbish!" and led the way into another room. He stopped, batting his eyes rapidly. The *other room* had somehow become a field of rampant violets. A brook ran at his feet.

ON THE broad plateau of a powerful nation, a general had mobilized two million soldiers, the greatest military panoply in history. Proudly, he stood atop a table rock and watched maneuvers. "Nothing," he said pointedly, "could stop that army! It would sweep the very Himalayas before it!"

His eyes were glued on the plains beneath. The broad cloud of dust raised by the huge army had stilled. There was a growling buzz of dismay. His army had vanished—almost. The heads and shoulders of his soldiers *were sitting on the very plains!*

OUTSIDE a small town a fake revivalist was exhorting a crowd from atop a wooden platform. He had one eye fixed on heaven, and the other on contributions. "And I say to you that I will be lifted aloft!" he cried.

"Hm-m-m," said a dubious gentleman. Then he took a very deep breath. There was a giant tree suddenly in front of him. In the top, the revivalist was yelling lustily.

THE Reverend Percival Tweedy stepped forward to the cement parapet of the stage. "I would like to give a graphic illustration of the shockingness of modern dress."

There was a burst of applause from hatchet-faced dowagers. The applause broke into startled gasps. Mrs. Hildebran said sharply, "Really, Reverend, it

is highly unnecessary to be so graphic!"

But Reverend Tweedy could not bring his mind to dwell on that statement. Mrs. Hildebran was staring at him indignantly through lorgnettes. She was wholly unclad! Even in his amazement he thought, "Skinny old wretch!"

IN the city, a crowd stood watching a deep excavation. An Irishman spat into the hole and was accused by a friend of trying to drown the workers.

"Begorra, and Oi could fill the hole with one more," he boasted.

He spat again.

He looked, and crossed himself with fright. The pit was brimming with water!

IN a one-story bar, Pat McGovern was well ensconced for his day's imbibing. He raised his sixth glass of whiskey with a flourish. "Micheal, me lad, nothing is impossible. With me own eyes I have seen gnomes and banshees. I have spoken, intelligently, mind ye, with the spirits within the very bottle!"

"That's the time to take the pledge," smiled Micheal.

"Ay, and I intend to—as soon as this catastrophe happens!" Pat chuckled.

He brought the glass near to his lips. But he did not drink. Micheal had suddenly developed an immense red beard completely covering his chest. His finger nails were four inches long.

Pat eyed his glass with stern reproof. A mushroom sprouted from its top.

Pat considered these phenomena with dignified suspicion. He arose with majestic mien and tried to whistle casually. His first note blew a jet of dust from his mouth. Mr. McGovern threw self-possession to the winds and bolted.

VINCENT DREGA had that moment seated a group of powerful financiers. "War in Exestheenland will be the first move for complete world control." He banged a rustless steel table. His brain felt momentarily fagged, but his dynamic power quickly returned. The men sat so engrossed in plans they even forgot to smoke.

What might have astounded them was that the country under discussion no longer existed! It was a gigantic inland sea. But they had no way of knowing that.

IN the *Journal*, Lucky Flagherty stared unbelievingly at the city editor crumpled amidst a pile of dirt on the floor. "Fine picture of a rushing city editor," was his first thought. Then he thought, "Well, it's happened. This is the hereafter, or something. Maybe we're just disintegrated ideas wandering around in space."

He thought with sudden panic about Lulu Belle. If he was just an idea, what had happened to her? But Lulu Belle was quite safe. She was thinking, "Just wait until I get my hands on that Lucky Flagherty. This is probably some trick circulation stunt of his!"

III.

LUCKY FLAGHERTY tried to think. It sent violent pains through his head. His mind and nerves oscillated to growing hysteria. Before he could clearly see about him, he felt something drastically wrong. Realization hit him with the impact of a mailed fist. *There was no noise.* A vast, almost throttling silence reigned over the city. Instinctively, he realized danger and put an iron control upon himself.

He knew by instinct, long before he could reason it out, that some terrible calamity had taken place. He knew by instinct that he must get himself straightened out before he began to worry about what had happened.

His mind fluctuated between things he had been thinking at the moment of three-thirty, and new thoughts struggling to form. He wondered how he

That was New York—blocks of it—under clear water! Only fish—not humans—moved in those drowned halls.

knew this man in front of him was his city editor. A long dishevelled beard hid the features. The face was black and crusted. There were cakes of dirt around his eyes, and atop his bald pate was a peculiar fuzzy growth.

The editor sat up and blinked. "My God! Is that you, Lucky?"

The question annoyed Lucky's slow wits. Who did he think it was?

"It's me," Lucky said. Speaking hurt him, and his voice sounded strangely grated and harsh. His words formed slowly and were thick. He had the idea that his hearing senses must be as slow as his speech or he would not be able to understand himself even.

He found his mind unable to cope with rapid shift of thought, or even with an entire complicated thought. He

walked a few paces and tried to sit down. He could not squat. His bones and muscles refused to permit the action. He glanced at the editor who was trying futilely to rise.

Thoughts came stiffly, physically, with the effort of lifting a wrenched arm. They formed erratically, coming in gushes and then he would have to stop and feel for a word-idea in the middle of a thought-sentence. He knew, without knowing how he knew, that he had no time sense. He did not know if it took him ten seconds or an hour to formulate an idea.

He shook his head several times. This seemed to help. But his head turned slowly, and bones and cartilage snapped sharply. Flakes of something dropped onto his shoulders. He examined one, and found it hard and crumbly, like dried mud that had been mixed with printing ink. He wondered if that could possibly be his body. He experienced fear when picking the first lumps away, a feeling that possibly he was destroying himself.

He rubbed his neck as briskly as he was able. His most violent motions were peculiarly strengthless and slow. A great many flakes fell off his neck and thereafter he could move his head much easier. Mentally, he wondered if he was really dead. Instinctively, he knew that he was very much alive.

HE MOVED his body slowly. Joints popped and creaked. Muscles cramped. He went through a series of simple exercises, but his motions were very limited and uncertain. Gradually, they became easier. Then, for a long time, his body was afire with prickling sensations and infinite small cramps. He knew that he should be in agony, but the sensations seemed very far away—as if they might be in another body.

He turned to careful inspection of himself. He found he was naked. There were numberless questions about how he got that way, but for the time being he simply accepted the fact. His nostrils were completely caked and closed, but only at the tips. He cleared them of chunks of rock-hard dirt. He found his whole body covered by a coating of peculiar mud, varying from one-eighth inch to two-inch thickness.

The hair on his legs was eight to twelve inches long. But it was brittle and broke off. His skin was peculiarly white and colorless and dry, so dry that he peeled off a three inch strip of flesh before realizing it. Blood began to ooze through the raw gash. The blood of a dead man might look like that, just before it turned to water.

Lucky laughed at the macabre thought, and the motion split his lips. He stuck out his tongue to wet them, but his tongue was dry and the moisture barely discernible. He was conscious of sudden thirst—or not so much thirst as a terrific *need* for water. There was a deep hollow in the window ledge holding a small pool. Shuffling over, he stooped with difficulty and drank. He thought a dehydrated potato might feel as he felt.

He rinsed his face in the little pool and had a definite feeling of *skin thirst*. Again he bathed it, and soon the parchment dryness began to disappear.

A lock of hair fell across his chest. It was fully three feet long, and broke off in a bunch with a slight yank. It was gnarled and filthy and lifeless. It made him think of cadavers he had seen. Systematically, he pulled off all his hair.

He kept scratching himself by accident, and suddenly noticed his finger nails were three inches long. His toe nails had been long, too, but most of them had broken off while he shambled about. He bent his finger nails and they snapped. Dry—brittle—dead. It was unpleasant, this deadness of a living body.

Lucky's feelings were becoming sharper. They were not distorted in

the way of a man coming out of ether, but were slow and incomplete, like the thoughts of an idiot. He splashed more water over his body, rubbing it carefully. The skin soaked it up like a blotter. He felt stronger each time.

Something had surprised him earlier, but he could not recapture the thought his numbed brain had not fully grasped. It had something to do with feet, and stooping, he pushed a finger into the cement floor. It was soft in the way that sand gets when it has been thoroughly wet and then baked dry. By gouging, he could scoop shallow trenches with his finger.

"Dead cement," he thought.

THE DISCOVERY frightened him. Something had happened which had killed "life" in an inorganic compound like cement! Then what had really happened to his body? Was he actually dead and this just some hallucination of a dying brain?

He looked at the window of the room. Most of the panes were gone. Pieces of glass lay amid dirt on the floor. He picked up a piece, found it exceedingly light and brittle and lifeless. He could pulverize it in his hand without being cut. But he cut himself on a piece of the old five-gallon water bottle. It occurred to him that heavy expensive plate glass might have considerable life left in it.

He could not find the old ice cooler. There was a mass of dirt filled with chunks of rust and oxidized metal where it had stood. He glanced at the stainless steel window frames. Some were still intact, but warped, and black and rusty. He was able to break out a section like breaking a candy stick.

The floor was covered by an irregular mass of dust and dirt. Mostly, it was hardened and dark. He chipped up a chunk and tasted it. It had the taste of printing ink mixed with salt. There were regular mounds of dirt where desks should be standing. He poked around in one and found a complete typewriter frame intact, but it was an oxidized mass. Only where metal had oxidized in wood was there any sign of wood left.

"Damp," he thought. "Sea air enough to rot anything. But that would take time, years!" Slowly, a thought of the number of years required was growing in his mind.

A growing din smashed through his detachment. Men and women, black, hairy, naked, made strange noises and sobbed hysterically around the room. He recognized them only by some instinctive sense. He realized for the first time that they were all skin and bones, and that he himself must have lost half his normal weight. Sally Blane, the paper's ace wit, was sitting on the floor making feeble typewriting motions above the pile of dirt in front of her.

Most of the bodies were in about the same condition as Lucky's, but the degree varied. Sid Beckle had toe nails at least three feet long. Beside him, Herb Oliver's toe nails were a bare six inches. The sole and heel and backpiece of one shoe clung to one of Oliver's feet. The leather was rotted and dried and twisted.

Oliver looked up, grinned drunkenly and said, "Boy, what a bender! I'll be in the Psychopathic by to-morrow."

The remark brought a violent reaction to Lucky's mind. He thought, "Maybe I'm drunk or plain nuts!"

He put the question aside for future consideration. He saw that he was, in some ways, advanced a stage ahead of most of the men and women. Some were sitting stupidly or lying in grotesque, stiff positions. Most were going through the throes of muscular contractions he had already experienced.

All their voices were harsh and cracked, and some could not formulate words at all.

Their mental conditions varied. Some showed signs of full comprehension or alert bewilderment. There was fear, hysteria, uncertainty, disbelief. Other brains were not fully functioning, and a few people sat immobile with no sign of mental activity.

LUCIUS PRESCOTT staggered through a door, his eyes wild, his mouth agape. He hit the partition coming through and it fell. His expression changed from disbelief to amazement, and quickly to disciplined self-possession.

He cleared his throat with a squeaking rumble. The bedlam diminished, hysteria quieted momentarily by the habit of silence in the publisher's presence. He drew himself erect with pompous dignity. He reached to hook a thumb through his vest, but his vest was no longer there. His arm remained in its accustomed position.

"Something," he announced impressively, "has happened."

There was silence, then a burst of hacking laughter. Prescott scowled. He glowered. But his dignity was bereft. No one could look dignified with a deflated stomach hanging nudely. Part of his shirt, oddly, still clung to his shoulders. He had been very proud of the fine linen in his shirts.

His scowl gave way to a wry grin. "For the time being," he croaked, "I suggest we keep from asking questions. Let explanations wait until we have ordered ourselves."

There was a deafening crash somewhere in the building. It shivered and groaned. A crack shot down one wall. The city editor glanced abruptly toward the clock. The face was barely discernible behind a layer of dirt. The glass front was gone. "Holy socks! Six minutes past deadline!" he shouted.

He was still sitting on the floor and reached out to where the phone should be on his desk, if his desk had been there. His hand sank into a mound of dirt. It came up with the telephone intact!

He began to jiggle the hook. "Cripes! Biggest story of the century and you can't get the damned operator. Boy! Run out and wake that dame up. What's happened around here?"

He was in a queer mental state compounded of memories of normal routine of the hectic deadline rush. But others looked at each other with fearful tenseness.

What had happened?

IV.

MINDS WERE working strangely, the very seriousness of the situation making matters seem oddly impersonal. Lucius Prescott thought with cynical humor of the governor's lambasting about "yellow journalism". He paused to comment to Lucky that once again the *Journal* had served the public, and that he must remind the governor about it.

Lucky said, "I wonder if he's alive?" He stopped and added, "I wonder if we're alive?" In terrifying, sudden flashes, that thought kept recurring to all.

A choked yell broke on their chaotic thoughts. "Fatty" O'Brien was standing in the middle of the floor doing his best to shriek. Beneath him, the floor bent like thawing ice weighted in the middle. Suddenly it made a tearing noise and gave. Fatty dropped through a hole and sank slowly to his large hips. He stopped there, but loosened cement trickled down beside his stomach like running sand. Slowly, he was sinking through. Around the dangerous dent the others stood helplessly.

"Get a rope!" Beckle shouted.

"Rope, hell!" Meyer shouted back. "There's nothing that isn't rotten." His

eyes opened wide with astonishment. How did he *know* there wasn't anything which was not rotten? None of them had moved out of that room. Yet he was certain of it—*he knew it!*

Down the hall Lulu Belle discovered the fire hose. It was dry, and kinked in a circular shape from being rolled on its drum. The drum had entirely disappeared, but the hose had strength left in it and enough pliability to be carefully unrolled into a kinked length. With the hose, Fatty was hauled to sounder flooring.

There was a crash somewhere below, and wild yells of agony, shivery yells that sounded like deaf mutes trying to laugh. A brick flew through the paneless windows and burst with a puff against a pillar. The building began to quiver, and floors and walls shook out a cloud of choking dust.

Prescott said, "The presses fell through. Outside!"

They moved with careful flat treads toward the stairway, but the iron had rusted and corroded and broken loose in large sections. The rails and some of the supports alone looked sound. There was no way to reach those sections to find out.

Prescott stood with a puzzled expression on his face. "Rusted out," he muttered. "Maybe some corrosive element in the air."

They turned to the elevator shaft. Lucky put his shoulder against a metal door. It gave, nearly pitching him through. The central cables were swinging in the middle of the shaft, apparently free at the bottom end. Lucky contemplated them as the choking dust grew denser. More crashes were coming from below.

"They might snap like threads," Prescott said.

"We've got to get down or we'll fall down," Lucky replied. It struck them very funny and they bent with laughter. The laughter ached in every muscle of their bodies. Lucky choked and gasped to get self-control. Then he leapt.

HE CAUGHT the cables and they swung, nearly snapping his feeble grasp. A thread of one cable pinged rustily. He knew from the feel and the swing that the cables were light in weight, lost of much strength. A sound like rain from the bottom of the shaft told him of the deluge of rust shaking free.

Oliver grabbed one of Lucky's legs as he came near the doorway and hauled him over. They made the cables fast at the landing with the hose. Painfully, Lucky climbed down, splinters of rust biting his flesh like shrapnel. A coating of black, almost iron-hard grease adhered to and protected the cables.

He turned to the street lobby in bewilderment. It looked almost as it should! The metal fronts of the letter boxes were black, but intact. The cigar case was filled with dirt and grime as it always had been. The old circular spinning door was in place, and the heavy chandelier was swinging slightly overhead.

Lucky tried his letter box. The combination dial was stuck and he twisted violently. The entire front section came away in his hand. It should have weighed thirty pounds. It weighed about ten! He dropped it, and watched it shiver to fragments like a Christmas ornament.

Lulu Belle came down the cables, her legs and arms torn from sliding. Lucky wanted to extend his masculine protection. He felt very strong and capable in the face of peril.

"Well," demanded Lulu Belle, "are you going to play post office or find out what's happened?"

Lucky glowered and swore and turned to storm through the spinning door. It was an action of habit. He hit the glass a heavy blow.

The door did not turn. The glass went out with a dry, smoky puff and

infinite small tinkles. Thick frost broke much like that. Lucky stumbled across the sidewalk and street under clumsy impetus and came up sprawling on a high ridge of land opposite the building.

The fall had jarred him badly, although it was not much of a fall. But it was his amazement which held him in that ungainly position. He was looking at the roof of the Journal Building, and no roof should look as that roof looked. Coarse saw-grass, ten feet long, drooped over the edge. There was a giant tree in one corner.

Lulu Belle came out and giggled. "Who'd ever expect the *Journal's* ace crime sleuth to be rolling around naked in a patch of violets?" She giggled again, and walked away, apparently unconscious of her own nudity, and leaving Lucky fully conscious of his own for the first time.

PRESCOTT came out, his eyes blinking steadily in the light. For a long moment he stood blinking at a puddle of water on the ground. Then he stooped and tried to scoop it up. He could not control his hands well enough for that, and at length he stuck his head in the pool and lapped. It was the sweetest water he had ever tasted, but he wondered what errant native instinct made him do that. Ordinarily, he was a very dignified gentleman.

"Odd," he thought, "that a date should go down through history with such evil significance! The Ides of March. I must order a Sunday story on that."

He bracketed the thought to be taken care of later. Such was the state of his mind that he did not correlate another idea, already established to himself, that there were no printing presses left.

Herb Oliver reeled across the street. He had rubbed most of the whiskers from his face, and beneath the grime, his old whiskey leer made him the most familiar-looking of the group. "Boy," he chortled, "nobody's ever been this drunk before!"

Lucky got up painfully and shook him. "Listen, Herb, you aren't drunk! This is something that happened."

Oliver waggled a finger and winked knowingly. "All right, smart guy, tell me you're not drunk! What's this you're standing on?"

"A ridge of grass," Lucky said with renewed bewilderment. The piers and ships should be where this ridge ran!

Herb held his hand over Lucky's eyes. "And what should be four blocks north?"

"The Chemical Warehouse."

Herb took his hand away and spun Lucky around. Four blocks north was a dense forest looking as old as time itself. "So we're not drunk!" Herb chortled.

Lucky thought, "Damn it, I can't be." He was having difficulty focusing his sight accurately, and the forest was wavering in front of him. Something itched his foot and he scratched it absently. His mind was groggy and he was trying to figure out if perhaps Oliver was right when his foot itched again. Something about the itch made his skin crawl. He tried, unsuccessfully, to whistle.

The third time it was more than an itch. It was a poke! Something cold and clammy and covered with fuzz made him think of an animal finger trying to pull him into the ground.

Lucky gave a hollow laugh, clapped Oliver's shoulder, decided Oliver was right, and stole a surreptitious glance at the ground. Ice tingled along his spine. A finger was beckoning at him —a real finger out of the ground. It reached over and hooked his big toe.

Lucky gave a wild yell and kicked clear. The gathering group stood gaping while a second finger appeared and made erratic motions.

"I told you so," Oliver said gravely. "I think it was that gin up at the saw-murderer's house."

PRESCOTT gulped and wiped his forehead. "Monsters," he whispered hoarsely. "Real monsters in the earth—and no press to tell the world about it!"

"He's green colored and has hooves," Oliver stated sadly. "I know him intimately. Usually he lives over at Belleview Hospital."

They all stared, entranced and stupid with the discovery.

"Well, you might try to save the man!" Lulu Belle said behind them. "Can't you see he's buried?"

"That's just it," Lucky quavered.

Gingerly he brought himself to reach down and pull the hand. The hand turned and gripped his with a vise-strong wrist lock. "Oh, Lordy!" Lucky said and pulled.

They could not budge whatever the thing was through the heavy sod. With their weak hands they tried to dig it away. It clung and was beyond their strength. Stupidly they stood around staring. Lucky thought of the cigar case and went back into the building. A body hurtled past the elevator door as he went in. There was a sound like falling leaves, then a gritty crash. He went over and looked down, but the bottom was dark.

He knew somebody was dead down there, but it left him strangely unexcited. He had the feeling that he had known all along people would die, and that he had expected this without knowing exactly what would happen. He turned to the cigar case. The glass was cracked and came away easily in his hand.

He inspected the glass carefully, for it was the first thing which had actually had the feel of life about it. It was much lighter than it should be. He knew that. He knew by the instinct of feeling that it was not very strong. Maybe without its coating of grime it would not even hold together. But somehow his fingers told him there was still some strength left in it. He carried it back and they chopped away sod, using the glass carefully. It broke, but it served. They uncovered a man's head and then his shoulders. They pulled and he came out of the ground.

It was a strange-looking man, with chunks of dirt stuck over his body. He was entirely covered with a mossy fungus growth. Dirt, clumped in his hair, gave root to a waving flower. His eyes remained tight shut.

"I'll finish the masthead in no time, sir," he whispered thickly. Then he fainted.

"What masthead?" Lulu Belle inquired.

Lucky felt dizzy. He said, "The banana ship, *Valparaiso,* was docked here this afternoon and there was a seaman painting the masthead at three twenty-five."

Prescott rumbled, "All this is impossible! We're under gas or having delusions."

Oliver waggled his finger at Prescott. "I never knew you drank before," with drunken friendliness. "Lucky, the old duffer's regular!"

V.

PRESCOTT grinned a little self-consciously. "Damned if I couldn't be drunk right now! I have absolutely no feeling of any sort except mild surprise over what's happened, or is happening."

Lucky said, "Neither have I. But we've got to find out. Look at the skyline."

Prescott gazed around with screwed-up eyes. He could not see very far. None of them could. But he could see far enough to see forests and flats and fields and hills where there should be well-known buildings. It looked like a composite picture of country and city.

A twenty-story building jutted out from a grove of maple trees.

Prescott said, "It's impossible, of course. It's some sort of mirage or hallucination. Remember that story that the Japanese had a secret gas which would drive whole populations insane, all simultaneously and all the same way? We said it contained opium."

Oliver leered and said, "Boy, I had to get stinko to write that one. Maybe they took the tip and did it."

Lulu Belle said, "If any country had anything secret, Drega would know about it. He's the man behind every country."

Prescott looked at her with dawning admiration. "That's the first intelligent suggestion."

"What?" growled Lucky, thinking she might have let him say it.

"Drega," said Prescott. "Do you think you could find your way to his place through this mental chaos, Lucky?"

"I could show him," Lulu Belle said sweetly.

Lucky snapped, "You keep quiet and go get some clothes on. I'll find my own way." She was smiling with mischief as he started off.

Drega's treasure house was on the other side of town. Lucky's sight was improving, and he could see far enough away now to realize that if this were real, and not a dream, he was going to have difficulty finding his way. In the distance were a few oddly dark and ancient-looking buildings, shattered, all twisted black skeletons silhouetted against the sky. Immediately north and south were fields and patches of trees.

He took a cross street just faintly visible through a field of grass and spring growth. Before long, he was on hopelessly unfamiliar territory and traveling by instinct. He waded small streams of brackish water that seemed to back in from the river.

In a few of what had been city blocks he saw people at a distance. They moved with peculiar jerks and uncertainty, and he realized for the first time that his own movements were the same. He stopped to test his balance and found it almost nil. He could not stand on one foot. When he walked, he actually fell from one foot to the other. He fell down a number of times.

THE TOPOGRAPHY of the country amazed him and he stopped with physical pain at the flood of questions deluging his mind. Some instinct pulled him out of a case of near hysteria. He thought, *"I must not think yet. I must not see anything that is not in my immediate path to Vincent Drega's."* He knew that was the only way to get there. He experienced for the first time in his life the dominant singleness of purpose which had driven men, half blown to pieces, over battlefields during the World War.

He shut everything possible from his mind. Twice, groups of men raced by him, making weird noises. That is, they appeared to race. He knew from their jerky movements they really could not be travelling very fast. Then his mind must be working as slowly as his body. He would have liked to ponder that, but he shut the thought out.

He came to a wide bay reaching in from the river. He was not sure he could traverse a swamp at the end, so he waded in and trod water. He had swum half way across before he realized the terrific tax the effort was making on his body. His body was heavy to support. When he stopped to float, he started to sink.

He trod water and ducked his head low into the waves to look beneath. The water was clear and he saw a startling sight. A complete block of buildings stood on the bottom! He recognized the tower of the Andean Bank, a low structure that had served shipping companies.

His heart pounding, Lucky looked for grimmer sights. At least two thousand people must have sunk with this area. Even after months, there should be some sign of bloated bodies. But all he saw was a school of fish.

He came to the other side of the bay and crawled onto a rise to rest. The ground was shivering slightly, and from far uptown came occasional booming noises. A sudden gurgle and sucking noise from the center of the bay drew his attention. The waters opened and began sweeping in a gigantic whirlpool. It closed as he looked and sent up a towering jet of water.

Lucky jumped to his feet and stumbled up the high mound. Behind him, an immense wave reared and chased half way up the ridge. There was a growl from the bottom of the bay and the waters boiled. The Andean Bank had fallen.

Dimly, Lucky realized the soaking in swimming had made his desiccated body stronger.

Lucky heard a harsh call and turned to confront an impossible sight. A giant lumbering thing shaped like a rough statue of a man moved ponderously toward him. The coating was like cement. Pieces of rust and brick projected from the coating. Lucky was ready to bolt.

"Thank God, somebody's human!" the Thing said.

The voice was thick and dry and barely understandable. The Thing came to a halt and stood of its own stiffness. Half choking, it said it was a man. A chunk of coating fell off and disclosed a raw knee which began to bleed. Lucky began to break away the rest of the coating.

HE GATHERED that the man had been working in a glue factory. The next thing he had known, his fellow workmen had turned to stone! But they were alive! They made noises. Terrified, he had lumbered out and wandered in this direction. The man gave a sob and fainted as Lucky got off the last big chunk of coating. It had come away like a plaster cast. He left the man lying on the mound.

He got bearings on the blackened and bleached hulk of the old Worthington Tower. About where he was staggering through briers should be the old tenement district. He came onto more even ground, but it was treacherous, filled with covered pits and sharp cornices covered with thin turf. He stepped onto a solid-looking hummock. It moved, and turned out to be a man's head! He pulled him out of a shallow and left him babbling incoherently.

He came out of what should have been the tenement district into what should have been a sweatshop district. There were shattered ruins here, and one building of fourteen stories which looked almost as if it were recently erected. Over the top of a high mound came shouts of hysteria and pain, then a high, piercing feminine shriek. There was silence after that, and shortly following, a low-browed brute of a man went slinking out from behind a wall.

Lucky felt sick and winced. The action gave him a terrific pain in his abdomen. He was waiting for a cramp to pass when a man staggered out of a pile of moss-covered ruins and leaned gasping against a wall. Suddenly the wall leaned, then toppled atop the man with a kind of dead roar. Bricks crashed as if half dust.

Lucky saw more people now, all naked and covered with dirt. But their skin color, where it showed, was varied. Some were green, some red, and some copper. Lucky grabbed a few and questioned them sharply in spite of their hysteria. He got respect and realized at length it was because the bay had washed his body comparatively clean and he looked almost human. He was also much stronger than these people

and his strength was increasing by the minute. He wondered again if the bay had anything to do with it.

The copper man shrugged shoulders which once had been mighty and muscular. Now they were actually shrunk in the bones. He said, "Brother, I don't know from nothing what happened. I was working in a smelting room for copper filings. Then I find myself lying under some dirt and mess. I was kind of mixed up and scared, but I got clear and looked myself over. Way I figured, some of that copper dust covered my body. It's skin deep. I can't get it off."

"But it will kill you. It's poisonous," said Lucky.

"Well, it ain't killed me yet, and I been kicking around since way before light. I'll sweat it off in a couple of days if I can find some decent water to drink."

LUCKY thought they needed calm men like that, and directed him toward Prescott's with a warning about the bay. He questioned a few other people. The red-skinned ones had been working in a dye shop. They were not covered with dye. Their skins were impregnated with it. The green people had been in a chemical factory and were in the same condition.

His head was beginning to pain again, and he realized it was with an overload of thinking. He remembered his errand and blotted out everything, staggering with unseeing eyes through ruins and groups of hysterical people, through morasses and briers and clumps of trees, over hills and through backwaters.

What seemed hours later, he came to the grim-looking low building which had been the heart of the Drega empire. Metal doors were blackened but erect. The building looked odd, and then Lucky realized that the adjoining tower had toppled. But there were no ruins showing, only a great pile of grassy hill.

Six men came around the side of the building and Lucky stared idiotically. *They were dressed.* Their shoes and socks and shirts and ties were missing, but their suits were complete—and pressed! One of them was gesticulating violently. It was Drega. Lucky ran up panting. "Do you know what happened?"

Drega peered at him closely without ceasing his flow of thought. He shook his fist at one man. "I know this crook built me a building out of second rate material! Look at it—the mighty Drega Tower! The tomb of ten thousand of my workers and a lifetime of my own work."

"But the whole city's crashed, Drega," the man faltered.

"No buildings that I built myself!" Drega shouted. "Look at this original section. Look at the Island Bank. Look uptown at the First Chemical. I drove the last rivets in those! Yes, other buildings crashed—but you built them! Get out of here, Ransom. You're finished."

He glared after the crestfallen man and then turned abruptly to Lucky. "You look like a starved edition of Flagherty of the *Journal.*"

Lucky nodded, bewildered by the man's dynamic force and thinking in the face of events.

Drega grinned. "I thought the *Journal* always knew what happened."

"We don't," Lucky said. "But as much of the city as I've seen is this way. I guess the world is. How'd your clothes stay together? Nobody else has any."

"Maybe they'll solve the mystery," Drega smiled. "This is a new material made of spun glass. I had everybody try on a suit just before the meeting."

He had Lucky by the arm and led him to the steps to sit down. For an hour he questioned him about what he

had seen coming across town. Three times he cut Lucky short when Lucky started to interject his own questions and bewilderment. Drega held him to actual facts. At the end of the time he nodded sharply.

"The city at least is ruined," he said. He grinned at a cadaverous member of the group, one of the greatest bankers in the world. "That's tough on you, George! All those real estate holdings you swindled out of the depression aren't worth a damn."

"I'll still own the land," the man whined.

This seemed to strike Drega as immensely humorous. He roared with laughter. Lucky had never heard laughter like that outside of very virile rural communities. He thought of a lumberjack he had once known.

Drega said with a devilish grin, "You own the land my tower is supposed to be on, *but I own the tower.* I don't know if there are any courts left, but by golly, if you try to foreclose that land you'll have to deliver my tower intact first, or I'll claim you stole it."

The cadaverous banker sat down and whimpered. He could not cry. There was not enough water in his body to make tears.

VI.

DREGA clapped Lucky on the shoulder. "It's marvelous, my boy!" he boomed lustily.

"What?" asked Lucky.

"The opportunity to build!" Drega said glowingly. "Look at it. A whole city, maybe a whole world, to rebuild. And this time we'll build it *right.*"

Lucky thought of recent rumors. "But you were getting ready to cause another world conflict. Is that building?"

Drega looked pensive. "Few men want war. It isn't profitable in the long run. But war and honorable death is better than chaos and starvation and national hysteria. You probably don't know it, but the world was faced by financial ruin. Governments were bankrupt."

Drega got up and began tapping the big metal doors, inspecting the masonry of the building. He disappeared inside and came out bearing five suits. He was grinning. "My fortune," he said laconically. He gave Lucky one suit. "That is probably the equivalent of several hundred thousand dollars I'm handing you, Flagherty. See that you remember it when you begin muckraking again."

Lucky looked doubtful. "You had your vaults full of gold," he said. "You're probably the only private individual who has any gold."

"Oh, the gold's still there," Drega said casually. "But you can't keep warm in gold." He turned and stared for several moments at the building. "I'm sentimental about this pile," he said. "But it's dead. We'll blow it up first chance we get."

"Odd it's still standing when newer buildings have disappeared," Lucky noted.

Drega shook his head. "It's masonry," he said. "Every building standing in sight is masonry. My bet is the churches are in the best condition of any. St. John's will be in perfect condition. It was designed to last two thousand years." He signalled, and the six men started around the foot of the island. Lucky thought it was easier than working through the strange, torn interior.

Near the telephone building they found Judge Tillson of the Federal Bench. He was standing quite naked with immense sorrow and dignity. At his feet lay his beard, broken off in one piece. The Judge nodded at them abstractedly. "Drega, this ought to make you too busy for wars. But I don't know where the money's coming from to rebuild. They can't raise taxes any more."

Drega grinned. "They can tax George's real estate. But I don't think money will be of much use."

"Not enough gold left?" asked the Judge.

"Maybe too much," Drega said. "Did you ever stop to think how difficult it would be to make money without some basic value to the money?"

LUCKY was thinking of Gamble's cheap gold, when a dirty, naked gang of men came out of the telephone building. The leader had a pair of black pliers in his hand. He saw Drega and waved.

Drega smiled welcome. He seemed to get younger with every new incident. "Trouble-shooting crew, eh? Well, you've got trouble now, Tim. That tool any good?"

"It's the only damned tool in the city. A pair of trick bronze pliers I was fooling with when this—this cockeyedness happened." He laughed mirthlessly. "We come down from uptown to see how things were here. It's lucky. The nitwits down here couldn't figure how to get out of the building. All the stairs are gone."

"Are they getting out?" Drega asked.

The foreman nodded. "We spliced 'em a cable ladder. Long distance cable. It's the only thing I saw with any guts left in it. The ordinary telephone wire cracks up when you touch it. The toll cable was lead-sheathed and air-sealed at both ends."

"Any dynamos left?" Drega asked.

"Sure. Oxidized so solid you'd think they were hunks of ore. Mr. Drega, whatever happened, happened good."

The financier threw an arm around the foreman's neck. "It's Drega to you again, Tim. We've got work to do."

The foreman said, "O. K., Vin." He grinned. "There isn't so much difference between us since three-thirty, eh?"

Drega laughed again, that booming laborer's laugh. "Come along, boys." Without question they fell behind. Lucky wondered if they would have obeyed Prescott so readily.

"I never liked using junk," Drega said. "But maybe we'll have to. That's peculiar about the tools."

The foreman said, "There isn't enough good iron left in the city to salvage a dog chain. The city's corroded. Look at the cornice of that building. Those aren't rust streaks on the stone. That's oxidized iron pushed through the masonry."

"But what's holding the building up?" Lucky asked.

The foreman grunted. "Prayers and rust and some archways they put in for ornament."

The Judge suddenly said, "Gentlemen! It is unbecoming to the dignity of the court to be wholly unclad. Drega, I see you have some clothing there."

Drega's eyes twinkled. "But I couldn't bribe the court."

"Of course not," the Judge declared.

"But I could hire your legal services," Drega continued.

"Hm-m-m," the Judge said, reaching to stroke his missing beard. "Yes, I think under the circumstances that would be constitutional, Drega."

Drega handed him a suit. "By the way," he said. "If the Constitution is in the same condition as some vellum agreements I had in my vaults, it is now a nice little pile of ashes."

"Hm-m-m!" said the Judge. He glanced around. "I had an idea that might have happened."

"ALL RIGHT, boys, let's follow Flagherty," Drega said to the trouble shooters.

Lucky felt a distinct tinge of pleasure at being selected as guide. It was a small enough honor, but it showed trust and confidence, and somehow under the dizzying effect of the weird city it meant

a great deal. The ruin of a brick wall was beside him, and a little over-importantly, Lucky posed himself leaning against the wall to reconnoiter for landmarks. The whole shoreline at the foot of the island had extended itself considerably, and their path around was not the simple walk it had been before—well, before *this*.

"You can count on me," Lucky said largely.

There was a sort of growled Bronx cheer from the brick wall and it crashed over, nearly killing the lot of them. The trouble shooter foreman bristled. "You dope! Don't you know better than to put strain against a ruin?"

Flagherty climbed out of a pile of bricks and clouds of dust ruefully. Drega was laughing and the foreman's temper subsided into humor. It crossed Lucky's mind that humor was going to be very important during the next few months. He laughed himself, past his moment of egotism.

Little knots of hysterical people ran in the distance, and some joined their party as they marched over grasslands and knolls where well-known buildings should be. Drega commented on the evidence of time passed. "I never believed in time machines," he said, "but this could almost be proof."

There was an inlet where the Custom's House should be, with a single remaining cornice on the edge. A bronze plate on the cornice attracted the foreman's eye. He stopped the party for twenty minutes while they worked the corroded, patina-covered plate loose from the rotten stone. The pins holding the plate to the stone were gone, but the metal had grown into the stone itself. They had to knock the stone loose from around the plate, instead of prying the plate from the stone.

Where the Four Star Fish Co., a huge plant, should be, was a grove of ancient oaks. A peculiar thing struck them all about this spot. The grass in the open spaces was greener and finer here, and spots were rampant with thick mattresses of spring flowers.

For an hour they struggled through a difficult brier patch to come out at length twenty feet from where they started and find an easy passage at their feet. There was rolling country and heavy woods ahead, but the woods were broken by patches of dead ground and sand beds. The top of a building jutted out of the crown of a grass-covered hill more than a hundred feet high.

THE GROUP at Prescott's had swelled to over a thousand people. They stood about, dazed or hysterical, or in little groups earnestly asking each other what had happened. Drega nodded to Prescott, gave him one suit, and looked over the crowd.

"The people are stunned," Prescott said.

"So it would seem," Drega mused. His tones turned clipped and authoritative. He signalled the trouble shooters. Temporarily, he made each a sergeant and organized details to search for wood and fire and water, to set up guard lines, to make surveys and exploration parties. He had hysterical people silenced by the expedient of knocking them out.

"In case anybody doesn't know it," he said, "you are faced with the problem of living before you begin worrying. You have very little to work with but your hands. I want every man and woman to go to the high points on this knoll, and carefully study the topography. You are all going to work—or get kicked out—and it will be difficult not to get lost around here."

They marched up the incline, muttering but obedient.

"Things look pretty bad," Prescott said. He relayed the items of news he had picked up from arrivals at the camp.

"They could be worse," said Drega. "The best thing is there won't be enough food for people to get lazy." The word brought peculiar sensations to his mouth. "In fact, I wonder if there is *any* food."

Prescott had ripped away his shred of shirt when he donned the suit. He was holding it like a cherished art object. Drega spoke about it. His own shirt was missing.

"Unusually fine linen," Prescott said with almost automatic pleasure. "Very much like the weave and material found in Tutankamen's tomb. Imagine it, Drega, after three thousand years——"

He stopped abruptly, the two looking at each other with wide eyes. *"Three thousand years—!* It isn't possible—" Prescott murmured.

"It's it," Drega snapped.

Then he began to laugh softly with the appreciation of a clever joke. "Animal life has been in suspended animation."

"That means there's no food left in the world except meat and fish and wild grains. The world will die of scurvy before it can culture fresh crops."

"But some food can be raised by late summer," Lucky said.

"I don't think I can wait that long for dinner," Drega said. He was still chuckling to himself. And thinking of the world's greatest authority on suspended animation. One Gamble—who hated the economic system this catastrophe had wrecked!

THERE had been a vague growing noise from uptown. Now there was a crash and the ground shook. They looked northward and saw the top of the Cartledge Tower turning slowly on a narrow corner of upright building. Five stories beneath had gone out except for that small V. For a second, the tower balanced, then cracked in upon itself and hurtled downward.

There was a greater noise across the river. They looked as nature growled in tortured rage. A single splitting note deafened them as the side of the Palisades began to move. With ponderous slowness, the face of the cliffs began to drop like an immense, mile-long curtain. Millions of tons of rocks and dirt seemed to hang in mid-air, then crashed in a titanic avalanche.

The concussion smote them before the noise. Like a giant mailed fist, it knocked them to the ground. The ground rippled in waves of anguish. The river rose, an unleashed demon.

But the human beings lying along that ridge did not know this. They were knocked senseless and inert.

TO BE CONTINUED.

MATTER is CONSERVED

——*and analysis may be fatal!*

by Raymond A. Palmer

Burne groaned inwardly—they were going to unguessed danger, and he was helpless!

GREGORY BURNE stepped back, brush in hand, and looked at the name he had just painted in crude black letters on the side of the glass-enclosed machine before him. Roughly cubicle in shape it was, and about six feet high.

"Obscurascope," he read aloud. "That ought to describe it."

"Poppycock!" came an angry squawk.

Burne placed the paint can on the window sill of the laboratory, and laid the wet brush carelessly across it. Then he turned.

"Polly," he addressed the brilliantly plumaged bird swinging easily to and fro on its suspended perch, "you talk pretty smart for a parrot. What do you know about the *obscurascope?*"

"Poppycock," repeated the parrot pompously, swinging vigorously.

"That's what I thought." Burne grinned. "Well, I'll explain. But don't get the idea I'm catering to you. I'm just reviewing for my own benefit, just in case there might be something I forgot. After all, I taught you that word. Though sometimes I regret it.

"However, no doubt you've heard of a camera obscura? No? Well, a camera obscura is a dark chamber so contrived that light entering through a tiny aperture casts an image of external objects on the surface opposite the aperture. Simple, eh? And that's where I get the name for my machine.

"But not so simple, this machine," Burne went on. "It took me years to figure it out. Einstein started it, when he said light had mass. That got me to thinking. If light has mass, it must have—but look." Burne picked up a wrench and tossed it to the floor, where it landed with a loud thump.

The parrot stopped swinging abruptly and loosed a startled "Damn!"

"See what I mean?" asked Burne, ignoring the parrot's exclamation. "Anything with mass causes an impression on whatever it hits. There's a nice dent in that floor now. So if light has mass, then it must make its impression somewhere in the universe. But on what?

"Objects become visible only when light strikes them and is reflected back to the observer. It causes heat upon impact. But that isn't the impression I mean.

"Light, having mass, must propel itself through something that also has mass. Scientists have long assumed this medium to be ether, an all-pervading entity, weightless and elastic, filling the universe and permeating solids, liquids, gases. Light and electro-magnetic radiations were assumed to be transmitted through the ether as an undulation. These same scientists tried to detect an ether drift, but failed. Thus, most of them assumed such a medium did not exist.

"When Einstein predicted that light rays would deviate through gravitational influence, they checked him through observations during solar eclipses and found him to be correct. Light undoubtedly had mass. But that's as far as they went. I say it proves the existence of ether, also."

The parrot's eyes were narrow slits of disinterest.

"Damn poppycock," it announced sleepily.

BURNE continued with a grin. "Those old sayings: *Coming events cast their shadows before them,* and *Footprints in the sands of time,* might have some basis in fact. Maybe even 'Damn poppycock'. I liken the ether, or whatever you choose to call it, to a continuous photographic film, undeveloped, but susceptible to impressions from disturbances caused by the collision of light with some object. Similarly, as light causes heat, losing some of its mass in the process, there must also be some change in the ether. And I believe that change leaves a permanent record—a continuous reel of exposed film in the giant motion picture of cosmic history.

"That's where my *obscurascope* comes in. With it, I plan to reconstruct, project on a globular magnetic field about the machine, the image of past events indelibly imprinted on the ether stream. I use a negative light, black light, to do it, much like a phonograph needle picks up the recorded vibrations of sound and reconstructs them.

"Light travels 186,000 miles a second, so it shouldn't take long to traverse even billions of miles into space, along the recorded film of the past, all without leaving the laboratory."

Burne finished and eyed the parrot with a quizzical look. The bird's head was tucked beneath its wing and it was obviously fast asleep. Burne chuckled and turned to his machine.

It looked like a six-foot square of glass, ribbed with sturdy steel ribs and braces. The glass was an inch thick, but amazingly clear and permitting undistorted vision. Atop it was a massive globe filled with complicated filaments, the black light projector. Inside were oxygen tanks for a maintenance of an even supply of breathable air, since it would be tightly sealed against outside influences.

He stepped inside the massive glass door and inspected the bank of power tubes to create the magnetic screen, the giant batteries below them, the small but sturdy dynamo with its tiny gasoline engine with exhaust leading through the wall outside, for emergency charging of the batteries. The gas-tank meter registered full. In one corner was a large box of concentrated foodstuffs and a keg of pure water.

Burne closed the door behind him and an oxygen tank began a sibilant hissing while the studs squeaked beneath his hands, tightening the door into rigid immobility in its rubber setting.

Confident though he was as he seated hmself before the control panel, nevertheless his heart pumped oddly when he laid his hand upon the lever. Blood pounded audibly in his ears, even above the hissing of the oxygen. How would it all happen? Would the images of days and nights seem to flash by at the increasing speed as he depressed the lever, gradually merging into a quivering gray blur on the invisible globe-shaped magnetic field about the ship? Would the walls about him fade, be replaced by other walls, fade again, and reveal the growth of a giant mushroom city of phantoms—buildings rising and falling with the progress of the projected ether stream under the influence of the black light?

ON THE VERGE of his experiment, Burne hesitated. Perhaps his theory of the ether stream was wrong. Would the black light draw back the filmed record of time from the depths of space? Or would the *obscurascope* itself be drawn from the Earth? After all, that was the eventuality he had in mind when he installed the foodstuffs, water, and oxygen tanks. And if it did, could he return along the ether continuum by reversing the black ray?

Burne's confidence began to ooze from him, and to circumvent a change of heart, he flung the lever abruptly down to full speed.

Instantly a numbing influence paralyzed his muscular functions. Panic flooded his brain as he discovered that he was unable to move. Even his eyes were riveted upon his hand and he could not force them from it.

As he stared, that hand became all that was existent to him and his terror grew. For it shriveled and shrank and grew old! He felt his entire body aging, becoming wracked with pain and stooped under an incredible weight. Desperately he struggled against the terrible paralysis, but he was powerless to stop the machine in its headlong rush to his own destruction.

Direction. That was the one factor he hadn't considered. No exposed ether film this, but virgin ether stream! What effect would the black light have on that?

Suddenly a wracking pain and a wave of blackness overwhelmed him, to be dispersed almost immediately by a strange awareness. He knew, without seeing, that the hand which had riveted his attention was no longer upon

the lever, but in its place a cloud of dust floated with infinite slowness to the floor of the machine. He hung in space and knew his body lay beneath him in dust upon the floor!

Ages seemed to pass.

A single speck—an atom of dust—remained floating and his awareness centered upon it. He entered it—and knew again that he had a body!

Frantically he struggled to release his muscles from the paralysis, and his mind from the nightmarish delusions that engulfed it. The effect of the machine seemed to be lessening. Gradually he reached a slim, long-fingered hand up—up—up with enormously tiring effort to that earnestly desired lever. One last surge of energy and he clasped it with a cry of relief—pushed it back.

The *obscurascope* whirled about him, and he plunged to the floor in a fit of dizzyness. For a time he lay there struggling to control his spinning senses. Oxygen hissed with a welcome sound while the revivifying ozone replenished his starved tissues.

Finally, with a sob of anguish, he raised himself to a sitting position, the sweat of weakness pouring from him. He became aware that he was entirely nude. The startling fact led almost instantly to other discoveries, still more stunning. Those pipestem legs—that puny frame. *What had happened to him?*

BURNE STRUGGLED to his feet in a haze of conflicting emotions. Curiosity waged a battle with fear, and curiosity won as with a great effort he calmed his whirling brain and viewed his present situation with something resembling reason. After all, he was alive. He had been wrong, that was all. He had traversed the undeveloped film of future cosmic history, and it had reacted to the black light, causing this weird evolution of his body. Could it be that the ether stream controlled the course of events, of evolution? That it was not the film at all, but the developing medium——

The thought struck him forcefully and his curiosity grew. If this had happened to him, what had happened to the world outside the machine? Trembling with eagerness he peered through the thick glass. For a moment he stared. Blankness crept over his face and incomprehension into his eyes.

There, just as he had left it, was the prosaic interior of his own experimental laboratory.

Like one dazed by a blow, Burne stumbled to the control panel. With wondering eyes he gazed at the dials. They registered over eighteen million miles.

Miles!

"Something is wrong," he whispered, passing his trembling hand before his eyes. "Either these indicators, or it may be that the machine reached the peak of its forward swing only to reverse its direction and return to its starting point. In that event, why am I like this and the laboratory unchanged? I——"

He became aware of the whispering sound of his voice when a terrifying pain beset his throat. "My voice," he gasped, "it's gone!"

His frantic utterances served not only to accentuate the pain that wracked his vocal organs, but wrenched his mind back from the sea of terror upon which it had again embarked. Quickly he ceased his attempts at making his voice audible. It was as if those vocal cords had never been used. Gingerly, fondling his aching throat, he made his way to the door of the *obscurascope*. A cloud of dust rose about him as he scuffled through a heap of it lying on the floor, causing an uncanny prickling sensation to run along his spine. He remembered the weird sensations of his voyage and his illusion of death and disintegration, violently shocked by the realization that his vision had been reality. Terror

again struggled to overflow its confines, and he fumbled frantically at the studs of the door. His ridiculously slim, weakened fingers bled as he wrenched desperately at the door. To his reduced stature the door loomed like an immovable monster, but at last he conquered the studs and the barrier swung aside.

Breath whistling shrilly, he collapsed upon the floor of the laboratory, fighting to regain his composure. It was many minutes before his puny frame ceased to quiver, and for more minutes he lay resting upon his back, gazing about the familiar laboratory. Curiously, the air seemed unnaturally heavy and he could not cease panting.

At length he rose to his feet and crossed to the mirror on the washstand. He was more prepared now for unusual revelations, and he did not flinch as he beheld the weird countenance that confronted him. A huge, bulbous head balancing precariously upon ridiculously tiny shoulders; a pair of round eyes, carrying an uncanny appearance of power in their depths; a mouth shaped like the shutter of a camera lens; a mere slit of a nose finishing off a face with a tiny, but strangely firm chin. It might have been an artist's conception of the countenance of a being from another planet, so strange was it to his dazed mind.

EXPERIMENTALLY he pursed his shutterlike mouth and uttered a piercing whistle. So astoundingly deafening were its qualities that he sprang back in startled alarm, sending the mirror crashing in fragments to the floor.

Startlingly, an answering raucous scream came from behind and he whirled to face the fluttering shape of the parrot, eying him in fright from its wildly swaying perch.

"Poppycock!" it screamed. "Damn poppycock!"

Suddenly it flew directly toward him, and its wings struck him a stunning blow on the head. Sharp talons scratched at his face, at his eyes. They gashed him deeply and he felt blood running down his cheek.

In desperation he picked up the wrench which still lay on the floor where he had thrown it during his whimsical explanation to the parrot. The bird returned to the attack and he lashed out with it. There was a sickening crunch. With an agonized squawk the parrot plopped soddenly to the floor. It flopped about a few times before lapsing into shuddering limpness.

Once again a piercing whistle left his lips as he attempted to cry out in agonized dismay at the death of his pet.

As if an echo of the piercing scream of that whistle, he heard the faint tinkle of the doorbell below. He stood stock-still, listening while the housekeeper's movements in answer came dully to his ears. Funny how extremely sensitive his hearing had become. His laboratory was well insulated against disturbing sounds.

Down below, the door opened and closed. Voices sounded for a moment. Then the sound of footsteps on the stairs.

Panic assailed him as the footsteps approached the door of his laboratory. Quickly he darted behind the huge bulk of the *obscurascope* and crouched down. What if he were discovered? His present plight would only be accentuated by publicity. Any chance of discovering a means of retracing his steps back to normalcy would be impaired. He held his breath as he recognized the timid knock of his Irish housekeeper.

"Ain't thot odd, now?" he heard. "Oi know he's in there."

A deep masculine voice startled him. "Maybe something's happened to him?"

"Knock again," suggested another male voice.

Sweat beaded upon Burne's forehead as his housekeeper complied. The two voices belonged to Jack Dunn and Carl

Manning, his two best friends, laboratory comrades who occasionally discussed their problems with him. Should he open to them? His voice was entirely useless, and he doubted their reactions upon beholding his weird evolution. No, he would let them go.

"Have you a key, Mrs. Crowley?" asked the first speaker.

"Glory be, no, Misther Dunn," returned the housekeeper. "Misther Burne has the only key himself. You know, he allows no one in the laboratory unless he's afther bein' with them. He even watches me whin Oi clean and scrub the room."

Burne clapped his tiny hands to his delicate ears in pain as the mighty fist of Jack Dunn shook the door.

"Greg!" shouted Dunn. "Are you in there?"

A moment's pause, then a few quiet words caused Burne to leap in alarm.

"Come on, Carl, we've got to break this door down!"

IN HIS excitement and alarm, Burne forgot his destroyed voice and attempted a loud shout of "Don't!" Instead, a piercing multiple-toned whistle echoed through the room. Burne cowered down in dismay.

"What's that?" came the startled voice of Carl Manning.

"There's something wrong in there!"

The heavy door quivered under the mighty assault of Dunn's broad shoulders. Burne swept a frantic glance about the room and stepped from his concealment in indecision. Splinters began to fly from the panels of the battered door. Both men were now flinging their husky frames against the stubborn surface. In desperation Burne whistled a series of commands in his strange whistling language whose tonal range and complication of chords rang through the room like a dozen reed instruments gone wild. The battering at the door ceased.

"Who's in there?" shouted Manning. "Open up, or we break the door down!"

For a moment Burne hesitated and then stepped to the door and shot the bolt back. It swung open. Face to face, the trio outside confronted him in amazement and horror.

A scream mounted to Mrs. Crowley's lips and burst forth startlingly.

"Good gosh!" exclaimed Dunn, his eyes widening as he beheld the misshapen figure before him.

"What is it?" asked Manning in awe.

Burne stepped forward a bit with his tiny arms raised above his head in an attitude of peace, whistling a few sentences.

Mrs. Crowley's terrified wail burst forth again and she fled precipitately down the stairs, wailing dismally about "the little folk."

"Stop her!" shouted Dunn. "We can't have outsiders butting in on this yet."

Manning dashed after the woman and his voice could be heard remonstrating with her on the floor below. Meanwhile Dunn and Burne remained facing one another in silent survey; the former in unbounded curiosity and careful watchfulness; Burne in nervous apprehension.

"Who are you?" asked Dunn abruptly.

Desperately Burne tried to make his vocal cords function, but the effort only brought agonizing pain and a shortness of breath. In despair at his failure he whistled wildly and Dunn jumped.

"Quit that!" he said sharply. "I'm not used to such an infernal racket. What's the idea, anyhow?"

Burne shrugged his shoulders helplessly and Dunn leaned forward in amazement.

"Do that again," he requested.

Burne complied, shrugging his little shoulders several times in quick succession.

"I'll be short-circuited!" gasped

Dunn. "Say, little fellow, do you understand me?"

Burne fairly jumped in his excitement and nodded vigorously.

"Well, I'll be hanged!"

"What for?" came Manning's voice from the doorway.

Dunn whirled about in excitement. "Carl, this—whatever he is—understands every word I say!"

Manning regarded Burne dubiously for a moment. "Do you?" he asked.

Burne nodded again, vigorously.

"Then why can't you answer?"

Burne pointed excitedly at his throat and made motions indicative of despair.

"Something wrong with your voice? How about writing?"

A WAVE of relief surged over Burne as he nodded eagerly in answer to the suggestion. Now he would be able to explain. He took the notebook Dunn produced and grasped the pencil with trembling hands. Placing the book upon a chair, he stood before it and wrote several sentences hastily. Triumphantly he handed them to his friend.

Dunn accepted the notebook and scanned it with alacrity, but a puzzled expression crossed his face as he beheld the weird conglomeration of cabalistic signs written in a closely packed line.

Impatiently Manning snatched the book from his hands and glanced at it himself, only to stop in blank amazement upon beholding the incomprehensible characters.

"What's this?" he asked blankly.

"I'll be hanged if I can make it out," returned Dunn in bewilderment. "It's just a bunch of chicken tracks."

Burne felt an ominous sinking sensation in the pit of his stomach and he gazed anxiously at the bewildered faces of the two men. What had happened to him? What queer mixture of personalities was he? Writing which to him seemed perfectly legitimate and comprehensible English was nothing but chicken tracks to them. Cold sweat broke out on his forehead. Was he going mad—already insane?

"Try writing something yourself," suggested Dunn.

"I don't believe it will be understood."

"And why not?"

"Because I don't believe he understands a word of English!"

"But he knew what we said," protested Dunn.

"Yes, but not through his knowledge of English. Jack, I'll bet my last dollar that little fellow can read our minds!"

Disbelief spread over Dunn's large face. "How do you figure that out? I don't believe in that mind reading stuff, especially by this little fellow. He must be some freak escaped from a circus. How he ever got in here is a mystery to me. And where is Greg? If he knew what was going on here, he'd be boiling mad. Greg won't stand for any monkeying in his laboratory."

Manning, his long, lean, intelligent face expressing impatience at the doubts of his companion, gazed queerly at Burne, who all this time stood in helpless stillness, thoughts whirling madly as he turned Manning's astounding revelation over in his mind.

"Jack, do you know what Greg was doing in his laboratory lately?" asked Manning abruptly.

Dunn looked around. "Well, looks like he's built himself some sort of newfangled oxygen chamber. I can't make it out though. Worst mess I ever saw him construct. Look at that name painted on it. *Obscurascope*. Whatever that is."

"Well, that machine is nothing else but the ether machine he was always talking about."

"Ether machine?" Dunn's brow wrinkled.

"Yes. And Greg must have taken a trip in it already. He undoubtedly went

somewhere with it and there met with an accident. Perhaps this thing," indicating Burne, "stole the machine and came back with it."

"A trip—inside these four walls?" Dunn's voice held a note of laughter.

"Not actually. In some extra-dimensional manner," explained Manning patiently.

"By gosh," exclaimed Dunn. "I believe you're right! It's lucky we arrived when we did. Some way or other we've got to rescue poor Greg. This thing here, whatever it is, will have to take us back to where he got the machine."

BURNE LEAPED forward suddenly, whistling shrilly. His broad forehead dripped sweat in his tremendous effort to make himself understood. But his two friends merely gazed guardedly at him, apparently suspecting some antagonistic effort, but sure of their prowess to circumvent it.

"Looks like you've struck the nail on the head, all right," observed Dunn. "He's surely excited."

"Yes," admitted Manning. "But let's take a look at that machine. Perhaps I can tell something from the meters."

As he moved forward he kicked the dead body of the parrot.

"Greg's parrot!" he exclaimed. "It's dead!"

Dunn looked at Burne with an angry frown. "If I thought this thing killed it——" He halted with an expressive motion of his huge hands and mounted guard over Burne, a baleful look in his eyes, while Manning inspected the interior of the *obscurascope*.

In a moment his voice came excitedly:

"The meters read over eighteen million miles! No wonder that little fellow looks strange!" But his voice changed as he stepped to the door of the machine and stood scratching his head.

"I don't get it," he muttered.

"Don't get what?" asked Dunn curiously.

"That eighteen million miles. Where, within eighteen million miles, is there a world from which this little fellow could come? And Greg never said anything about inventing a spaceship. He distinctly elucidated a theory of ether-drift, the stream of events, time——" Manning slapped his thigh in sudden excitement.

"Jack, that isn't miles, on that indicator, it's years! This isn't an ether machine, or a spaceship, it's a time machine!"

"A time machine?" Dunn was patently doubtful.

"I understand it all now," Manning went on swiftly. "Greg spoke of reprojecting the film of cosmic events, as recorded by light on the ether stream. He didn't know it, but what he proposed to do was figuratively travel in time. He used a form of magnetic black light, and it acted differently than he expected. Instead of unreeling the events of the past, it plunged him into the virgin ether stream. And there, something happened, and this—this creature—you'll notice it's sexless—somehow stole the machine from him and was returned down the stream!"

Burne stood thunderstruck, oblivious for the moment of his friends. That was the answer! Einstein's fourth dimension, time, was measured by the ether stream!

Dunn's voice broke in on his thoughts again: "Carl, I think you've hit the nail on the head. It all ties in."

"And lucky for us, too," Manning put in. "We won't need to risk having the little thief guide us back. We know exactly to what point in the ether stream we must go. I have no doubt that we'll find Greg there." He glanced at the clock.

"We'll start at once," he decided. "You tie up our captive and we'll get going. We'll arrange to come back

about the same time we left, so he won't have time to get away."

BURNE WENT wild at this, and leaped with rabbitlike quickness toward the door.

"No you don't!" shouted Dunn, flinging his huge body forward with astounding speed for his size. "I've got you!"

His great hand clasped the fleeing Burne about the ankle and he came to the floor with a squashy thud. The shock dazed him and pain shot all over his frail body. With a despairing whistle, he lay still.

"That's better," said Dunn. "And now, I'll tie you up so you won't have a chance to try it again." Taking a loop of supple insulated wire from the wall, he bound Burne tightly to a chair, winding his tiny figure many times about with the soft, but strong wire.

Dimly Burne was aware of the forms of his two friends moving about the room preparatory to making the trip into the ether stream in search of him. He groaned inwardly at the prospect of seeing them placed in his own predicament. And sweat broke out on his forehead as he realized that there were billions of chances to one against either one of them reaching a future incarnation at the same point in the ether stream as he. Perhaps Dunn would find himself carnate in fifteen million years. And should Dunn stop the machine, what would happen to Manning? He would be doomed to bodiless time-suspension, helpless except for the chance movements of the machine under Dunn's guidance. In such an event, would he, Burne, be able to loose his bonds and repair the damage done? Burne nearly screamed aloud as he realized the impossibility of his ever being able to do anything for the other two were they stranded in the time stream as he was.

"What's all this dust on the floor?" wondered Dunn aloud.

"Don't know," returned Manning. "It's got me worried though."

Dunn looked up in startled horror. "You don't think——"

"I hope not," Manning hastened to halt his words. "Such a thing——" He fell silent, realizing the import of his words, their terrible significance.

He picked up a handful and carried it over to the laboratory bench to attempt an analysis. Dunn waited patiently while he worked. Finally Manning ceased his labors, a worried look on his face, but he said nothing.

"What did you find?" queried Dunn. "What is it?"

"I'm not sure," said Manning slowly. "It would take too long to analyze it thoroughly. Seems to be a combination of elements. Carbon, traces of phosphorus, iron, and so forth. But let's go. We've got to find Greg now or never. This thing," he indicated Burne, "will be safe until we return, which will be only a few minutes at the most."

Burne, his head clearing rapidly now from the effects of his fall, watched the two men enter the ether machine with straining eyes. He pulled and squirmed against his bonds to no avail. He whistled repeatedly and wildly.

"Pipe down, little fellow, before you bust a gut," advised Dunn caustically before he swung the door shut.

Burne desisted in despair, watching dully as Dunn tightened the thumb screws. At length all was in readiness. Manning was seated at the controls and Dunn hung tightly to a handrail, in doubt as to what he should expect. In spite of the horribleness of his situation, and the prospect of a similar predicament for his friends, Burne waited interestedly for what would occur. Perhaps he would obtain some clue which would make it possible for him to solve his difficulty. He watched closely as Manning drew the lever down.

Nothing happened.

Burne breathed a sigh of relief. The machine would not function. His two friends were in no danger. He watched interestedly as they fumbled around for several moments and then gave up in disgust. They opened the door and stepped forth.

The little man attempted a smile, but failed miserably with his shutterlike mouth. Instead he felt his face pucker up into a horrible grimace.

DUNN, who was just stepping from the ether machine, looked at him with open mouth. Then his eyes gleamed and his face hardened.

"Carl," he said, "that little imp is making faces at us."

"Probably because we couldn't make the machine work," said Manning. "In his position, I believe I'd make faces, too."

"Well," said Dunn grimly, "no little squirt like that makes faces at me and gets away with it. We're going to have another try at that *obscurascope*, but this time that pipestemmed freak is going to sit at the controls."

He doubled his huge fist and thrust it under Burne's almost non-existent nose.

"Little fellow," he said sharply. "I know you can understand me. We're going to get into that machine now and you are going to take us to where Greg is. And if you don't, I'm going to kill you. I'd have no more compunction killing you than I would a snake. For all I know, you aren't even human, even if you look like something cut out of the comic paper. Come on."

Burne shrank back under the menace of the fist, and squirmed uneasily. Dunn unwound the lengths of wire that secured him, then grasped him by one arm.

"What if he tries some trick on us?" Manning was cautious as always.

"He won't," returned Dunn grimly. "I meant every word I said. If he wants to live, he'll take us pronto to the place he left Greg."

"All right," Manning yielded, "it looks as if that were the only way. I'll close the door while you get him onto that seat. Looks as if you'll have to hold him, or he can't reach the levers."

"He reached them before," said Dunn, plumping Burne down in the seat. "Now get busy," he advised menacingly as the last thumb nut squeaked into place.

Burne glanced about in desperation. If the machine worked, and he was sure it would under his own manipulations, he would plunge his two friends into his own horrible position, or an even worse one. And what would happen to himself? Would his second body fall to dust as had his first?

Burne determined that the machine should not work. Covertly he inspected the huge cable that ran under the control board. A short in that would ruin the machine entirely.

"No you don't," came Dunn's warning voice. "No funny business. I'm watching you. There's no need for you to pay any attention to anything but those controls and those meters. We want to go to the place you left Greg. And snap into it, or I'll break your legs!" He gripped one of Burne's legs and Burne winced.

What was he going to do? He gazed in despair at the dials. They registered exactly 18,000,010 years in the ether stream. His eyes widened as he comprehended the extra ten years. They gave him an idea. Why not try the machine for ten years backward? He could then determine what effect traveling in that direction on the ether stream might have on his companions. If they became younger his last straw would have failed. But if they didn't—Burne was sure that travel in that direction was impossible. One could not change what was. But he, himself, should be able to traverse what was to him the undeveloped portion of the stream, even

though his body was a premature product of its evolution.

HE GRASPED the lever and set his eyes upon the dial. Ten years back, no more, no less. And then, he would see. He was positive the body he now occupied was more than ten years old. There would be no danger to himself. And perhaps Dunn and Manning would thank him for the youth he might bestow on them if the machine really worked into the past. He pulled the lever down an infinitesimal bit, his eyes glued to the dial. Elation filled him as the needle moved slowly back. Nine—six—two—— He snapped the lever back and swung about to gaze at his comrades. They were close beside him, gazing at him in suspicion, but they were unchanged! Burne's hopes leaped and his eyes burned. He himself felt slightly younger!

Dunn gripped his leg again. "Come on," he said tensely. "You've done something—keep on."

Burne turned back to the lever. A triumph filled him. Everything was going to be all right after all. He would return to his own place in the ether stream, regain his own body, and explain to his astounded comrades. He pulled the lever down to its limit, bound backward. He could not go too far—that was proved by the lack of effect upon his two friends. He felt himself shrinking, his body growing young. He sensed the removal of Dunn's hand from his leg and saw the horrified look on his face. The machine was functioning perfectly.

Suddenly he knew that he was again disembodied—become only an awareness—an existence that he could not understand. He knew, without seeing, that Dunn and Manning gazed dumfounded at the empty seat before the controls—felt their mental consternation. But strangely enough, there was no dust settling to the floor.

And then an agonizing pain struck him and he descended abruptly into the blackness of embodied unconsciousness. The last thing he saw before he collapsed to the floor was the needle of the indicator swinging back to zero.

JACK DUNN stared down at the figure of Gregory Burne, lying before him, blood oozing from a great wound in his chest.

"It's Greg!" he exclaimed. "And he's hurt!"

Manning bent over the prostrate figure a long, anxious moment, then rose to his feet shaking his head.

"He's dead!" he said in hoarse bewilderment.

"Dead!" echoed Dunn. "Dead!" His great fists clenched.

"If I had that little imp in my hands now——" He groaned, "I'd——" He didn't finish the threat.

Manning stood a long moment with a stricken look on his face, thinking.

"Jack," his voice sounded strained and unnatural, "that little imp, as you call him—you wouldn't have hurt him."

Dunn was surprised. "Why not? The murdering little——"

"Stop! Jack, can't you realize that little fellow was Gregory Burne, as he will exist eighteen million years from now?"

As Dunn's jaw dropped, Manning went on: "Somehow, ether and time are connected. Maybe ether *is* time, in its concrete dimensional form. Anyway, Greg traversed deep into its hidden reaches. And who can say how much time a million miles of ether stream means, when translated into its corresponding value? So, under the time influence of the ether stream, he aged and died in a few seconds, his body even becoming dust with great distance. And since nothing is ever lost in the universe, the mysterious life-force that was Gregory Burne reached the point in

the ether stream where it again became carnate. Then, able to control the machine, he halted it where it was and stepped out into his unaffected laboratory. Then, no doubt, the frightened parrot attacked him and he was forced to kill his own pet. And shortly after, we broke in upon him and like fools, tried to plunge ourselves into the same plight as he; tried to force him to do it. And small wonder he couldn't write English. How write something you never learned?"

Understanding crept into Dunn's eyes as Manning finished, and he turned to gaze down at the mangled body of his friend.

"I get it all now," he whispered. "But what killed him?"

Manning opened the door of the ether machine and strode over to the laboratory bench. He lifted a test tube of dust in his hand.

"This," he said in pained tones, "is what killed Gregory Burne. Our ignorance—and a handful of dust!"

OF THE 500 KNOWN ELEMENTS—

MORE than two hundred occur in nature. Five hundred elements——? So physicists report, since they recognize three different hydrogen atoms—hydrogen, deuterium and tritium—and more than ten kinds of lead. In fact, of all the chemists "elements" but few have only one type-form. Since each is demonstrably different in its behaviour in physicists' apparatus, they constitute different physical elements.

SOME two hundred of these various forms occur in nature, but many others are so unstable that they cannot exist long enough to persist in nature. Whatever quantity of the radioactive sodium isotope may have existed in the Earth originally, it broke down long since, for its half-life is but 25 minutes.

IN ADDITION to the unstable isotopes of known elements, physics has synthesized (by transmutation) elements that do not exist in the chemists' tables. While the radioactive sodium isotope reacts to the chemists' reagents as ordinary sodium would, the addition of a neutron to a uranium atom produces a chemical substance the chemist cannot place on his table. It is a new element, heavier than any he knows.

"All I can hear," snapped the doctor, "is hair scratching on the stethoscope diaphragm."

HYPERPILOSITY

by

L. Sprague de Camp

WE all know about the brilliant successes in the arts and sciences, but, if you knew all their stories, you might find that some of the failures were really more interesting."

It was Pat Weiss speaking. The beer had given out, and Carl Vandercock had gone out to get some more. Pat, having cornered all the chips in sight, was leaning back and emitting vast clouds of smoke.

"That means," I opined, "that you've got a story coming. O. K., spill it. The poker can wait."

"Only don't stop in the middle and say 'That reminds me', and go off on another story, and from the middle of that to another, and so on," put in Hannibal Snyder.

Pat cocked an eye at Hannibal. "Listen, mug, I haven't digressed once in the last three stories I've told. If you can tell a story better, go to it. Ever hear of J. Román Oliveira?" he said, not waiting, I noticed, to give Hannibal a chance to take him up.

He continued: "Carl's been talking a lot about that new gadget of his, and no doubt it will make him famous if he ever finishes it. And Carl usually finishes what he sets out to do. My friend Oliveira finished what he set out to do, also, and it should have made him famous. But it didn't. Scientifically, his work was a success, and deserving of the highest praise. But humanly, it was a failure. That's why he's now running a little college down in Texas. He still does good work, and gets articles in the journals, but it's not what he had every reason to suspect that he deserved. Just got a letter from him the other day—it seems he's now a proud grandfather. That reminds me of my grandfather——"

"Hey!" roared Hannibal.

Pat said "Huh? Oh, I see. Sorry. I won't do it again." He went on: "I first knew J. Román when I was a mere student at the Medical Center and he was a professor of virology. The J in his name stands for Haysoos, spelled J-e-s-u-s, which is a perfectly good Mexican name. But he'd been so much kidded about it in the States that he preferred to go by Román.

"You remember that the Great Change—which is what this story has to do with—started in the winter of 1971, with that awful flu epidemic. Oliveira came down with it. I went around to see him to get an assignment, and found him perched on a pile of pillows and wearing the awfullest pink and green pajamas. His wife was reading to him in Spanish.

"'Leesten, Pat,' he said when I came in, 'I know you're a worthy student, but I weesh you and the whole damn virology class were roasting on the hottest greedle in Hell. Tell me what you want, and then go away and let me die in peace.'

"I GOT my information, and was just going, when his doctor came in—old Fogarty, who used to lecture on sinuses. He'd given up G. P. long before, but he was so scared of losing a good virologist that he was handling Oliveira's case himself.

"'Stick around, sonny,' he said to me when I started to follow Mrs. Oliveira out, 'and learn a little practical medicine. I've always thought it a mistake that we haven't a class to train doctors in bedside manners. Now observe how I do it. I smile at Oliveira here, but I don't act so damned cheerful that he'd find death a welcome relief from my company. That's a mistake some young doctors make. Notice that I walk up briskly, and not as if I were afraid my patient was liable to fall in pieces at the slightest jar——' and so on.

"The fun came when he put the end of his stethoscope on Oliveira's chest.

"'Can't hear a damn thing,' he snorted, 'or rather, you've got so much hair that all I can hear is the ends of it scraping on the diaphragm. May have to shave it. But say, isn't that rather unusual for a Mexican?'

"'You're jolly well right she ees,' retorted the sufferer. 'Like most natives of my beautiful Mehheeco, I am of mostly Eendian descent, and Eendians are of Mongoloid race, and so have little body hair. It's all come out in the last week.'

"'That's funny——' Fogarty said.

"I spoke up: 'Say, Dr. Fogarty, it's more than that. I had my flu a month

ago, and the same thing's been happening to me. I've always felt like a sissy because of not having any hair on my torso to speak of. Now I've got a crop that's almost long enough to braid. I didn't think anything especial about it——'

"I don't remember what was said next, because we all talked at once. But when we got calmed down there didn't seem to be anything we could do without some systematic investigation, and I promised Fogarty to come around to his place so he could look me over.

"I did, the next day, but he didn't find anything except a lot of hair. He took samples of everything he could think of, of course. I'd given up wearing underwear because it itched, and anyway the hair was warm enough to make it unnecessary, even in a New York January.

"The next thing I heard was a week later, when Oliveira returned to his classes, and told me that Fogarty had caught the flu. Oliveira had been making observations on the old boy's thorax, and found that he, too, had begun to grow body hair at an unprecedented rate.

"Then my girl friend—not the present missus; I hadn't met her yet—overcame her embarrassment enough to ask me whether I could explain how it was that *she* was getting hairy. I could see that the poor girl was pretty badly cut up about it, because obviously her chances of catching a good man would be reduced by her growing a pelt like a bear or a gorilla. I wasn't able to enlighten her, but told her that, if it was any comfort, a lot of other people were suffering from the same thing.

"Then we heard that Fogarty had died. He was a good egg and we were sorry, but he'd led a pretty full life, and you couldn't say that he was cut off in his prime.

"Oliveira called me to his office. 'Pat,' he said, 'you were looking for a chob last fall, ees it not? Well, I need an asseestant. We're going to find out about this hair beezness. Are you on?' I was.

"WE STARTED by examining all the clinical cases. Everybody who had, or had had, the flu was growing hair. And it was a severe winter, and it looked as though everybody were going to have the flu sooner or later.

"Just about that time I had a bright idea. I looked up all the cosmetic companies that made depilatories, and soaked what little money I had into their stock. I was sorry later, but I'll come to that.

"Román Oliveira was a glutton for work, and with the hours he made me keep I began to have uneasy visions of flunking out. But the fact that my girl friend had become so self-conscious about her hair that she wouldn't go out any more saved me some time.

"We worked and worked over our guinea-pigs and rats, but didn't get anywhere. Oliveira got a bunch of hairless Chihuahua dogs and tried assorted gunks on them, but nothing happened. He even got a pair of East African sand rats — *Heterocephalus*—hideous-looking hairless things—but that was a blank, too.

"Then the business got into the papers. I noticed a little article in the New York *Times*, on an inside page. A week later there was a full-column story on page 1 of the second part. Then it was on the front page. It was mostly 'Dr. So-and-so says he thinks this nation-wide attack of hyperpilosity' (swell word, huh? Wish I could remember the name of the doc who invented it) 'is due to this, that, or the other thing.'

"Our usual February dance had to be called off because almost none of the students could get their girls to go. Attendance at the movie houses had fallen off pretty badly for much the

same reason. It was a cinch to get a good seat, even if you arrived around 8:00 p. m. I noticed one funny little item in the paper, to the effect that the filming of 'Tarzan and the Octopus-Men' had been called off because the actors were supposed to go running around in G-strings. The company had found that they had to clip and shave the whole cast all over every few days if they didn't want the actors and the gorillas confused.

"It was fun to ride on a bus about then and watch the people, who were pretty well bundled up. Most of them scratched, and those who were too well-bred to scratch just squirmed and looked unhappy.

"Next I read that application for marriage licenses had fallen off so that three clerks were able to handle the entire business for Greater New York, including Yonkers, which had just been incorporated into the Bronx.

"I was gratified to see that my cosmetic stocks were going up nicely. I tried to get my roommate, Bert Kafket, to get in on them too. But he just smiled mysteriously, and said he had other plans.

"Bert was a kind of professional pessimist. 'Pat,' he said, 'maybe you and Oliveira will lick this business, and maybe not. I'm betting that you won't. If I win, the stocks that I've bought will be doing famously long after your depilatories are forgotten.'

"As you know, people were pretty excited about the plague. But when the weather began to get warm, the fun really started. First the four big underwear companies ceased operations, one after another. Two of them were placed in receivership, another liquidated completely, and the fourth was able to pull through by switching to the manufacture of table-cloths and American flags. The bottom dropped completely out of the cotton market, as this alleged 'hair-growing flu' had spread all over the world by now. Congress had been planning to go home early, and was, as usual, being urged to do so by the conservative newspapers. But now Washington was jammed with cotton-planters demanding that the Government Do Something, and they didn't dare. The Government was willing enough to Do Something, but unfortunately didn't have the foggiest idea of how to go about it.

"ALL THIS TIME Oliveira, more or less assisted by me, was working night and day on the problem, but we didn't seem to have any better luck than the Government.

"You couldn't hear anything on the radio in the building where I lived, because of the interference from the big, powerful electric clippers that everybody had installed and kept going all the time.

"It's an ill wind, as the prophet saith, and Bert Kafket got some good out of it. His girl, whom he had been pursuing for some years, had been making a good salary as a model at Josephine Lyon's exclusive dress establishment on Fifth Avenue, and she had been leading Bert a dance. But now all of a sudden the Lyon place folded up, as nobody seemed to be buying any clothes, and the girl was only too glad to take Bert as her lawful wedded husband. Not much hair was grown on the women's faces, fortunately for them or God knows what would have become of the race. Bert and I flipped a coin to see which of us should move, and I won.

"Congress finally passed a bill setting up a reward of a million dollars for whoever should find a permanent cure for hyperpilosity, and then adjourned, having, as usual, left a flock of important bills not acted upon.

"When the weather became really hot in June, all the men quit wearing shirts, as their pelts covered them quite as effectively. The police force kicked so about

having to wear their regular uniforms, that they were allowed to go around in dark blue polo shirts and shorts. But pretty soon they were rolling up their shirts and sticking them in the pockets of their shorts. It wasn't long before the rest of the male population of the United States was doing likewise. In growing hair the human race hadn't lost any of its capacity to sweat, and you'd pass out with the heat if you tried to walk anywhere on a hot day with any amount of clothes on. I can still remember holding onto a hydrant at Third Avenue and Sixtieth Street and trying not to faint, with the sweat pouring out the ankles of my pants and the buildings going 'round and 'round. After that I was sensible and stripped down to shorts like everyone else.

"In July Natasha, the gorilla in the Bronx Zoo, escaped from her cage and wandered around the park for hours before anyone noticed her. The zoo visitors all thought she was merely an unusually ugly member of their own species.

"If the hair played hob with the textile and clothing business generally, the market for silk simply disappeared. Stockings were just quaint things that our ancestors had worn. Like cocked hats and periwigs. One result was that the economy of the Japanese Empire, always a pretty shaky proposition, went completely to pot, which is how they had a revolution and are now a Socialist Soviet Republic.

"NEITHER Oliveira nor I took any vacation that summer, as we were working like fury on the hair problem. Román promised me a cut of the reward when and if he won it.

"But we didn't get anywhere at all during the summer. When classes started we had to slow down a bit on the research, as I was in my last year, and Oliveira had to teach. But we kept at it as best we could.

"It was funny to read the editorials in the papers. The Chicago *Tribune* even suspected a Red Plot. You can imagine the time that the cartoonists for the *New Yorker* and *Esquire* had.

"With the drop in the price of cotton, the South was really flat on its back this time. I remember when the Harwick bill was introduced in Congress, to require every citizen over the age of five to be clipped at least once a week. A bunch of Southerners were back of it, of course. When that was defeated, largely on the argument of unconstitutionality, the you-alls put forward one requiring every person to be clipped before he'd be allowed to cross a state line. The theory was that human hair is a commodity—which it is sometimes—and that crossing a state line with a coat of the stuff, whether your own or someone else's, constituted interstate commerce, and brought you under control of the Federal Government. It looked for a while as though it would pass, but the Southerners finally accepted a substitute bill requiring all Federal employees, and cadets at the military and naval academies, to be clipped.

"The destitution in the South intensified the ever-present race problem, and led eventually to the Negro revolt in Alabama and Mississippi, which was put down only after some pretty savage fighting. Under the agreement that ended that little civil war the Negroes were given the present Pale, a sort of reservation with considerable local autonomy. They haven't done as well as they claimed they were going to under that arrangement, but they've done better than the Southern whites said they would. Which I suppose is about what you'd expect. But, boy, just let a white man visiting their territory get uppity, and see what happens to him! They won't take any lip.

"About this time—in the autumn of 1971—the cotton and textile interests got out a big advertising campaign to

promote clipping. They had slogans, such as 'Don't be a Hairy Ape!' and pictures of a couple of male swimmers, one with hair and the other without, and a pretty girl turning in disgust from the hirsute swimmer and fairly pouncing on the clipped one.

"I don't know how much good their campaign would have done, but they overplayed their hand. They, and all the clothing outfits, tried to insist on boiled shirts, not only for evening wear, but for daytime wear as well. I never thought a long-suffering people would really revolt against the tyrant Style, but we did. The thing that really tore it was the inauguration of President Passavant. There was an unusually warm January thaw that year, and the president, the v-p, and all the justices of the Supreme Court appeared without a stich on above the waist, and damn little below.

"We became a nation of confirmed near-nudists, just as did everybody else sooner or later. The one drawback to real nudism was the fact that, unlike the marsupials, man hasn't any natural pockets. So we compromised between the hair, the need for something to hold fountain-pens, money, and so forth, and our traditional ideas of modesty by adopting an up-to-date version of the Scottish sporran.

"The winter was a bad one for flu, and everybody who hadn't caught it the preceding winter got it now. Soon a hairless person became such a rarity that one wondered if the poor fellow had the mange.

"IN MAY OF 1972 we finally began to get somewhere. Oliveira had the bright idea—which both of us ought to have thought of sooner—of examining ectogenic babies. Up to now, nobody had noticed that they began to develop hair a little later than babies born the normal way. You remember that human ectogenesis was just beginning to be worked about then. Test tube babies aren't yet practical for large-scale production by a long shot, but we'll get there some day.

"Well, Oliveira found that if the ectogens were subjected to a really rigid quarantine, they never developed hair at all—at least not in more than the normal quantities. By really rigid quarantine, I mean that the air they breathed was heated to 800° C., then liquefied, run through a battery of cyclones, and washed with a dozen disinfectants. Their food was treated in a comparable manner. I don't quite see how the poor little fellows survived such unholy sanitation, but they did, and didn't grow hair—until they were brought in contact with other human beings, or were injected with sera from the blood of hairy babies.

"Oliveira figured out that the cause of the hyperpilosity was what he'd suspected all along—another of these damned self-perpetuating protein molecules. As you know, you can't see a protein molecule, and you can't do much with it chemically because, if you do, it forthwith ceases to be a protein molecule. We have their structure worked out pretty well now, but it's been a slow process with lots of inferences from inadequate data. Sometimes the inferences were right and sometimes they weren't.

"But to do much in the way of detailed analysis of the things, you need a respectable quantity of them, and these that we were after didn't exist in even a disrepectable amount. Then Oliveira worked out his method of counting them. The reputation he made from that method is about the only permanent thing he got out of all his work.

"When we applied the method, we found something decidedly screwy—an ectogen's virus count after catching hyperpil was the same as it had been before. That didn't seem right. We knew that he had been injected with

hyperpil molecules, and had come out with a fine mattress as a result.

"Then one morning I found Oliveira at his desk looking like a medieval monk who had just seen a vision after a forty-day fast. (Incidentally, you try fasting that long and you'll see visions too, lots of 'em.) He said, 'Pat, don't buy a yacht with your share of that meelion. They cost too much to upkeep.'

"'Huh?' was the brightest remark I could think of.

"'LOOK HERE', he said, going to the blackboard. It was covered with chalk diagrams of protein molecules. 'We have three proteins, alpha, beta, and gamma. No alphas have exeested for thousands of years. Now, you will note that the only deefference between the alpha and the beta is that these nitrogens'—he pointed—'are hooked onto *thees* chain instead of that one. You will also observe, from the energy relations wreeten down here, that if one beta is eentroduced eento a set of alphas, all the alphas will presently turn into betas.

"'Now, we know now that all sorts of protein molecules are being assembled inside us all the time. Most of them are unstable and break up again, or are inert and harmless, or lack the power of self-reproduction—anyway, nothing happens because of them. But, because they are so beeg and complicated, the possible forms they take are very many, and it is possible that once in a long time some new kind of protein appears with self-reproducing qualities; in other words, a virus. Probably that's how the various disease viruses got started, all because something choggled an ordinary protein molecule that was chust being feenished and got the nitrogens hooked on the wrong chains.

"'My idea is thees: The alpha protein, which I have reconstructed from what we know about its descendants beta and gamma, once exeested as a harmless and inert protein molecule in the human body. Then one day somebody heecupped as one of them was being formed, and presto! We had a beta. But the beta is not harmless. It reproduces itself fast, and it inheebits the growth of hair on most of our bodies. So presently all our species—wheech at the time was pretty apish—catch this virus, and lose their hair. Moreover, it is one of the viruses that is transmeeted to the embyro, so the new babies don't have hair, either.

"'Well, our ancestors sheever a while, and then learn to cover themselves with animal skeens to keep warm, and also to keep fire. And so, the march of ceevilizations it is commence! Chust theenk—except for that one original beta protein molecule, we should probably today all be merely a kind of goreela or cheempanzee. Anyway, an ordinary anthropoid ape.

"'Now, I feegure that what has happened is that another change in the form of the molecule has taken place, changing it from beta to gamma—and gamma is a harmless and inert leetle fellow, like alpha. So we are back where we started.

"'Or problem, yours and mine, is to find how to turn the gammas, with wheech we are all swarming, back into betas. In other words, now that we have become all of a sudden cured of the disease that was endemic in the whole race for thousands of years, we want our disease back again. And I theenk I see how it can be done.'

"I couldn't get much more out of him; we went to work harder than ever. After several weeks he announced that he was ready to experiment on himself; his method consisted of a combination of a number of drugs—one of them was the standard cure for glanders in horses, as I recall—and a high-frequency electromagnetic fever.

"I wasn't very keen about it, because I'd gotten to like the fellow, and that

awful dose he was going to give himself looked enough to kill a regiment. But he went right ahead.

"Well, it nearly did kill him. But after three days he was more or less back to normal, and was whooping at the discovery that the hair on his limbs and body was rapidly falling out. In a couple of weeks he had no more hair than you'd expect a Mexican professor of virology to have.

"BUT THEN our real surprise came, and it wasn't a pleasant one!

"We expected to be more or less swamped by publicity, and had made our preparations accordingly. I remember staring into Oliveira's face for a full minute and then reassuring him that he had trimmed his mustache to exact symmetry, and getting him to straighten my new necktie.

"Our epoch-making announcement dug up two personal calls from bored reporters, a couple of 'phone interviews from science editors, and not one photographer! We did make the science section of the New York *Times*, but with only about twelve lines of type—the paper merely stated that Professor Oliveira and his assistant—not named—had found the cause and cure of hyperpilosity. Not a word about the possible effects of the discovery.

"Our contracts with the Medical Center prohibited us from exploiting our discovery commercially, but we expected that plenty of other people would be quick to do so as soon as the method was made public. But it didn't happen. In fact, we might have discovered a correlation between temperature and the pitch of the bullfrog's croak for all the splash we made.

"A week later Oliveira and I talked to the department head, Wheelock, about the discovery. Oliveira wanted him to use his influence to get a dehairing clinic set up. But Wheelock couldn't see it.

"'We've had a couple of inquiries,' he admitted, 'But nothing to get excited about. Remember the rush there was when the Zimmerman cancer-treatment came out? Well, there's been nothing like that. In fact, I—ah—doubt whether I personally should care to undergo your treatment, sure-fire though it may be, Dr. Oliveira. I'm not in the least disparaging the remarkable piece of work you've done. But,'—here he ran his fingers through the hair on his chest, which was over six inches long, thick, and a beautiful silky white—'you know, I've gotten rather fond of the old pelt, and I'd feel slightly indecent back in my bare skin. Also, it's a lot more economical than a suit of clothes. And—ah—if I may say so with due modesty—I don't think it's bad-looking. My family has always ridden me about my sloppy clothes, but now the laugh's on them. Not one of them can show a coat of fur like mine!'

"Oliveira and I left, sagging in the breeches a bit. We inquired of people we knew, and wrote letters to a number of them, asking what they thought of the idea of undergoing the Oliveira treatment. A few said they might if enough others did, but most of them responded in much the same vein that Doc Wheelock had. They'd gotten used to their hair, and saw no good reason for going back to their former glabrous state.

"'So, Pat,' said Oliveira to me, 'It lukes as though we don't get much fame out of our discovery. But we may essteel salvage a lettle fortune. You remember that meelion-dollar reward? I sent in my application as soon as I recovered from my treatment, and we should hear from the government any day.'

"WE DID. I was up at his apartment, and we were talking about nothing in particular, when Mrs. O. rushed in with the letter, squeaking 'Open eet! Open eet, Román!'

"He opened it without hurry, spread the sheet of paper out, and read it. Then he frowned and read it again. Then he laid it down, very carefully took out and lit the wrong end of a cork-tipped cigarette, and said in his levellest voice, 'I have been esstupid again, Pat. I never thought that there might be a time-leemit on that reward offer. Now it seems that some crafty *sanamagoon* in Congress poot one een, so that the offer expired on May first. You remember, I mailed the claim on the nineteenth, and they got it on the twenty-first. Three weeks too late!'

"I looked at Oliveira, and he looked at me and then at his wife. And she looked at him and then went without a word to the cabinet and got out two large bottles of *tequila* and three tumblers.

"Oliveira pulled up three chairs around a little table, and settled with a sigh in one of them. 'Pat,' he said, 'I may not have a meelion dollars, but I have something more valuable by far—a wooman who knows what is needed at a time like thees!'

"And that's the inside story of the Great Change—or at least of one aspect thereof. That's how it happens that, when we today speak of a platinum-blonde movie-star, we aren't referring to her scalp-hair alone, but the beautiful silvery pelt that covers her from crown to ankle.

"There was just one more incident. Bert Kafket had me up to his place to dinner a few nights later. After I had told him and his wife about Oliveira's and my troubles, he asked how I had made out on that depilatory-manufacturer stock I'd bought.

"'I notice those stocks are back about where they started from before the Change,' he added.

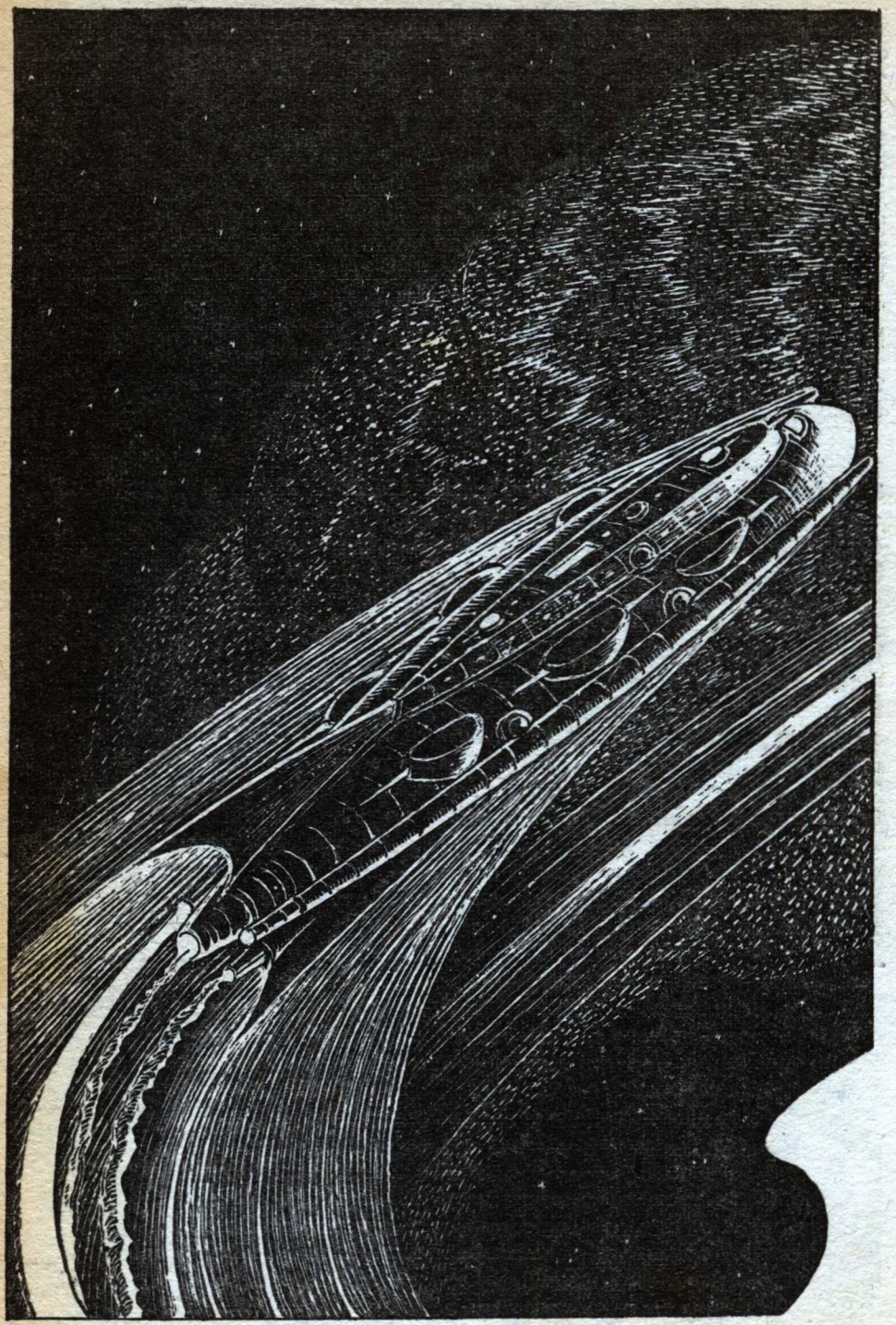
"'Didn't make anything to speak of,' I told him. 'About the time they started to slide down from their peak, I was too busy working for Román to pay much attention to them. When I finally did look them up I was just able to unload with a few cents profit per share. How did you do on those stocks you were so mysterious about last year?'

"'Maybe you noticed my new car as you came in?' asked Bert with a grin. 'That's them. Or rather, it; there was only one—Jones and Galloway Company.'

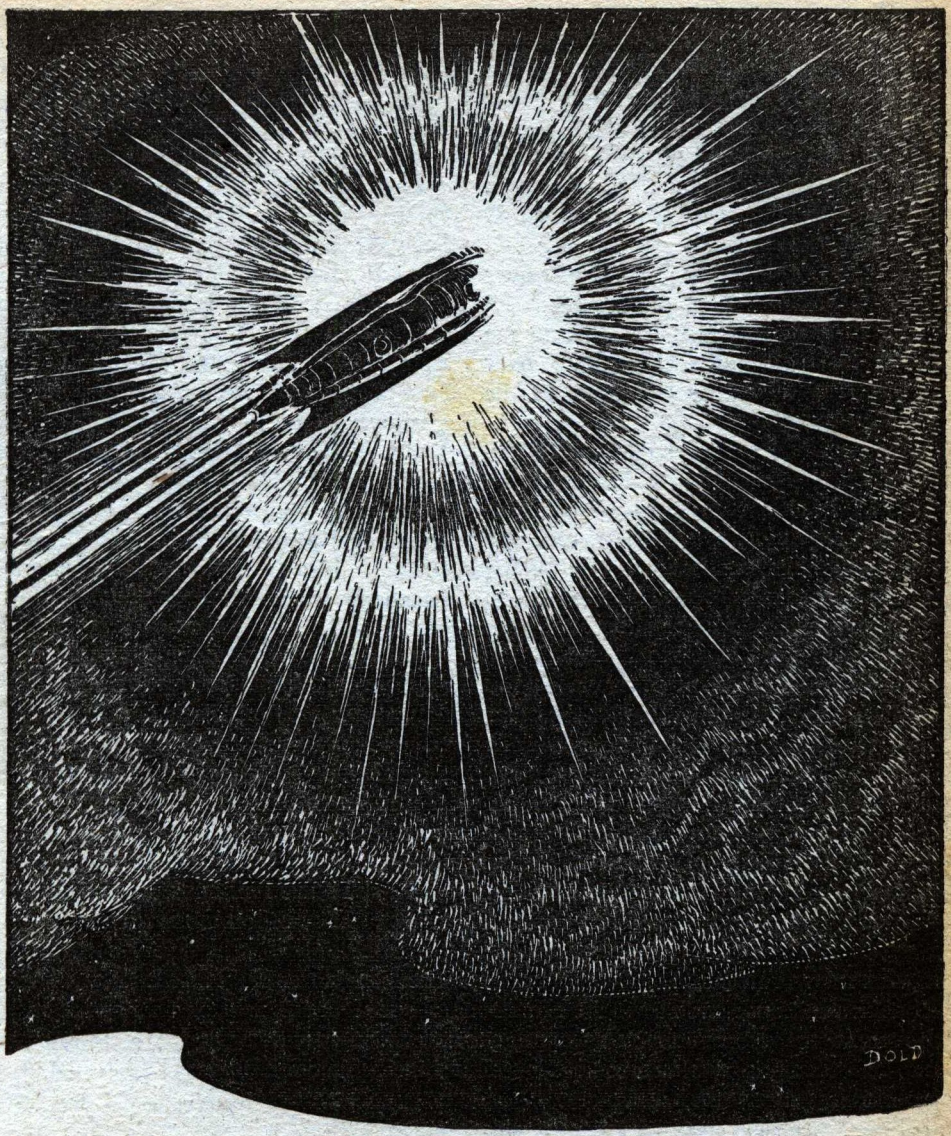
"'What do Jones and Galloway make? I never heard of them.'

"'They make'—here Bert's grin looked as if it were going to run around his head and meet behind—'currycombs!'

"And that was that. Here's Carl with the beer now. It's your deal, isn't it, Hannibal?"



Desperately the **Arethusa's** *blasts roared out, wrenching her stout fabric— slowly she turned from the fire-fly area of annihilation——*



NEGATIVE SPACE

by NAT SCHACHNER

"It may be that Novae are——"

SPACE Commander Dan Garin spraddled his big-thewed body before the forward observation port and scowled blackly out into space. He did not look at his two companions in the tiny control chamber. His gusty face and gustier beard, its coal-blackness unstreaked with the slightest gray, were twisted in half-humorous bitterness.

"By the Beard of the Comet," he roared suddenly, "I'm getting fed up with this silly patrol duty and sillier transportation of distinguished space-tourists from one end of the Solar System to the other. I'm a fighting man, and the *Arethusa's* a fighting ship. It ain't natural for us to shuttle back and forth like brood hens clucking over blasted little chicks. I think I'll ground me and spend my declining days in the Martian pulque-caves, mumbling over my drink and telling tall tales to the gaping tourists."

"And a good many you'd have to tell, Dan," said Jerry Hudson affectionately, settling his slighter form more comfortably into his chair. His keen, gray eyes glinted with amusement. "What poor Dan actually means," he explained to the other passenger with becoming gravity, "is that within four days more, one Sandra Stone will be landed on Callisto to join her father, James L. Stone, General Manager of Callistan Mines, and that one Jerry Hudson, by devious methods known only to himself, wangled a new research unit on the aforesaid Callisto, with the sole and nefarious purpose of dwelling in close juxtaposition to the said Sandra Stone, thereby assuming an unsportsmanlike advantage over that once scourer of the spaceways, that terror to now extinct pirates, Danny Garin."

"Be careful, Mister," warned the girl, puckering up very kissable lips in the process. She was slim as a young willow, with all of its pliable grace. Little wrinkles of laughter sprayed over her fresh young face, but there was understanding and some pain in her blue eyes. "You know the ancient saying, 'Absence makes the heart grow fonder!'"

Dan Garin swung his burly, powerful body around, glared savagely at the younger man. "Why, you young squirt," he rumbled, "just because I'm an old, worn-out, simple space-man, and you're the best damn scientist in the entire System, and a good-looking pretense at a man to boot——" He grinned suddenly. "Maybe you're right, Jerry. Sandra and you'll make a swell couple—with youth, looks, brains and the universe before you. I'm old enough to be her father, and a crabbed space-bachelor besides." He held up a big hand to stop Sandra's little cry of protest. "It really ain't that so much," he muted his roar. "It's just that I'm getting bored, rusty from disuse. The spaceways are just as placid and as disgustingly safe as the tunnel back on Earth under the Atlantic Ocean. Look out there!" He pointed through the observation port at a snub-nosed freighter, pitted with meteor scars, coasting bleakly against a star-strewn backdrop at an unhurried twenty miles per second.

JERRY nodded briefly. "She's Callisto-bound as well as ourselves. Carrying colonists and their families for the mines, and due to return with a heavy cargo of polonium and iridium."

"Sure!" Dan scowled. "And as safe and placid as a canal scow. A few years back, things'd have been different. There'd be a black-dusted pirate ship hurtling toward her—colonists bring good ransom, and Callisto metals run the Solar System—and I'd be breaking out my space-tubes, yelling orders into the visor. Blue bolts of energy'd flick out across the void—there'd be swift maneuvering to avoid rocket torpedoes—all space'd crackle with the heat and flame of combat—then a direct hit, and pouf! you'd be blinded with the dazzle of the explosion." He sighed heavily. "Those were the good old days!"

"I really believe," protested Sandra with humorous indignation, "you're half pirate yourself, at heart."

"For ten thousand years," observed Jerry calmly, "men have bemoaned the good old days and thought all danger, all daring adventure past. You're an

anachronism, Danny. Besides, it is your own fault that the spaceways have become dull and monotonous. Who was it finally located the pirate lair within the hollow shell of an inconspicuous asteroid and blasted them all into a billion fragments?"

Dan Garin shook his black-tousled head gloomily. "To tell you the truth, I'm sort of sorry I did it. Now there's nothing but——"

"What a queer effect!" Sandra said suddenly, her eyes fixed on the observation port. "I wonder what it is."

Both men turned to the magnifying crystal, stared. Silence descended in the little control chamber. The ship seemed suspended in a limitless void, without life or motion. Yet Jerry knew they were coasting along with the rocket tubes shut off at a swift two hundred miles a second.

Outside, to the extreme left, Jupiter was a belted orb, with the great mysterious Red Spot a splash of color across its surface. Three of its moons clung to its sides, tiny pinpoints of light. The farthest out was Callisto, their destination. A sizeable Earth-colony was already established on its bleak terrain, mining the precious heavy metals that furnished atomic power for rocket blasts and the mighty engines of Earth and Mars.

Involuntarily Jerry's eyes swung to the right. The stubby freighter was making its placid way, steady, unswerving. Its twenty miles a second seemed but fixity in space to the swift flight of the *Arethusa*. The detector-unit showed its distance to be approximately 100,000 miles. At their respective rates of speed, Jerry figured, it would take only about ten minutes for the *Arethusa* to overhaul it.

Then his gaze held. He heard the quick suspiration of breath of the black-bearded captain. Beyond the freighter, directly in front of its course, the normal star-powdered blackdrop of space seemed to have gone haywire. Tiny flashes of light, microscopic puffs of flame, flared up with explosive suddenness, winked to extinction with as startling rapidity, spangling the jet blackness of space as far as the eye could see.

"It's like an enormous swarm of Earth fireflies," gasped Sandra.

THE SIMILE was most apt. Those tiny flickers that went on and off like ancient electric light bulbs worked by a manual switch, were like nothing so much as dancing fireflies on a sultry evening in June. But there were countless trillions, and they swarmed in interplanetary space where no life could exist!

"By Deimos and Phobos!" swore Dan, "what would you call that, Jerry? A new type of aurora?"

Jerry was already on his feet, eyes narrowed. "Nothing of the sort," he said swiftly. "You can't have an aurora without gaseous matter. And there's no meteor dust or cometary clouds in that sector of space. The interplanetary surveys have mapped them pretty definitely. This is an entirely new phenomenon—something that——"

A hopeful light transfigured Dan Garin's scowling face. "Now look you, Jerry lad," he demanded with a certain eagerness, "you wouldn't be thinking that it's pirates' work—some new-fangled device by a new-fangled band?"

"Don't be silly, you old pirate-hunter," grinned Jerry. "No band of pirates in the universe could create that effect. Why, it's about 50,000,000 miles in diameter, I'd say."

Dan sighed gustily. "Then what the hell!" he groaned. "It ain't my business. It's meat for pallid scientists like yourself, my lad. Go ahead. Study it, write it up, get yourself a medal for discovering a bunch of loony fireflies lost in space——"

"That freighter is heading straight into it!" Sandra exclaimed.

"Won't hurt it any," growled the captain. "Its hull's platino-duralumin alloy, insulated against every conceivable electrical or magnetic effect. Even meteors——"

"I wouldn't be too sure of that," Jerry's voice whiplashed. His keen, tanned face had suddenly become tense. "Whatever it is, it is something entirely new, something the solar system has never encountered before. It's come from the depths of outer space." He flung swiftly around, his speech crackled. "Quick, Danny! Signal the freighter before it's too late. Warn them to swerve, to apply their rockets full blast."

Captain Garin narrowed his eyes in surprise. "You're crazy, man!" he expostulated. "To get away now, when they're so close and coasting without power, would wrench every last hull-plate loose from its moorings and just about ruin every colonist's digestion on board."

Jerry swore. "Let 'em take that chance," he jerked out. "Don't you understand? It's a matter of life and death!"

Dan did not understand. But he knew Jerry Hudson, and, like a good commander, knew when to obey without asking too many reasons.

Without another word, he hurled for the control board, snapped on the visor. S-N-T! S-N-T! The space urgency call sputtered across the intervening void.

A bare 2500 miles now separated the lumbering cargo ship from the edge of the dancing fires.

Back came the reply, growling sarcastically out of the sono-tube. "Hello, *Arethusa!* Captain Greer of the *Mercury* talking. What's the matter? Need any help from a *good* boat?"

The veins swelled on Dan's dark forehead. "No, blast you!" he roared so that the control chamber shook. "I'm handing out orders. Cut in your entire battery of forward landing rockets; blast on every starboard tube. Swing to port in the sharpest arc you can; do not enter frontal area of flashes until we investigate."

A SINGLE moment the sono-tube was silent. Then, coldly, "Have you gone crazy, Captain Garin? You may be on patrol, but I'm running the *Mercury.* D'you think I'm going to ruin my ship on account of a lousy corona effect? So long, chicken-heart!"

Dan Garin choked. No one had ever dared talk to him that way before. Was he slipping? Had his name been forgotten in the last five years? "Listen, you white-livered son of a dog-faced Plutonian!" he yelled. "I'm handing out orders and you're taking them! Blast on your tubes, or by all the asteroids——"

A single word spattered out of the sono-tube, short, sharp, and to the point. A word of great antiquity.

"Nuts!" said Captain Greer.

"It's too late, anyway," breathed Sandra tautly.

The snub-nosed freighter coasted steadily on, direct on its course. It swerved neither to the right nor to the left. Then it immersed, head on, in the scintillating bath of little flashes of light.

A moment the ship silhouetted blackly against the flickering background. Tiny puffs of evanescent flame, measurable distances apart, harmless-seeming as summer lightning.

"Why, nothing's happening!" Sandra exclaimed. There was relief, mingled with an odd disappointment in her tone. Jerry had been wrong——

Captain Dan Garin scowled blackly. His beard bristled—a sure sign of inner volcanic wrath. Not only had Greer mocked him with vigorous language, but Jerry had let him down. He would be the laughing stock of the System when this got around; he would——

"Look!" said the young scientist, mouth a straight, hard line.

The hull of the *Mercury* had illumed suddenly with lambent blaze. St. Elmo-like fires raced and flashed over its pitted surface.

"What the hell!" rasped Dan angrily. "That ain't nothing. Even that blasted tub can take an electrical disturbance. You've let me down; you've——"

The flickers of dazzling light seemed to coalesce. There was a blinding surface flash, followed instantly by a furious explosion. The *Mercury* seemed to vanish in a spouting, geysering inferno of seething flame. The interior of the control chamber on the *Arethusa* flared with molten light.

Sandra cried out, threw her arm over her eyes to shield them from the searing blight. Captain Garin, with a strangled oath, stumbled blindly toward the control board, groped for the switch that controlled the helioscope filter. His fingers found it, closed.

The screen that made it possible for space-voyagers to look directly at the sun fell smoothly into place. At once the insupportable glare died away; a soft-toned, polarized illumination filtered through the chamber.

With horror in their hearts, they stared out at the gigantic cataclysm. A great shell of dazzlement shot out from the doomed ship, expanded, died down to abrupt darkness. A huge sphere of intense black made a hollow void within the flickers of innumerable pinpoints of flame.

But within the hollow shell a curiously shrunken *Mercury*—a collapsed miniature, correct in every proportion—blazed furiously. Even through the helioscope filter the glare of its molten wrath was almost unbearable. Jerry, sick at heart, calculated that fiery core at millions of degrees of Earth temperature.

Then, while they watched speechless, unable to move, the tiny ship fell inward upon itself, fused to a molten meteor—a single point of flame within a shell of dark quiescence.

"THOSE poor people on board!" whispered Sandra, eyes wide with pain.

Her words released a trigger in the Captain's dazed mind. With a bull roar of rage he sprang for the rocket controls. At a touch, red fires licked out of the drive tubes; the armored ship leaped forward, pulsing and thrumming in every welded seam.

"Here, what are you going to do?" Jerry cried in alarm.

"Do?" snapped Dan, a terrible look on his face. "Dive straight into that hellfire and get the blankety-blank pirates that thought up this new stunt."

Jerry whirled to the observation port, aghast. The ship was accelerating to 500 miles per second; they were rushing headlong into the mysterious spangle of space. In another two minutes——

It was too late to argue with Dan. His single-track mind was obsessed with pirates. There was only one way to avoid immediate destruction! In a single bound he was at the controls, punching feverishly at the buttons.

"Hey!" shouted the Captain.

The next moment he fell crashing against the side, barely missing Sandra as she flattened to the wall with inertial pull. Jerry clung desperately to a stanchion, swinging like a pendulum to the tremendous shift in pace and direction.

But even as he was hurled to the floor, his haggard eyes sought the observation port.

The staunch spaceship groaned and twisted with tremendous torque. The hull-plates creaked and crawled. The port rockets thundered in mighty unison, belching great tongues of fire into the void. The atomic engines heaved and buckled. Supplies slid from side to side within the hold. From the crew quarters came cries of alarm, the thud

of slamming bodies. Never before had the spaceship been subjected to such a sudden, close-angled shift in course.

Yet still they hurtled on, held in the grip of a mighty initial accleration, toward that ominous dance of glittering fireflies. They were turning, yes, but would they bank in time to avoid the annihilation that awaited them within that innocent-seeming spectacle?

Jerry whipped back unsteadily to his feet. His throat was a dry constriction. He had no illusions. If the *Mercury* had pulsed to fierce destruction, no power in the universe could save the *Arethusa* from a similar fate. Closer, closer! All space was swallowed up by the vast-reaching flashes of light. Jupiter was gone, its clinging satellites; the stars were obliterated in their courses. Only an endless panorama of evanescent sparkles, and the deadly spectacle of a collapsed freighter, glowing like a nova within a curious shell of moveless black.

Nova?

But even as his brain clicked on that casual simile, the cry that started in his throat died stillborn. From behind he heard Sandra's moan of terror, Danny's curse.

They would never make it. Already it seemed that they were within. In front, to the port, rocket tubes smothered and roared, but—the queer little explosive puffs surrounded them.

"Sandra!" he called in sudden despair. "It's all over. We——"

II.

THEN, with a whoosh and a last desperate swerve, they cut in and out again, careening on a runaway tangent, back toward the asteroid belt.

Captain Garin hurled his powerful body toward the controls, sweated and cursed as he sought to bring the rocking, reeling vessel back to normal.

"You young idiot!" he howled at Jerry, "you've ruined my fighting ship! You've sprung open every seam, I'll be bound. And you stopped me from getting at the blasted beings responsible for Greer's annihilation—God rest his soul!"

Sandra picked herself up from the floor, her face still pale with the shadow of averted death. "But, Jerry," she cried shakily, "we were inside, and nothing happened. Are you sure——?"

The young scientist was not listening. His eyes glowed with the light of discovery. He snapped his fingers. "I've got it!" he exclaimed.

They stared at him as if he had gone suddenly insane.

"Got what, Jerry?" the girl asked gently.

"The connection. What happened out there to poor Greer's ship is the same as that which happens in galactic and extra-galactic space when a nova bursts forth."

Dan shook his massive head pityingly. "The strain was too much for him," he muted his voice for Sandra's benefit. "We'll get him to Callisto as fast as possible where he can receive proper medical attention."

"You'll do nothing of the sort," Jerry snapped fiercely. "We're not going to Callisto yet—perhaps never. If what I think is right, the Solar System, or major parts of it at least, is doomed."

"Doomed?" breathed the girl incredulously.

He repeated the word with a quiet despair. "Yes; doomed! If that visitant from outer space"—he pointed to the still flickering depths where the *Mercury* was a fast receding furnace—"is what I think it is, then we have bumped unwittingly into a space-structure that is responsible for the apparition of nova, of sudden-blazing stars. Suppose that area contacts a planet, contacts the sun itself. Well—you saw what happened to the *Mercury*. Think of the same flare-up on a gigantic scale, with the

sun as the center. All the planets would melt away in the tremendous outburst, like particles of ice in a rocket-tube blast."

Dan snorted in his black beard. "You're a swell scientist, Jerry lad, but this time you've addled your own brains. You mean to say that when a star suddenly acts up way out in Andromeda—explodes, so to speak—that it's because it ran into a bunch of blooming fireflies like out there?"

"Exactly!" Jerry retorted. "Astronomers have never been able to figure out an adequate explanation for the appearance of a nova. They theorize about collisions between two stars, about the tidal pull between close-moving suns, about the frictional passage of a star through a nebula, about some mysterious sudden release of energy within the core of the bursting body. But none of their hypotheses has fitted all the facts. This new phenomenon into which the *Mercury* ran, does!

"There was the same swift expansion of a brilliant shell of gas, the same absorption into a dark area, and the final retraction of the blazing core, to gradual extinction or inconspicuousness."

IN SPITE of themselves, the others were impressed. There was a logic to it, and they had witnessed with their own eyes——

"But what is this mysterious influence in space?" Sandra asked with a sharp intake of breath. She was thinking of her father, kindly, gray-haired, out there on Callisto waiting for her, waiting for the *Mercury* with its cargo of colonists. Involuntarily her eyes strayed to the observation port.

Already the blaze that had been the hapless freighter was dying down. Already the glittering sparkles had swept between them and their destination. Callisto and all the outer Solar System was cut off from the inner planets, from Earth.

"That is what we must find out at once," Jerry answered grimly. He spun on his heel. "Look, Danny! Swing the *Arethusa* around, head us back to that damnable mess, while I set up some test instruments. Every second counts. Every second represents the irrevocable loss of a faint chance to save our System from impossible disaster. But as you value our lives—and the safety of billions of people—keep out of range of those sparkles."

Captain Garin tugged at his black beard. A somber glow smoldered in his dark eyes. "I still think you're haywire," he growled. "I still think there's living beings in back of this; whether from this System or from some unknown star, I don't know. But I'll give you a chance, lad. If you fail——"

The next hours were fraught with unbearable tenseness. While Dan swung the *Arethusa* back on its tracks, hurtled once more for the ominous phenomenon that had strangely intruded itself into the spaceways, Jerry feverishly carted up from the hold the apparatus which he was shipping to Callisto for his new research laboratory, set up his instruments, tightened connections, adjusted, tested.

Sandra helped him—she had worked with him on Earth—her lovely face pale, but brave. Only once did she ask the question that was tearing at her heart. "Do you think Callisto—is—safe?"

Jerry straightened, looked at the girl he loved, said gently, "I don't know, darling, yet. I'll have to check the size of this space-disturbance, determine its velocity, its direction. Until then——"

He bent to his work. He did not want to tell her all the truth—that he was desperately afraid that no part of the System would survive the impending cataclysm.

"O. K.!" roared Dan, as the ship swerved from its headlong course like a racing thoroughbred to the pressure of its rider's knee. "We're running paral-

lel, exactly 10,000 miles away. Get going, lad."

"I'm ready," Jerry responded quietly. He turned immensely delicate anmeters and voltmeters on the evanescent flashes, switched contact. Then he stared. The sensitive needles, shielded from all known influences, did not move. "Damn!" he swore, puzzled. "There isn't the slightest evidence of electrical disturbances." Frowning, he tried next for magnetic effects. There were none.

"But there's plenty of light," Sandra protested.

"Of course there is," he answered impatiently. "Light is a concomitant of practically all energy transformations that include the requisite wave lengths. But it is usually a secondary, not a causitive phenomenon. However——"

HE SET UP his light-wave traps, adjusted his spectroscope, attached his Hallam-Geiger counters. "There are photons, of course, as is natural. It doesn't mean anything——" He leaned forward suddenly, stared eagerly at the automatic count of all energy intake on the admission disk, frowned furiously at the clicking count at the end of the trap where only pure photons could penetrate.

"By all the Martian gods," he swore in amazement, "this is unbelievable!"

"What is?" Dan Garin wiggled his black beard in Jerry's direction. His eyes still burned on that sparkling space with which he kept the ship skillfully in pace.

"Why," Jerry gasped, "the count on both is exactly the same."

"So what?" Dan snorted. He was a grand fighter and navigator, but he was not long on science.

"This! That phenomenon which has invaded our system is *pure light*—nothing else. There is absolutely no trace of any other energy content that I can determine."

Silence held the chamber a moment, broken only by the muted roar of the firing rockets. Then Sandra gasped. "It's not only unbelievable, Jerry, it's impossible. The *Mercury* didn't explode and blaze to extinction simply because it ran into light waves."

The young scientist ran nervous fingers through his hair. "I wish I knew the answer, darling," he said.

"Another thing, my lad," growled Dan. "What's making that light? I've been watching them there little fireflies till my old eyes are smarting. First there's nothingness—the regular black o' space. Then suddenly there's a blast of light. Then there's nothingness again. And never twice in the same place, Jerry boy. Once it's winked out, that spot stays dark."

Jerry said sharply: "What's that? Repeat what you said—every word!"

Dan repeated his observation, bewildered.

For a moment they could almost see the swift, keen machinery of the scientist's brain in action, then he let out a whoop. "By Ceres and the Rings of Saturn, I think you've put your finger on it."

"On what, Jerry?" asked Sandra.

But he was not listening. He had become a whirlwind of vital energy. He raced among his apparatus; his fingers fairly flew as he set up new tubes, placed a pinch of white powder within a lead-shielded chamber, pointed its orifice at the observation port.

"Artificially activated polonium salts," he explained rapidly. "A splendid source of beta-rays, or electrons to you."

"I see," nodded Sandra. "You're going to shoot a stream of electrons into those light photons. What will that prove?"

"I'm not shooting them into the photons," he corrected. "I'm shooting them into the space in which the photons are seemingly born. If it will do what I think it will—but watch!"

The powder began to glow under the activating bombardment. Little light dartles spattered along the tube. Trillions of electrons converged along a magnetic path, ripped through the glassine port as though it were not there, shot out with inconceivable velocity into space.

A grim tension filled the chamber. Three pair of eyes held to their invisible path, sought that far-off glitter where the focused pointers declared that the electron bombardment would strike.

OUT THERE, at the apex of the invisible stream of hurtling electrons, at the point of contact with the space-intruder, light blazed up suddenly. Light of an order comparable to that which had flared up from the hapless *Mercury*. Light which seared their eyeballs even through the filtering helioscope. No longer were there solitary photon flashes per cubic inch. A solid wall of brilliant energy lashed out, beat against the plunging ship with a perceptible jar. The light-wave trap recoiled from the blow—the Hallam-Geiger counters could not take the load.

But still the activated polonium sent out its countless streams of electrons, set automatically upon that given spot, 10,000 miles away. In seconds, a pocket of utter darkness took the place of the flame of light. But deeper in, new fires commenced.

"Like a powerful stream of water that's washed away loose soil, and is attacking deeper layers," Sandra whispered in awe.

For the first and last time in his life, Captain Garin looked aghast. "For God's sake, Jerry lad," he husked, "turn the damn thing off. I'm scared."

The young man's eyes glowed fiercely—glowed with the thrill of discovery and with a strangely commingled fear. Swiftly he clamped a heavy lead shield over the electron-gun, switched off the power.

"Well?" demanded his two companions simultaneously.

The fear dulled the glow in his eyes. His face grew ashen. "It's incredible," he said slowly, "yet Dirac, that ancient mathematician of the twentieth century, postulated wiser than he knew."

"Never mind the details, lad," growled Dan. "Let's hear the worst."

"The details are important," Jerry replied with quiet intensity. "Dirac theorized from his differentials that space as we know it—the space of the Solar System, of the outer galaxies as well—was a continuum, a featureless energy continuum. But his equations also demanded that in certain instances, holes would develop in this space—pockets, depressions, whatever name you wish to give them—in other words, negative energy levels."

"Of course," Sandra cried out. "You mean positrons."

Jerry nodded gravely. "I mean positrons," he agreed. "But hitherto positrons, or negative energy states in space, have been among the very rarest of phenomena. Whenever, in our planetary laboratories, we managed with much exertion to create these positrons, their life-existence was extremely short."

"Huh!" snorted Dan. "Even I, an ignorant old space-navigator, know that. There'd always be free electrons running around loose. They'd meet up with friend positron, and the electron, of opposite electric charge, would sort of fall headlong into the positron hole, and —*bang*—both of them would annihilate each other, to vanish in a flash of photon energy." He started. "Hey, Jerry! You don't think——?"

"I don't think; I know it!" retorted the scientist. "My tests were conclusive." He flung his arm out at the observation port. "We are witnessing something never before seen by man: not merely a single positron, of infinitesimal dimensions, but a mighty con-

geries, a vast "positron" that is over 50,000,000 miles in diameter! In other words, a tremendous hole in space, a sinister negative energy level. Look what happens! As electrons hit these negative states—negative, that is, in space, but actually positive to our arbitrary attribution of a negative electrical charge to electrons—the charges annihilate each other, and emit photon energy in the process. That is what happened to my electron stream; that is what happened to the *Mercury*. Every outer orbit electron in its composition was stripped away, the corresponding emissions of energy at such infinitesimally close quarters disrupted even the close-held electrons in the nucelus, and the atoms literally exploded. Our ship was saved from a similar fate because, during the mere seconds we were immersed, our rocket gases took up the load, and flashed first to extinction."

DAN'S EYES bulged as he looked out at the tremendous panorama. "But if matter is required to set off that super-positron, why does it keep on exploding all the time?"

"You forget that so-called empty space is not actually empty. It has been calculated that there is, in fact, about an atom to every cubic centimeter in the so-called emptiest portions of interstellar space. Conceive, then, of these vast holes scattered throughout the galaxies. They sweep up the free electrons, flash out light messages—perhaps even some of the nebula as yet unanalyzed by our spectroscopes are, in fact, positron hordes——"

"But in the course of millions of years," Sandra protested, "they should have swept up enough electrons to annihilate themselves."

"You forget," Jerry pointed out, "that the average of one electron per cubic centimeter is almost infinitely small. The time element must be of the order of countless trillions of years to do what you suggest. But when a floating negative state, or positron bubble, should happen to meet up with matter in the mass—like a star—— Well—a nova results, a frightful cataclysm."

Sandra caught hold of his arm suddenly, clung to it. "And you think," she whispered, "that that is what's going to happen to our beautiful system, to our civilization, our peoples?"

"A scientist's duty," he answered harshly, "is not to think. He must *know!*" He turned swiftly on the bearded captain. "All right, Dan. Get busy! We've got little enough time. We're going to get all available data on this damned space-positron."

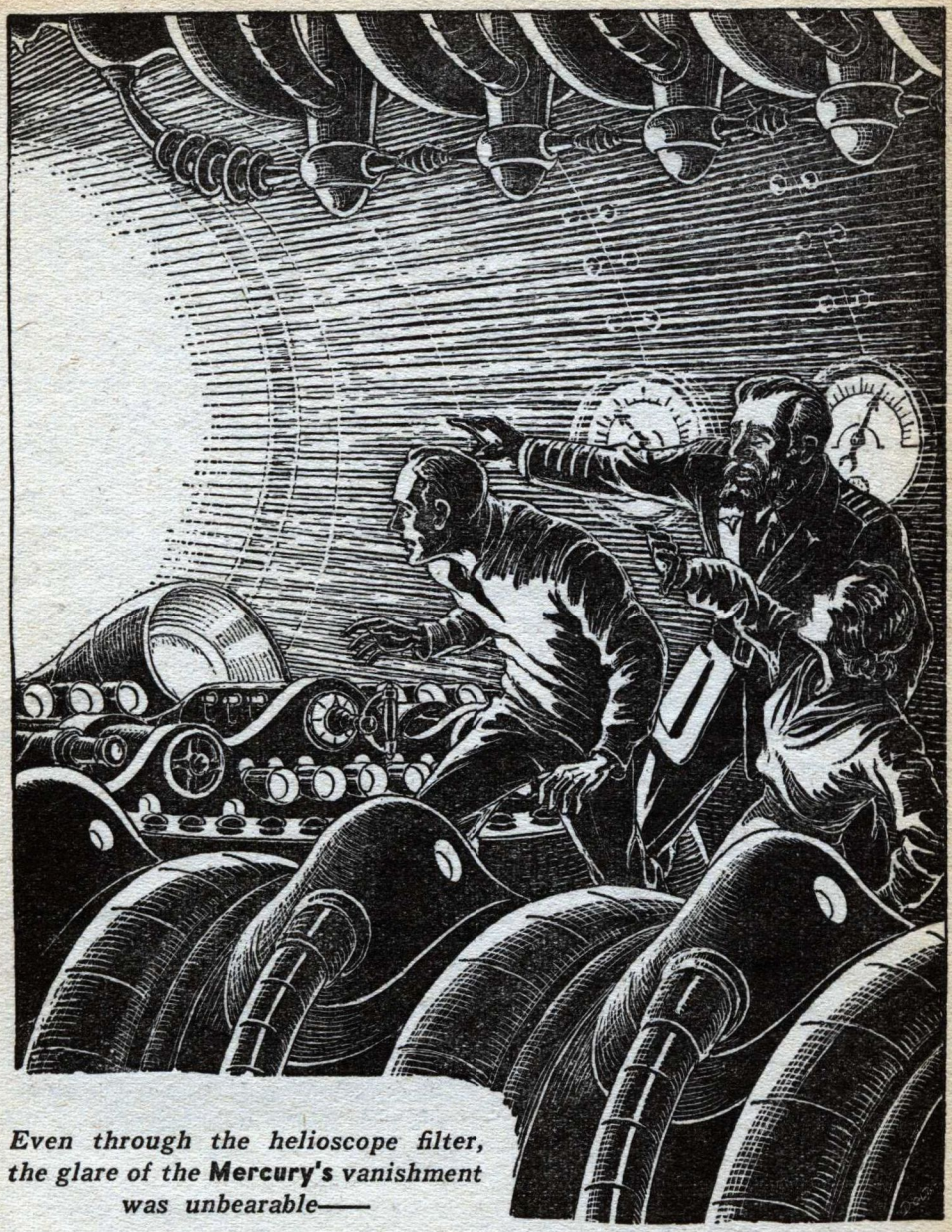
It took them almost a day of Earth time. A desperate, feverish race with onrushing disaster. The swift space-cruiser roared along the very edge of the mighty hole in space, building up reckless velocities, darting over its spangled surface, probing its depth, its direction, its size and velocity. Within the control chamber, tension built up to electric proportions, as Jerry, with Sandra's help, tested, flashed electron streams, plotted charts, calculated.

The last calculation ripped out of the integraph, the last chart was plotted on the automatic space-graphs. Jerry stared at them with a practiced eye. An unbearable silence surrounded him. Dan flicked him a glance, turned back steadily to his controls. But Sandra could not prevent a little moan.

They both had seen—had read the doom that was writ large in Jerry's eyes as he stared at fateful charts and figures.

"The solar system will smash into a nova, won't it?" the girl asked bravely.

Jerry lifted his gaze. There was pain, infinite sadness in his look. "Not quite," he said tonelessly, "but it's almost as bad. The probes give the positron bubble an ellipsoid shape—62,340,000 miles along its major axis, and 44,591,000 miles along its minor axis. Its spatial



Even through the helioscope filter, the glare of the **Mercury's** *vanishment was unbearable——*

coördinates show a directional velocity toward the Sun's path in space of twelve miles per second—zero velocity along the other coördinates. Which means that, with respect to our System, the positron area is motionless in interstellar space, and that the Sun and its attendant planets are meeting it head on."

"Please, Jerry, come to the point," Sandra begged. "What will it hit?"

He evaded her feverish question. "Thus far," he said slowly, "the System has been fortunate. The orbits of the outer planets have not coincided with the ellipsoid."

"You mean Callisto is safe?" whis-

pered the girl. She was thinking of her father.

Jerry's eyes brooded on her slim loveliness. "Callisto is safe—for the present," he replied gravely. "But the longitudinal surface will graze Juno, in the asteroid belt. The attendant energy development will be sufficient to fuse the tiny planet into a miniature sun. Luckily, the glancing blow will not produce an explosion of the order of a nova."

"Thank God for that!" breathed Sandra. "Then there's really nothing to worry about. Juno is uninhabited."

"Mars, the next planet in line," continued the young man inexorably, "will be in conjunction, on the other side of the Sun. But——" he hesitated, and his face clouded.

The girl put her hand to her mouth to prevent an outcry. "Then the Earth will——"

Again he avoided their gaze. "Yes," he said very low. "Earth is directly in line. It will be a total envelopment. Earth cannot escape."

III.

SANDRA fell back into a chair, hid her face in her hands. The vision of Earth, her home, its green fields and tossing oceans, its teeming peoples even now living and loving and laughing, unknowing of onrushing catastrophe, brought choking sobs from her lips.

"Yes," repeated Jerry dully, as if to himself, "nothing can save Earth. A new nova will appear in the heavens for the delectation of astronomers on some Sirian planet."

Captain Garin's broad shoulders heaved. With an oath he locked the controls, strode gigantically across the little chamber, caught the slighter man's shoulder in a bearlike grip, shook him violently.

"Lay off that nonsense," he roared. "You're the best damn scientist in the system, ain't you?"

Jerry smiled wanly. "That's what *you* say," he retorted.

"Well, you are," Dan shouted. "I know it, Sandra knows it, every one else admits it. You're not going to fall down on us now, lad. You're going to think up some scheme to chase that blasted positron back where it came from."

The young man shook his head mildly. "I'm not a miracle worker," he said. "Nor is any other scientist in the System. You might as well ask that we stop the Sun in its course, like ancient Joshua, or turn off the Moon."

"How much time is there?" rasped the bearded captain.

"I've already figured it out. The longitudinal vertex of the positron ellipsoid is 310,000,000 miles from the point of intersection with the orbit of Earth. At the Sun's speed of twelve miles per second it will take exactly three hundred days for the explosion."

Sandra breathed easier. "Why, in that time you could practically evacuate all of Earth's population to the other planets."

Jerry shook his head. "You forget what happened when the freighter, *Mercury*, a tiny bit of matter, flashed to extinction. Think of Earth, with its trillions of tons, blasting to annihilation. Its atomic nuclei exploding. Think of the nova in other galaxies. There would be a flare-up, an expanding shell of gas that would engulf the entire Solar System. Only Neptune and Pluto might escape. And even if they were habitable—which they are not—no rocket ships could get there in time."

"Oh!" said the girl faintly.

But Dan Garin laughed almost jovially. "Three hundred days!" he thundered. "Why, that's an eternity! If you can't figure out a way in that time, lad, you just don't deserve to have a girl like Sandra. I'll up and marry her myself."

Jerry grinned, snapped out of his despair. "With a threat like that——"

he exclaimed. "O. K.! How fast can you get back to Earth?"

The captain squinted at his fuel gauges. "Hm-m-m! The tanks are only a quarter full. But there's no time to stop at Vesta, and Mars is too far away. Damn it, boy! I'll give her everything we got, build up acceleration as quick as the tubes can hold it, and then coast the rest of the way to Earth." He did some figuring on a scratch pad. "I think there's enough to get a maximum of five hundred a second. At that speed we'll hit Earth in six days, which gives you 294 days more to do your stuff."

HE SPUN on his heel, ripped open every visor screen. The startled faces of the crew leaped out at him. "Come on, you blasted scalawags, you lily-handed sons of Saturnian monstrosities," he roared, "get to work! Work as you've never done before, as you never hope to do again. We're going back to Earth, and we're busting the *Arethusa* wide open to get there pronto. Bale out the fuel, cram the rocket tubes until they smoke, sit on the safety valves and let her ride. We're getting back in six days, d'ye hear?"

They heard and they grinned impudently back at their blustering commander. They loved him and would have gone through Hell for him. "O. K., old bullhead," shouted a grimy rocket-tube tender. "Keep your shirt on, and we'll get you there."

Danny turned to his passengers. "Y'hear that?" he demanded plaintively, "*that's* the kind of a rotten crew they hand me." But there was a twinkle in his dark eyes as he groused.

The spaceship swung in a wide arc. Jets of flame blasted out into space. The great hull thundered with fierce vibrations. The heavens whirled dizzily. The three in the control chamber caught at straps and cushioned seats to ease the tremendous acceleration. The *Arethusa* fled like a flaming comet back toward Earth, in a wild race with impending disaster.

"Don't you think," gasped Sandra, when she could catch her breath, "that we ought to televise Earth at once, to give them immediate warning?"

Jerry set his jaw grimly. "We'd better not," he decided. "They'll think us crazy. It'll be hard enough convincing sceptical scientists when we try to explain in person."

Just how hard it would be, even Jerry himself did not quite realize at the time.

They barely had fuel enough to smother their headlong fall toward the green-tinged planet. They hit the cushioning hydraulic cradle at the great rocket port on the Atlantic with a spine-jarring smack. Yet, without waiting even for the glowing, friction-heated hull to cool, they slammed out of the exit-port, yelled for an air-taxi.

"Hey, there, Captain Garin!" shouted a hurrying official. "This is most irregular! You weren't due back for another month. Where are your clearance papers?"

But Dan waved derisively down to the gesticulating field official from his seat in the taxi. "Give her the gun, fellow," he yelled to the pilot. "We ain't got any time to waste."

Within an hour they glided to the landing roof of the huge Planetary Council Hall, islanded on the great Atlantic swell. The capital of the Solar System, owning jurisdiction only to the interplanetary State. It was a magnificent affair. An artificial island, anchored immovably to the continental shelf, some sixty miles out from the American city of New York, dedicated to the uses of the ruling Council. White and gold buildings dotted its smooth white surface, housing the various ministries of the Planetary League.

Earth and Mars were the powerful member States, with the autonomous

Colonies, young and vigorous, steadily gaining in influence. Earthmen inhabited Venus, the hollow caverns of the Moon, and Callisto. Martians swarmed on Ganymede, Io, and Europa. Since the first Interplanetary War between Earth and Mars in 2346 A. D., Earth era, when both planets had been reduced almost to shambles, cooler heads had intervened and set up an amicable League. No further trouble had resulted. Disputes, claims to new territory, clashes between colonists, space-commerce rights, were quickly ironed out in an atmosphere of utter cordiality.

WHEN, in the 29th century, piracy along the interplanetary lanes had become a formidable threat under the aegis of the terrible Il Valdo, the patrols coöperated in stamping out the black-dusted vessels. It was Dan Garin who had finally discovered Il Valdo's almost inaccessible lair, and blasted him out of existence.

Towering high over the surrounding buildings on the Interplanetary Island was the great Council Hall. It soared upward for a hundred stories, its white and gold dazzling in the sun. Its flat roof had room for hundreds of Earth-planes, air-taxis, and even for the small, swift private cruisers that rocketed between the nearer planets.

Even as Dan Garin paid off the pilot of their air-taxi, Jerry Hudson said joyfully: "We're in luck. Look at those rows of fast space-cruisers on the racks. Official insignia on every one of them. Mars, Venus, Ganymede. There's a Council meeting in session. That means we'll get quick action."

A Council guard hustled over importantly just as the taxi took off again. "You can't land here," he exclaimed. "The Council is in session and no private individuals are permitted without a signed order from the mainland."

"Had no time to pick up any documents," Jerry answered quietly. "We've got news for the Council that's of the most urgent importance. Get down to the Hall as fast as the tubes can drop you, and tell Ira Peabody, Earth Representative and President of the Council, that Jerry Hudson, Captain Daniel Garin and Sandra Stone have returned from Callisto with matters of the gravest import to the entire System."

The guard—he was a youthful Moon Colonist, new to the job—hesitated uncertainly. He had heard of Hudson; the bearded Captain's name was still on every tongue; and James L. Stone, Sandra's father, was powerful—but his orders had been positive.

Dan towered over him. His black face screwed into fierce contortions. "Did you hear Mr. Hudson?" he roared. "Get going before I break you in two!"

The guard backed away hastily from the frightening apparition. "Y-yes, sir," he stammered. "I didn't mean to——"

He turned incontinently and fled for his life. Captain Garin was obviously not a man to be trifled with.

"My goodness, Danny," Sandra cried. "When you put on a face like that, you scare even me."

He grinned. "I learnt that trick from Il Valdo's men," he explained. "They used to frighten swell ransoms from their captives with their horrible scowls."

Within five minutes the guard was back, apologetic, subservient, yet keeping a discreet distance from the terrible Captain with the thick, black beard.

"President Peabody will see you right away," he said. "There's a recess just now. If you'll follow me——"

The great vertical tube dropped them at break-neck speed to the private office of the President. Ira Peabody rose to greet them. He was a tall, stooped man with gray hair and a thin, ascetic face. His sole consuming passion was the Interplanetary League. His devotion was that of an idealist; he loved resounding words like *Truth, Justice, Honor!* It

was even whispered that when practical matters intervened, he waved them aside with a lofty disdain.

HE SHOOK HANDS cordially, yet with a certain surprise. "Glad to see you, Jerry, and you, too, Captain Garin. We haven't forgotten your noble work against the pirates. And as for lovely Sandra, all that I can say is that you are lovelier than ever. But I thought you three were by this time landed on Callisto. The guard told me——"

"We didn't quite reach our destination," Jerry intervened. "We found something out there in space that made us turn around and come back as fast as rockets could take us. We——"

Peabody looked uneasily at his time signal. "Good Lord!" he exclaimed, "I'm due back in the Hall. We're in the middle of a discussion on a very important matter. We're considering what title to give to the representative from the newly discovered race on Mercury. How about having lunch with me after the meeting, when we can talk at our leisure?"

Jerry kept a grave face. "Of course I understand how important the matter is under discussion, Mr. President. But our own news can't wait. If the Council doesn't do something about it right away, titles won't be of much use very soon."

"What do you mean?" Peabody looked startled.

"I mean, Mr. President, that the fate of the whole Solar System is bound up in our news. Within less than a year, Earth will be wiped out, and all the inhabited planets with it. I doubt very much if all the resources of the Council can prevent it. But at least it must try."

"You—you're just joking," Peabody gasped.

"I can back him up on every word," Dan growled.

"And so can I," Sandra affirmed earnestly. "We saw things happen right before our eyes. Let Jerry tell his story right now to the Council."

Peabody was agitated, at a loss. His hands fluttered. "But we're right in the middle of a topic. Our agenda——"

"There isn't a minute to lose," declared Jerry with decision.

Ira Peabody reflected. Jerry Hudson, young as he was, knew more about scientific matters than any one else in the system. "Very well," he surrendered, "I'll put you on at once."

The vast Council Hall had a capacity of 20,000. But it was not filled now. Only the members and the advisory bodies were present. It was on stated public occasions that the huge galleries held the countless thousands of visitors. Now, only the small inner ring around the speaker's platform was occupied. About 2000 representatives in all; yet they were the brains and statecraft of the System.

Earthmen and Martians were about equally represented—with the Martians wearing special filters over their flat noses to cut down the oxygen content of the heavy Earth atmosphere. They were tall and extremely thin, with thick, rubberoid skins to keep out the Martian cold and green-tinged with chlorophyl-plasma to extract the maximum of vitamins from the pale rays of the sun on their native planet. The Colonists of both races were invariably bigger, burlier, more aggressive than their home-staying compatriots, as has been the case with pioneers in all ages.

A solitary, somewhat frightened, strange little creature sat timidly close to the dais. The new Mercutian, representative of a people newly discovered on that supposedly sterile planet. An expedition had stumbled on them by accident on the dark side of the sweltering orb. They were a race of troglodytes, dwelling in the deepest valleys of the enormous mountain ranges, holding on precariously to their limited air and

water supplies, burrowing for protection against the cold into the soft pumice-like dirt. Tiny, not over four feet high, brown-bodied and furry, incredibly lithe and boneless, with huge round eyes to make the most of eternal dimness. Now their delegate sat uneasily on the edge of his chair, his saucer eyes covered with tinted glasses to keep out the insupportable glare of Earth.

BUT THE BRAINS of the Council sat in the outer rows. The technical advisers, the scientists, engineers, planners, who made up the Advisory Boards. They seemed bored at the desultory discussion that was going on as Peabody and his visitors entered.

A Ganymedan was saying: "If it please this august Assemblage, I must protest against the use of the title, *His Magnificence,* for the new Mercutian delegate." He stared down from his wavering six-foot-three upon the pigmy accession. The Mercutian seemed to shrink still further into himself. "Let us," orated the Ganymedan, "consider a new name for these—uh—newer delegates. Let us say——"

The entrance of the President put a stop to these important proceedings. The Ganymedan yielded the dais. Curious eyes turned to the three Earth-visitors. The technical men in the rear sat up and took notice. What was Jerry Hudson doing back on Earth? He should have been safely installed on Callisto by now, commencing his vast research on the heavy elements, and the possibility of new ones even higher in the atomic scale.

Ira Peabody took his presidential chair. "I'm sorry to break in on our agenda like this," he apologized, "but my three visitors, all well known to every member of the Council, have thought it most urgent. Without further ado, therefore, I shall permit Mr. Hudson to tell you himself what he has to say."

Jerry, heart pounding with the extreme gravity of his message, mounted the speaker's stand, surveyed his audience. He *must* get his warning across, *must* enlist the combined weight of all the planets to back him. Yet it was an incredible thing he was going to tell them—and he had a sinking feeling as he surveyed their placid faces.

He told them his story, crisply yet carefully, weighing each word, trying hard not to sensationalize, yet bringing home in every detail the doom that awaited them all. He closed with words of earnest warning. "Even with the immediate massing of the resources and scientific ability of the entire System, it is extremely doubtful whether we can stave off overwhelming disaster. But at least we must try. We must drop everything else, concentrate on this one problem. I ask of you instant, unequivocal action."

Even as he finished, he knew that he had failed. The political delegates stared owlishly. Here and there one clucked his lips commiseratingly. It was a pity that a brilliant young scientist like Jerry Hudson had lost his wits. Overwork, no doubt.

The technical men had followed him more carefully, but with equal scepticism. Jan Worden, of the Moon, flushed angrily. He was an astronomer whose theory of the inner mechanism of nova had been most widely accepted. If this were true, then his chief claim to fame was knocked into a cocked hat. Gor Ala, Martian physicist, scowled darkly. He was an authority on positrons, and he had maintained with much vehemence that these evanescent creations were highly unstable bits of matter, and not negative energy states as that ignorant ancient, Dirac, had first decided. Others of the technicians had their own pet theories, and every one was ruthlessly brushed aside by this appalling new development that Jerry had brought into their midst.

THEY AROSE clamoring, defending their prepossessions with much heat and prejudice, attacking every angle of Jerry's positron bubble. Gor Ala led the attack. "We *know* by this time what positrons are, their nature, their essential breakdown. It is impossible for such a state as Hudson predicates to exist longer than a millionth of a second anywhere in space. With all due deference to his proven scientific ability, it is more than likely that he found a familiar type of frictional electricity based upon a huge cloud of meteoric dust. As for the tragic fate of the *Mercury*, its shields may have been defective, and the friction of its passage generated a sufficient static charge to disrupt its atomic fuel."

Jan Worden followed. "I would have placed greater credence in Hudson's fantastic story if he hadn't coupled it with a jejune theory about the origin of nova. I have conclusively proved that——"

The Secretary of the Council, a Venusian, observed tolerantly: "By Mr. Hudson's own admission, we have almost three hundred days to worry about this —er—phenomenon. Let us first send a fact-finding commission to investigate the matter, before we go off half-cock. In the meantime, the agenda of our meeting has been sadly disturbed. Now as to the question before the Council—the title by which the Mercutian delegate is to be addressed—let me say in no uncertain terms——"

In the privacy of his own office, Ira Peabody spread his hands placatingly at the storm of indignation with which Sandra threatened to overwhelm him. Her eyes flashed and her tongue was a rapier thrust. "Fact-finding commission indeed!" She stamped her slender foot. "What can those pompous ninnies find out that Jerry hasn't already determined?"

The President tried to clothe himself in the torn shreds of his dignity. "You must remember, my dear young lady," he intoned, "that this is our regular procedure. We cannot disrupt the work of the System on—uh—a wild goose chase, without adequate preliminaries, without complete reports. Of course," he added hastily, "no one knows better than I the scientific merits of our young friend Hudson; but you heard the Advisory Technicians——"

"Yeah!" Dan Garin interrupted brutally, "you'll be reading your blasted reports just in time to sizzle to a cinder. Come on, Jerry, let these political dodos and their yes-men stew in their own juices. We got a *man's* job to do!"

Growling like a wounded bear, he caught the grim young scientist with one huge paw, the slim, raging girl with the other, and literally forced them out the door. Behind them a sadly bewildered and rather futile-looking idealist murmured agitatedly: "Dear me! Dear me!"

IV.

IT TOOK the fact-finding commission ten days to get started. Gor Ala, the Martian and authority on positrons, was placed in command. He could not be rushed. It was, he felt, an excellent chance to crush his rival, the young Earthman, once and for all. So he filled three rocket ships with every conceivable type of equipment, checked and rechecked in advance.

Only the disturbing reports that began to filter through of ships on the Jupiter route being overdue induced him finally to hasten his preparations. They had been careless, no doubt, and permitted their shields to become defective. Static electricity covered all the facts—of that he was positive. Yet the great space lines were becoming anxious about their missing vessels, were clamoring for action.

On the eleventh day he started. There were speeches and admiring plaudits at the rocket port. Among those *not* present were Jerry, Dan and Sandra. They were immersed in Jerry's Earth labora-

tory, working furiously at a seemingly insoluble problem.

The planets were not disturbed. Judicious news items had been issued, emasculated editions of Jerry's jeremiad, followed by soothing announcements. Young Hudson was naturally an alarmist—his hypothesis was purely tentative—and, in any event, the famous physicist, Gor Ala, was even then on his way to check up. In the meantime, let Business Go On As Usual.

Business went on as usual. So did life. The peoples of the planets heard the newscasters, laughed, shrugged shoulders, discussed the possibilities with the same unconcern as if they were about an alien system. They made jokes about jittery scientists, and forgot them.

Gor Ala was in no hurry. The three ships under his command were fast cruisers, but he kept them at their normal space rate of two hundred miles per second. Not for him the risky pushing at top speed that had brought the *Arethusa* back in six days.

The voyage took thirteen days. From the space coördinates that Jerry had grimly given him, together with the pertinent data on directional velocity, etc., he calculated that the unknown field of force, at the time of his arrival, would be in the neighborhood of the asteroid Juno.

He was correct. On the thirteenth day, the three ships, driving parallel, spaced 10,000 miles apart, beheld the phenomenon almost simultaneously.

It was impressive, as even Gor Ala was forced to admit. He had never seen anything like it before. As far as his eye could reach, as far as his visor screens could take him, space was a glitter of innumerable darts of light, flashing up out of nothingness, blazing to sudden extinction, while new ones took their place.

Exactly as Jerry Hudson had described it. The spanglings were thickest on the outer surfaces of the ellipsoid, thinner within. But there was a certain variation. Whereas the young scientist had spoken of only one dark pocket within, caused by the destruction of the ill-fated *Mercury*, now there were a half dozen such pockets, all close to the surface.

For the first time Gor Ala experienced a little sensation of fright. The cold sweat burst out on his green, leatheroid skin. Including the *Mercury*, five spaceliners had been reported missing. Could it be that——?

He shook his head angrily. This was nonsense, of course. A tremendous hole in space, a negative energy level that swallowed electrons, indeed! Hadn't he proved the contrary about positrons?

NEVERTHELESS, he signalled his ships to stand off, not to approach too close as yet. While he was confident that it was a field of infinitely small particles of meteoric dust, generating millions of volts of frictional electricity, and while he had checked carefully the insulating shields on his convoy, nevertheless it might be wise not to take any chances, but to investigate first.

But even as his signal ripped out into space, the farther cruiser, captained by an overenthusiastic young Ionian whom he had thoroughly imbued with his own scepticism, had swerved suddenly and directly for the innocent-seeming little sparklets. Whether it was reckless overconfidence, or a desire to steal the honors of the expedition away from Gor Ala, no one was ever to know.

The Martian screamed angry warning into the visor, but it was too late. Perhaps the young captain heard and pretended ignorance. On and on rushed the vessel, headlong toward the glittering mass. Gor Ala, in the confines of his control chamber, yelled hoarsely and danced with rage. Whatever happened, he would be the loser.

Then there was contact. The dis-

obedient ship clove through the droplets of fire, scattered them to the right and left. At two hundred miles a second it ripped into the heart of the mysterious space, deeper, deeper, like a fast fish diving in luminescent water.

Now Gor Ala raged in good earnest. Damn that young squirt! He was safe, unharmed. Even as he, Gor Ala, had postulated. His shields were impregnable to any voltage. But he had stolen the show, and Gor Ala's glory would suffer. Wait until he got hold of him! He would prefer charges; he would see to it that——

The scattering flashes seemed to coalesce around the plunging cruiser, clung in sheeted flame to its rounded hull. Then suddenly Gor Ala staggered back with a loud cry, flung his hands over his blinded eyes to keep out the intolerable blast of light.

Out there, deep within the glittering mass, something had happened. Something terrible and cataclysmic!

The errant ship blazed with a fury of molten hue; a shell of blazing light swept rapidly out in all directions. Then there was an explosion. The hapless cruiser vanished in a shower of hurtling, dazzling particles. The velocity of expansion was incredible. Farther, farther they sped, flaring new areas to brilliance, leaving in their wake sullen darkness—moveless—dead——

At the very core a tiny replica of the huge ship was a molten mass, a miniature sun, on which it was impossible to look.

AT A DISTANCE, Gor Ala took stock with his frightened sister ship. He was puzzled, angry, and, withal, scared. He told himself, he told his dismayed companions, that young Tamu had been negligent, as well as disobedient. By a dreadful oversight he had permitted his shield to drain of its resistance.

But he could not convince himself, much less the others. He saw it in their ashen faces, the wary looks they turned to that firefly dance out in space, to that new gigantic hole where their comrade had rashly penetrated.

"I think," said one bolder than the rest, an Earthman, "that Jerry Hudson was right. My own hasty tests have been all in confirmation. We had better flash warning back to the Council at once!"

Gor Ala stabbed him with a furious glance. "I am in command of this expedition, not you," he said coldly. "When I have completed my own tests, I shall decide on our course."

"But at least," protested the Earthman, "we ought to report without delay the fate of poor Tamu, and what we discovered of the missing ships."

"And scare the Council out of its wits? That, too, can wait."

There was an uneasy mutter among the scientists. Gor Ala was running things with a high hand, yet there was nothing they could do about it. The Council had expressly given sole command to him, and discipline was strict.

Yet a burly Venusian could not forbear another protest. His eyes were glued to the space chart where Juno showed as a small disk. Close to its edge, closer than was comfortable, the inexorable line of dancing light motes was marching.

"Now look, Gor Ala," he said determinedly. "Only 65,000 miles separate that damned space field from Juno. At their respective rates of speed, it will take only an hour and a half for the asteroid to graze the field. According to Jerry Hudson, even that glancing touch will be sufficient to fuse it to incandescence. At present we're running approximately parallel to them both. At the moment of contact, our ships will be a bare 42,000 miles from Juno. If anything does happen—we're out of luck."

"You're beginning to believe Hudson's nonsense," the Martian laughed scornfully. "An asteroid is an entirely

different proposition from a tiny spaceship. A rocket cruiser is stored with highly combustible fuel. If for any reason the shield is drained of its resistance, a child in the lower schools could tell you that high-voltage static electricity would explode it. But on that sterile chunk of rock, nothing like that could possibly happen. Not even an aurora effect, since Juno possesses no gaseous envelope. We are scientists, Hanson, not frightened little children. It is our duty to stay close, to observe once and for all the destruction of Hudson's silly theory."

Hanson, whose ancestors had been Earth pioneers on Venus, met his superior's angry gaze with level eyes. "I, for one, have become converted to Hudson's silly theory," he declared boldly. "And I don't intend staying here to be blasted to extinction. I'm going back to my own ship and head for Earth to give warning."

"You'll do nothing of the sort," snapped Gor Ala. "I order you to stay."

"Nuts!" declared the Venusian inelegantly. "I'm going."

"And so am I," spoke up the Earthman.

"That's mutiny," gasped the Martian.

"Call it that or anything you damn please. But don't try to stop me."

HE WAS a burly specimen, and his hand was close to his ray projector. In silence they watched him stamp out of the control chamber, followed by his companion in mutiny. In bitter silence they saw his space-boat catapult from the lock, dart swiftly to the other ship. With longing in their eyes, they saw their sister craft swing around, rockets belching, on its long flight back to Earth. Yet they remained, obedient to orders, sticking by Gor Ala in spite of their private thoughts.

An hour and a half out in space, almost to the second, Hanson, the Venusian, and Whitney, the Earthman, saw it happen in their visor-screen.

A pale line of flame ran along the terminator edge of the asteroid. The flame exploded. Blazing fragments rained out into space. In progressive waves, as the rest of the planet received the impact of the fiery particles, as blasting heat smashed deeper and deeper, Juno glowed incandescent. A sun was born!

Though the fleeing ship was already more than two and a half million miles away from the scene of disaster, the heat of sudden combustion overwhelmed their thermal controls, made a searing oven of the interior. Gasping, retching, blinded with the molten glare, Hanson staggered to the visor-screen, frantically snapped connection with Earth. Breathless words poured out warning.

But Hanson's warning was not necessary. Back on Earth, clustered around an electronic scanner, Jerry Hudson, Dan Garin and Sandra Stone were watching in grim silence.

Even as they saw the explosion, watched the incandescence that once had been Juno, the shell of heat struck them. The temperature gauge in the laboratory ran up ten degrees in ten seconds; the walls dripped with sudden steam.

"Juno blasted according to schedule!" For once the black-bearded captain's voice was oddly quiet. "Gor Ala and all his men are but shells of vapor."

"They'll believe you now, the fools!" Sandra whispered almost hysterically.

"Yes, they'll believe me now," said Jerry slowly. He was white-faced, shaken. He was rehabilitated in the eyes of the world, but the triumph was empty, mere ashes and Dead Sea fruit. What profit to be right when, within a bare eleven months, the Solar System would be stripped of life, would fuse to primal incandescence? If a mere grazing contact with an inconspicuous asteroid had led to such tremendous results, what would happen when the entire Earth im-

mersed in the deadly area of negative energy?

Then, almost immediately, the sono-speakers commenced clamoring. The whole System was simultaneously trying to get in touch with the once-discredited scientist.

First Hanson, with his eye-witness account and confirmation of the loss of Gor Ala and two ships. Then a flood of terrified appeals from Mars, Io, Ganymede, the Moon, from every nook and cranny of Earth. Frantic, clamoring, imploring, throwing themselves unreservedly upon Jerry Hudson for protection against onrushing disaster.

Then, finally, blasting through all other calls on the powerful Council wave length, the almost tearful voice of Ira Peabody, President of the Interplanetary League.

"For God's sake, Hudson," he cried in extreme agitation, "you've got to do something, anything, immediately. You were right and the rest of them were wrong. The Council has just met and given you dictatorial powers. The planets, every resource of the System, are turned over to you. Call on every scientist for help. But you *must* find a way to stop this terrible thing before it hits Earth. You have no idea what's already happened from the flare-up on Juno. We've been overwhelmed with reports. They're awful! You're our only hope now!"

"I'll do my best, Mr. President," Jerry said coldly and snapped off the sono-tube.

He turned to face his companions. Sandra's eyes were shining. "You'll do it, Jerry. I know you will," she said softly.

Dan clapped him on the shoulder. "There ain't a doubt about it," he roared jovially. "Lad, the universe is yours!"

Jerry smiled a twisted grin. "I wish I were as certain as you two," he answered dryly.

V.

THE inhabited planets were in a turmoil. The disaster in the asteroid belt had caught them unprepared, because the announcements the Council made beforehand had been deliberately fragmentary, soothing.

The satellites of Jupiter suffered the most. Io and Ganymede, closest to the new sun, had almost roasted alive. The Colonists, fur clad against the constant cold, gasped and pulled frantically at their stifling garments. Callisto, luckily, had been on the opposite side of Jupiter, and that mighty orb had been an effective shield against the sudden outburst of heat. And Jim Stone, Sandra's father, had been warned in time by his daughter, and had taken the necessary precautions.

Mars escaped intact. It was still in conjunction with the Sun, remote from the cataclysm. On the Moon it did not matter. The sealed caverns were insulated against heat and cold. Venus barely felt the effect through its blanketing atmosphere. But on Earth there was trouble. An increase of ten degrees in temperature was a serious matter.

Crops were forced untimely from the ground, the tropics sizzled with added heat. Evaporation increased enormously. Steam rose from the oceans, coalesced in huge cloud banks, beat back to earth in furious storms. The northern ice, the glaciers, softened and thawed. Floods followed, great, lashing tides, inundations. The loss of life and damage to property were enormous. And all the while, low in the heavens, a new sun, tiny but brilliant, glared balefully with the threat of approaching disaster.

Jerry went to work at once. The Council was prostrate at his feet, the scientists of the planets feverishly eager to obey his lightest command, the plain people hailed him as their only savior.

His first thought was to send out scouting ships to observe the ominous

hole in space, to report instantly every shift, every change in its texture and direction. Perhaps, he hoped, the collision with Juno had broken it up, had somehow rendered it innocuous.

But even before the hundred hurtling cruisers reported, he knew that it could not be. The encounter with Juno would have sliced off a sizable area, filled the negative-energy states with electrons, and restored the placid normality of space. But the surviving mass would be sufficient to destroy Earth. As for change of direction, that was impossible. Neither heat nor gravitation nor impact with matter could appreciably stay its inexorable course.

AND SO it proved. Re-measurements disclosed the fact that the ellipsoid had shrunk along its longitudinal axis a full million miles, but Earth in its appointed orbit would still find itself thirty thousand miles deep within the negative space of the bulge of the minor axis.

Jerry said despairingly: "If only we could slice off that much more, Earth would be saved."

"If I remember correctly," suggested Sandra, "a magnetic field will swerve positrons from their path. Doesn't that help?"

"Not in the slightest," he answered grimly. "I already considered that phase of it. The amount of magnetism that we could build up with our generators would be infinitesimal compared to that which is required. Only the Sun is a sufficiently powerful magnet to do the trick. And at that distance the Sun is not close enough to exert a useful effect."

"I've got it," Dan exclaimed excitedly. "What you need are electrons to fill up the holes, to make that damned positron bubble vanish?"

"Well?"

"Why don't you get the rocket navies of the System to shoot space projectiles into it day and night?"

Jerry shook his head with a weary smile. "We haven't enough munitions in the world for one thing, and even a constant bombardment for the nine months that's left us wouldn't make much of an impression."

"Damn!" the Captain ejaculated disappointedly. "I thought I had the answer. Too bad we can't find a real big asteroid to throw into its path as a sort of a blasted sacrifice."

"Yes, it's too bad!" Jerry repeated absently. Then he jerked erect. "Eh, what's that?"

Dan was taken aback. "I only said ——" he started in self-defense.

But the young scientist's eyes were blazing; his body was a taut bow. "By the three-headed toads of Phobos, you've hit upon it, Danny!"

"You don't mean to say you can push asteroids around?" Sandra protested.

"Of course not. But we can sacrifice!"

"What?"

"The rocket fleets of the System, and every new one we can rush to completion in the allotted time. We have nine months to go. Look!" He sat down, scribbled furiously on a pad. "All we need is to slice off a cubic area of one hundred trillion cubic miles."

"A large order, lad," growled Dan.

"I know it. But we have now, at an estimate, some 20,000 rocket ships in the System. They range from small pleasure yachts to great 10,000-ton liners. Let us take the *Mercury* as the norm. It weighed about 2000 tons. Suppose we fill every last one of them with the heaviest cargoes we can get. Iron—even sand—atoms of any sort that possess the stores of electrons in orbits and electrons locked within their nuclei that we need."

HE GREW more enthusiastic, scribbled more furiously. "Within nine

months, with every shipyard going full blast, with the manpower of all the planets concentrated on the job, we can build another 20,000 ships, mine sufficient matter to fill every nook and cranny of them. Rocket fuel, of course, would have to be manufactured in tremendous quantities to lift these immensely heavy loads from the respective planets." He smiled wryly. "Fortunately, they wouldn't have to travel far."

Again he bent to the pad. "Now figure the average tonnage per ship, including hull and cargo, at 10,000 tons gross. Multiply that by the number of vessels, old and new—40,000 remember—and the total tonnage that we'll be able to hurl into that seemingly bottomless hole in space would amount to 400,000,000 tons. The cubic area to be filled runs to one hundred trillion cubic miles."

Dan Garin whistled. "That's mileage in any language."

"Yet we have enough material to take care of it, provided it is properly applied and at the most efficient points. I measured the dark area formed by the annihilation of the *Mercury*. It amounted to half a billion cubic miles for 2000 tons of matter. The proportion is almost exactly right."

The burly Captain stared. "Half a billion cubic miles?" he ejaculated. "Why, I saw it as well as you. It didn't look to me anything like that big."

Jerry smiled. "You forget we're dealing with cubic miles," he explained. "It sounds like a lot. Actually it means a diameter of not much over a thousand miles."

"But don't you know what you're doing, Jerry?" Sandra burst out suddenly. "You're going to strip the System of every ship, of all its reserves of metals. Civilization will be set back for hundreds of years."

"Isn't that better, dear," the young man replied gently, "than being wiped out altogether? We'll be crippled, no doubt, but I don't think it will take that long to get back to our feet. With united efforts we can build new rocket ships, exploit the mines, seek new sources of minerals on the planets beyond Jupiter where we haven't penetrated as yet. Of course there'll be suffering, hardship, for years to come. But perhaps it will be all for the best. Our peoples, especially on the old, settled planets, have been becoming rather soft of late. They need a return to harsher conditions of life. And in any event, it's the only way."

THE Interplanetary League drew back aghast at Jerry's calm proposal. What! Destroy every ship on the space lines, drop everything else and build more only for similar destruction? Throw the wealth of the System into the same inexhaustible maw? It was outrageous; it was worse! Surely there was some other method, easier, simpler —one that wouldn't throw the planets back to primitive conditions, almost.

The vested interests were the loudest clamorers. The owners of ships, the dealers in metals, the great financial houses that controlled these chief sources of wealth. They would be ruined, stripped of all the precious property their ancestors had struggled to amass.

They circulated ugly rumors. It was a brazen scheme on the part of Jerry Hudson to wring untold wealth and power from the necessitous condition of the System. No doubt he and his co-partner in crime, Captain Garin, had discovered an asteroid of solid polonium somewhere, and intended, after the stripping of all available supplies of the immensely precious fuel metal, to hold it for sale at exorbitant figures.

But the scientists of the System, after careful study of Jerry's data, unanimously backed up his conclusions. The System was doomed unless something was done, they announced in a joint proclamation. They had examined

Jerry Hudson's plan and found it entirely feasible. Also they had examined all other plans. They would not work. The sacrifice must be made.

The Council reluctantly passed the requisite resolutions. The malcontents were put down with stern measures. Propaganda was employed to obtain the proper coöperation. Lurid pictures were painted of the Earth as a nova, of all life crisping as far as Saturn. The propaganda almost overshot its mark. It scared the people half to death. Secret expeditions were outfitted by fearful millionaires and took off for the unknown reaches beyond Saturn. Thereby precious ships were abstracted. What happened to these desperate ventures was never learned. Very likely they all succumbed. Life could not possibly exist for long on the glacial moons of Uranus and Neptune.

Dan Garin cursed luridly at the long delay, but Jerry went calmly ahead with his plans. On the signing of the final ratifying decree his organization was full born. At a signal, work started in a thousand shipyards, in ten thousand mines. All but the most essential industries were dropped. The millions of men throughout the planets, and their wives as well, concentrated on the task in hand. Only eight months were left.

Rocket craft, of a uniform 2000 tons, slipped on the ways, and new hulls were commenced. Rocket fuel was manufactured in enormous quantities. Ore came in unending streams, was dumped into capacious holds to the bursting point. Countless billions of dollars of precious metals, the very lifeblood of civilization. New crews were hastily trained.

JERRY did not sleep or eat. He was everywhere, a whirlwind of energy, planning, organizing, exhorting, whipping up lagging workers. Sandra was with him constantly, assisting, taking care of details.

Captain Garin had charge of the technical problems of fuel supply, proper pay loads, and ultimate navigation.

They were in Jerry's Earth office. On the wall was a gigantic map of the Solar System, the ominous space-positron was marked out in moving red lights. It was now 186,000,000 miles from its anticipated meeting with Earth.

"Six more months to go," sighed Jerry. "And the work is only just really getting under way. But we can't afford to wait too long. The closer it gets to Earth the greater the danger." He turned to Garin, said quietly, "We'll have to start at once. Commence hurling loaded rocket ships into the intruder. I'll give you a duplicate of this map, marked in detail with the exact coördinates. It is essential that the sacrificial ships penetrate exactly to the areas marked. Otherwise it will never work out. We're working as it is on an uncomfortably close margin."

Dan saluted gravely. "How many ships and how many at a time?" he asked.

"I've marked that, too. Two hundred a day at as widely separated points as possible. Otherwise the generated heat of the blazing nuclei will be too great. Get going!"

Within a week the planets beheld an amazing spectacle. Huge fleets of rocket ships blasting upward from every rocket port on every inhabited planet. Gorged with thousands of tons of matter, propelled by gigantic jets of fuel. Behind them roared the convoys of sister ships, stripped of all gear, ready to stand by and rescue the crews of the devoted liners.

They took their positions in space, pointed noses toward the inexorably advancing glitter. Captain Garin, his face harsh with strain, checked every detail from his flagship. It was a highly dangerous adventure; the rocket crews of the sacrificial vessels might or might not escape in time. Yet science and

skillful navigation had done everything to safeguard their lives.

With hands that trembled he punched the signal to go ahead.

At once quiescent rocket tubes roared into life. Along the far-flung front, flame streaked out in parallel columns. Waiting ships accelerated furiously. Forward they darted, belching red fire and hot blue flame, straight into the maw of the harmless-seeming dance of fireflies. Ten thousand miles—five thousand miles—three thousand—straight on their courses, fixed, unswerving!

The perspiration beaded on Dan's forehead. In ten seconds more—— Desperately he jerked out the final signal: "Evacuate ships!"

Controls snapped into automatic steering. White-faced crews raced to the lifeboats. Locks ripped open, tiny lifecraft slammed out. There was no time for equalizations of pressure, for any of the usual minutiæ of space safety. It was a race with death!

Even as the deserted vessels roared into the plotted areas, all space was filled with hurtling small craft, darting headlong for the enringing convoy.

Then space seemed to explode. The fierce light-flashes caught the hurrying boats, tossed them like cockleshells on an angry sea. Blinded navigators fumbled at controls. Boats swerved violently from their course, shot back into the flaring maw of destruction. Two hundred cargo ships, metal-filled, flamed in unison. Two millions tons to fill the insatiable void!

The rimming convoy sped to the aid of the tiny lifeboats. One after another was swept up by magnetic grapples, the shaken, white-faced crews brought in to safety and medical attention. But twenty of them had gone to their doom, martyrs that the rest of the System might live.

Dan Garin cursed blue streaks in the privacy of his control room. Brave men had gone to their death, and he had watched them go from the safety of distance. Yet his orders were strict! As space-generalissimo he was not permitted to risk his life. He had raged and pleaded, but the Council had been adamant.

When the tiny nova had died down, careful measurements were taken. Vast dark holes yawned within the advancing glitter; but compared to what remained, they were but inconspicuous drops in an ocean of light. The coördinates were plotted, radioed to Jerry at his Earth Headquarters.

The next day 200 more ships flamed into the engulfing void, and ten more of the lifeboats were lost.

VI.

DAY IN, day out, the Herculean task went on. Space streamed with fresh ships hurtling to inevitable doom, more and more crews vanished heroically; and still the march of the electron-devouring void seemed as limitless as ever.

Production was geared to new heights. Men toiled and labored with frantic energy, racing a desperate race with time. The entire System was a gigantic workship. The clamor of electric hammers never stilled, the flare of disintegration furnaces never died.

And still the endless rocket ships plunged deep and exploded, and still a goodly portion of the crews died in the effort to escape. It became more and more difficult to obtain volunteers for the hazardous undertaking.

Dan Garin paced his control chamber like a wounded elephant, his bearded face dark with anguish and fury. Jerry took time off from his incessant labors to seek a way out, while Sandra cried at the repeated toll of gallant men.

They tried evacuations at 10,000 miles; they tried locked controls on crewless ships. But the laden vessels went haywire, collided with each other, flamed futilely in normal space, or rammed into sectors already normalized.

They had to go back to evacuations at 3000 miles and a terrible percentage of deaths.

There was something else that brought haggard lines of Jerry's face as he studied the charts. Something had gone wrong with his calculations. It was in the eighth month. The gigantic swoop of negative energy was but 35,000,000 miles from Earth. As the scattered electrons of space were engulfed closer and closer to the beleaguered planet, it became visible to the alarmed populace as a soft glow in the night skies. And always, brilliant splotches of light nibbled at its edges, where the cargo ships hurtled and blazed.

"Anything wrong?" Sandra asked anxiously, seeing Jerry's frowning concentration. She was thinner than she had been, and hollow rings encircled her eyes.

"Plenty!" retorted the young man. "We've already shoved 300,000,000 tons into the allotted areas. According to my figures we should have plugged up three-quarters of the energy holes along the line of anticipated contact with Earth. Actually it's only about two-thirds."

"You mean——"

"I mean," he declared harshly, "that even with our full maximum of production, 450,000,000 tons, there'll be a sufficient area left to blow the Earth into a complete nova."

THE WORDS roared in Sandra's ears. All their work had gone for nothing. In spite of gigantic labors, the System would die.

"How do you account for it?" she managed to whisper.

Jerry paced back and forth with quick, agitated steps. "It's something I overlooked in my calculations—something that couldn't possibly have been avoided. The ships and their cargoes are not homogeneous in composition. It is impossible to make them so. We haven't enough of any single metal. The result is that different parts of the sacrificial ships have varying amounts of electrons. Those units with the most electrons in their atoms are attacked more heavily than the others. Parts explode at different rates and with different intensities. Therefore the ships, though locked on their courses, gyrate widely from their predetermined destinations, invade each other's precincts. There is duplication, overlapping."

Again there was silence. "You mean," said Sandra softly, with pain in her eyes, "that if there were a human being at the controls in the last death plunge, he could so manipulate the ship as to force it to its proper place?"

"Yes!" Jerry said tonelessly.

It was put up to the Council, and through it to the planets. A call was issued for suicide squadrons, for a man to each ship to pilot it into Hell. There would not be a chance for escape.

The space-pilots, their ranks depleted by heavy losses, revolted. They had had enough, they shouted. Every day saw a certain percentage of their comrades lost. Already almost half their available manpower had flared to death. But at least there was a fighting chance. What was now being asked was entirely different. Even the bravest quailed at certain annihilation. A few did volunteer, but they were not enough. Either thousands would embark on a mass holocaust, or the plan would have to be dropped.

The plan was dropped.

Daily, the rocket liners hurled themselves into light-death; daily, frantic crews fled in lifeboats, and daily the casualty lists mounted.

Jerry almost wept. "It doesn't mean anything, all this that we're doing," he cried. "There are only fifteen days more. We've got 3000 ships left. They're enough to plug up what we need for minimum safety, *provided* each ship lunges exactly where we want it to go. But that's impossible!"

Dan Garin had come back to Earth for a flying trip. His black eyes glowed with a fierce, strange light. His glossy beard was stiff and electric. His face was dark from exhaustion and anguish of spirit. Daily he had seen men die while he had acted the coward.

"Look, lad!" he said suddenly. His normal roar was muted, almost gentle. "Would it be possible to smack, say, a couple of thousand ships simultaneously into the sectors you've plotted? I mean, with a few men piloting key ships, and holding the others to their appointed courses?"

Jerry stared. He knuckled his forehead. "I don't know," he answered slowly. "Perhaps. But it would require complicated control mechanisms on the key ships, and time is damn short."

Dan squinted out of Headquarters at the skies. It was night. The sheeted glow danced like an aurora; here and there, like torches on a glowing backdrop, fires burned.

"Look, Jerry lad," he said again. "I've got to be going back. But I'll be here again in five days, and I'll expect to find the necessary apparatus drafted and ready for installation. So long!"

He left hurriedly before the amazed scientist could even open his mouth. The young man scowled harshly, muttered to himself, then sat down at his worktable with swift determination.

ON THE FIFTH DAY, true to his word, Captain Garin appeared at Headquarters. The flame had died from his eyes, had given way to something stubborn and purposeful.

"Well, Jerry lad?" was his first greeting.

The scientist was excited, joyful. He belabored his startled friend. "You old elephant!" he cried. "That's the second time you've put me on the right track. I've got it!"

"Got what?" demanded Dan. Sandra, watching him closely, saw his face harden into a strange mask.

"The control apparatus, of course! Worked out to the last detail. A master mechanism on the key ship, tiny adjustable controls on the others. Each button on the master will handle a certain plotted course, no matter how many ships there are to be shifted. Twenty buttons in all will take care of all possible space coördinates."

"You mean," said Dan quietly, "only one master ship is required?"

"Yes. And I don't anticipate any difficulty in obtaining a volunteer. You remember that there were fifteen who offered their lives when the first proposition was made."

Captain Garin breathed deep. "Those fifteen," he said tonelessly, "have already died. No one else will volunteer."

Jerry stopped as if shot. "Why," he exclaimed, "there must be——"

"There is." Dan did not raise his voice. "I've found someone who will undertake the job."

"Swell! Who is he?"

"Someone—uh—that I know. He does not wish his name to be disclosed."

"It will be glorified in all future history," Jerry declared.

Sandra had been listening intently. But her eyes had never left the Captain's face. She got up suddenly, went to him swiftly.

"Dan Garin!" she cried, with a sharp break in her voice. "You're not fooling me. *You're* the one! There is no one else."

He was taken aback, essayed an awkward laugh. "Who, me?" he roared. "Not a chance! You're imagining things, Sandra."

She shook him with fierce tenderness, tears glittering in her eyes. "You *are* the one, and I won't let you, do you hear? I won't let you commit suicide. I won't!"

Jerry jerked to his feet. "By God, Sandra, you're right! He's damned

fool enough to do it. Look here, Danny! This is my job, not yours. I've navigated spaceships in my day. I know my controls."

The girl turned on him blindly, her eyes filled with an awful fear. "Jerry!" she screamed. "Not *you!* I couldn't bear it! I'd die!"

Dan's face twisted into a sad little smile. "There, you see, Jerry. You're out of the picture. Sandra loves you. She needs you. I'm an old man—all of forty-three—I've seen and done my share to fill a few lifetimes. I can afford to go." He smiled again, a funny little smile. "Only one thing I'll ask. Your first male child—call him Danny!"

FIVE DAYS before Earth and the huge positron-space were scheduled to collide! Ships had been thrust by the hundreds into its ominous path. But still there were ragged edges, sufficient, in spite of every desperate effort, to sink Earth into a devouring nova. Only one thing could save the System. Two thousand remaining boats, cargoed to the hilt, stabbing with exact precision at widely disparate, specified areas.

Earth was the base for the final tremendous effort. The great rocket port on the Atlantic was black with limitless humanity. Millions of people, come to see Captain Daniel Garin go to certain death that they might live! Millions of people, with the shadow of despair on their haggard faces, with hope flaring incomprehensibly in their hearts, shouting, yelling, sobbing a single name: *"Garin! Danny Garin!"*

"There, you see," he turned quizzically to Jerry and Sandra as they stood for the last precious moment in the control room of the master ship. "I was selfish at that. It isn't given many men to go out with five billion people rooting for you throughout the System." A faint smile played around his bearded lips. "Sounds good, don't it?"

Sandra sobbed unashamedly. Jerry's own eyes were queerly moist. Dan stared at them, said quickly, "Time's up. You'd better go now."

Jerry wrung his hand. There was nothing to be said. The girl flung herself into his arms, kissed him full on the mouth.

Dan's smile was utterly gentle. "Thanks," he said softly. "Remember always, Sandra, that I loved you!"

A minute later the giant ship sprang up from its cradle with a roar of thunder. But overwhelming even the rocket blasts was the greater roar that went up from millions of throats. A last, gigantic salute to a gallant gentleman!

Out in space, two thousand ships jockey into position before the serried fireflies. Only 5,000,000 miles from Earth!

In eight hours Captain Garin joined them. Last second calculations were made. Everything was shipshape, awaiting the final thrust. Dan checked his controls, making sure he had them at fingertips. Then, without turning his head, he gave quiet orders to the crew who had come with him this far. "You may go now, gentlemen! We are ready!"

They left him, taking to the lifeboats, reluctantly. Not an eye was dry. From the far-flung line the slim little lifeboats tumbled. All controls were now operated from the master key on Garin's craft.

A little smile played over his bearded lips. His tongue ran over them exploringly. A name formed itself, *"Sandra!"*

Then he looked at the time signal. It was zero hour. Without hesitation he leaned forward, punched buttons with practiced hand.

The long line of crewless ships jerked as though on an invisible string. Rocket jets flaring, they plunged ahead, each to a definite destination. Dan Garin hunched over his screens and controls,

watching sharply for any deviations from the appointed course.

Into the spangle of photon flashes they fled, into the electron-devouring gape of a negative space. Waves of blasting light enveloped the ships. Individual units lurched under the varying impacts, departed from the norm. Dan Garin, wholly shielded, watched the traceries on his screens, punched button after button. Far-off ships quivered, swung noses back into line.

It was getting hot! The air steamed. The ship rocked under furious assaults. Yet Dan clung to his post, punched buttons with methodical hand. They became red-hot to the touch. His clothes crisped, his skin started to sizzle. Breathing was impossible—fire stabbed at his lungs. Yet somehow his hands moved—errant vessels were brought sharply back into line.

Then—a glow of sudden splendor surged over and through him——

BACK on Earth, night became day. Twenty million tons had flared to extinction, two thousand tiny novæ glowed with insupportable luster. Sandra slid slowly, soundlessly, to the ground. Jerry Hudson, eyes taut on the electronic scanner, clenched his hands until they bled.

Earth cowered under the tremendous thrust. It was winter, yet frightened men clawed at enveloping garments. It became stifling hot. The snow melted, the rivers ran in spring floods, great storms rocked the upper atmosphere. Again the damage was incalculable.

But Jerry Hudson, clinging to his scanner, whose mechanism could pierce the clouds, plotted and calculated with fierce energy. He must not think, must not yield to the slightest emotion. One thing, and one thing alone now mattered. Had Danny Garin's sacrifice been in vain?

Suddenly his eyes misted. Something snapped within him. He leaned over the table, buried his head in his hands, and sobbed.

Behind him Sandra crawled painfully to her feet. She swayed, saw him bowed as if in despair, crying. A great fear displaced the anguish in her breast.

He lifted his head at her touch, turned tear-streaked face to her. Somehow they were in each other's arms.

"Dan Garin failed," she said quietly.

"On the contrary," he told her, "he has saved the System. Earth will clear with a bare five hundred miles to spare. What is left of the ellipsoid will drift once more into interstellar space."

They clung to each other then, desperately. Yet each thought of one who was not there—of black-bearded, roaring Danny Garin, who had gone to his death with a smile, that a System might live!

Tolemy remembered Man—the expedition had met success.

THE FAITHFUL

by Lester del Rey

A tale of the time when Man has gone, and his friend of the ages mourns alone——

TODAY, in a green and lovely world, here in the mightiest of human cities, the last of the human race is dying. And we of Man's creation are left to mourn his passing, and to worship the memory of Man, who controlled all that he knew save only himself.

I am old, as my people go, yet my blood is still young and my life may go

on for untold ages yet, if what this last of Men has told is true. And that also is Man's work, even as we and the Ape-People are his work in the last analysis. We of the Dog-People are old, and have lived a long time with Man. And yet, but for Roger Stren, we might still be baying at the moon and scratching the fleas from our hides, or lying at the ruins of Man's empire in dull wonder at his passing.

There are earlier records of dogs who mouthed clumsily a few Man words, but Hungor was the pet of Roger Stren, and in the labored efforts at speech, he saw an ideal and a life work. The operation on Hungor's throat and mouth, which made Man-speech more nearly possible was comparatively simple. The search for other "talking" dogs was harder.

But he found five besides Hungor, and with this small start he began. Selection and breeding, surgery and training, gland implantation and X-ray mutation were his methods, and he made steady progress. At first money was a problem, but his pets soon drew attention and commanded high prices.

When he died, the original six had become thousands, and he had watched over the raising of twenty generations of dogs. A generation of my kind then took only three years. He had seen his small back-yard pen develop into a huge institution, with a hundred followers and students, and had found the world eager for his success. Above all, he had seen tail-wagging give place to limited speech in that short time.

The movement he had started continued. At the end of two thousand years, we had a place beside Man in his work that would have been inconceivable to Roger Stren himself. We had our schools, our houses, our work with Man, and a society of our own. Even our independence, when we wanted it. And our life span was not fourteen, but fifty or more years.

Man, too, had traveled a long way. The stars were almost within his grasp. The barren moon had been his for centuries. Mars and Venus lay beckoning, and he had reached them twice, but not to return. That lay close at hand. Almost, Man had conquered the universe.

But he had not conquered himself. There had been many setbacks to his progress because he had to go out and kill the others of his kind. And now, the memory from his past called again, and he went out in battle against himself. Cities crumbled to dust, the plains to the south became barren deserts again, Chicago lay covered in a green mist. That death killed slowly, so that Man fled from the city and died, leaving it an empty place. The mist hung there, clinging days, months, years—after Man had ceased to be.

I, TOO, went out to war, driving a plane built for my people, over the cities of the Rising Sun Empire. The tiny atomic bombs fell from my ship on houses, on farms, on all that was Man's, who had made my race what it was. For my Men told me I must fight.

Somehow, I was not killed. And after the last Great Drive, when half of Man was already dead, I gathered my people about me, and we followed to the north, where some of my Men had turned to find a sanctuary from the war. Of Man's work, three cities still stood—wrapped in the green mist, and useless. And Man huddled around little fires and hid himself in the forest, hunting his food in small clans. Yet hardly a year of the war had passed.

For a time, the Men and my people lived in peace, planning to rebuild what had been, once the war finally ceased. Then came the Plague. The anti-toxin which had been developed was ineffective as the Plague increased in its virulency. It spread over land and sea,

gripped Man who had invented it, and killed him. It was like a strong dose of strychnine, leaving Man to die in violent cramps and retchings.

For a brief time, Man united against it, but there was no control. Remorselessly it spread, even into the little settlement they had founded in the north. And I watched in sorrow as my Men around me were seized with its agony. Then we of the Dog-People were left alone in a shattered world from whence Man had vanished. For weeks we labored at the little radio we could operate, but there was no answer; and we knew that Man was dead.

There was little we could do. We had to forage our food as of old, and cultivate our crops in such small way as our somewhat modified forepaws permitted. And the barren north country was not suited to us.

I gathered my scattered tribes about me, and we began the long trek south. We moved from season to season, stopping to plant our food in the spring, hunting in the fall. As our sleds grew old and broke down, we could not replace them, and our travel became even slower. Sometimes we came upon our kind in smaller packs. Most of them had gone back to savagery, and these we had to mold to us by force. But little by little, growing in size, we drew south. We sought Men; for two hundred thousand years we of the Dog-People had lived with and for Man.

In the wilds of what had once been Washington State we came upon another group who had not fallen back to the law of tooth and fang. They had horses to work for them, even crude harnesses and machines which they could operate. There we stayed for some ten years, setting up a government and building ourselves a crude city. Where Man had his hands, we had to invent what could be used with our poor feet and our teeth. But we had found a sort of security, and had even acquired some of Man's books by which we could teach our young.

THEN into our valley came a clan of our people, moving west, who told us they had heard that one of our tribes sought refuge and provender in a mighty city of great houses lying by a lake in the east. I could only guess that it was Chicago. Of the green mist they had not heard—only that life was possible there.

Around our fires that night we decided that if the city were habitable, there would be homes and machines designed for us. And it might be there were Men, and the chance to bring up our young in the heritage which was their birth-right. For weeks we labored n preparing ourselves for the long march to Chicago. We loaded our supplies in our crude carts, hitched our animals to them, and began the eastward trip.

It was nearing winter when we camped outside the city, still mighty and imposing. In the sixty years of its desertion, nothing had perished that we could see; the fountains to the west were still playing, run by automatic engines.

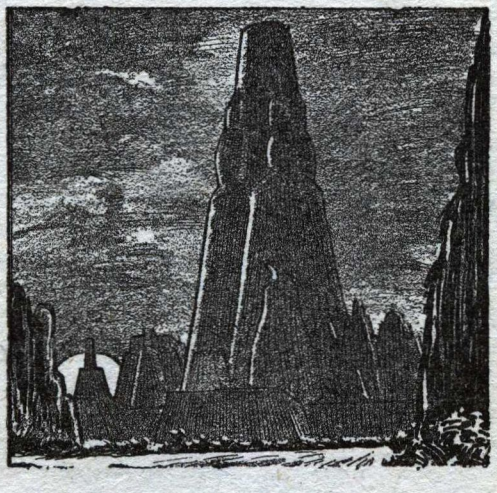
We advanced upon the others in the dark, quietly. They were living in a great square, littered with filth, and we noted that they had not even fire left from civilization. It was a savage fight, while it lasted, with no quarter given nor asked. But they had sunk too far, in the lazy shelter of Man's city, and the clan was not as large as we had heard. By the time the sun rose there was not one of them but had been killed or imprisoned until we could train them to our ways. The ancient city was ours, the green mist gone after all those years.

Around us were abundant provisions, the food factories which I knew how to run, the machines that Man had made to fit our needs, the houses in which we could dwell, power drawn from the

bursting core of the atom which needed only the flick of a switch to start. Even without hands, we could live here in peace and security for ages. Perhaps here my dreams of adapting our feet to handle Man's tools and doing his work were possible, even if no Men were found.

We cleared the muck from the city and moved into Greater South Chicago, where our people had had their section of the city. I, and a few of the elders seeing the return of the gods. My breath was choked; a great peace and fulfillment surged over me. "Greetings, and the blessings of your God. I had no hope of seeing Man again."

He shook his head. "I am the last. For fifty years I have been searching for men—but there are none. Well, you have done well. I should like to live among you, work with you—when I can. I survived the Plague somehow, but it comes on me yet, more often



who had been taught by their fathers in the ways of Man, set up the old regime, and started the great water and light machines. We had returned to a life of certainty.

And four weeks later, one of my lieutenants brought Paul Kenyon before me. Man! Real and alive, after all this time! He smiled, and I motioned my eager people away.

"I saw your lights," he smiled. "I thought at first some men had come back, but that is not to be; but civilization still has its followers, evidently, so I asked one of you to take me to the leader. Greetings from all that is left of Man!"

"Greetings," I gasped. It was like now, and I can't move nor care for myself then. That is why I have come to you.

"Funny." He paused. "I seem to recognize you. Hungor Beowulf, XIV? I am Paul Kenyon. Perhaps you remember me? No? Well, it was a long time, and you were young. But that white streak under the eye still shows." A greater satisfaction came to me that he remembered me.

Now one had come among us with hands, and he was of great help. But most of all, he was of the old Men, and gave point to our working. But often, as he had said, the old sickness came over him, and he lay in violent convulsions, from which he was weak for

days. We learned to care for him, and help him when he needed it, even as we learned to fit our society to his presence. And at last, he came to me with a suggestion.

"HUNGOR," he said, "if you had one wish, what would it be?"

"The return of Man. The old order, where we could work together. You know as well as I how much we need Man."

He grinned crookedly. "Now, it seems, man needs you more. But if that were denied, what next?"

"Hands," I said. "I dream of them at night and plan for them by day, but I will never see them."

"Maybe you will, Hungor. Haven't you ever wondered why you go on living, twice normal age, in the prime of your life? Have you never wondered how I have withstood the Plague which still runs in my blood, and how I still seem only in my thirties, though nearly seventy years have passed since a man has been born?"

"Sometimes." I answered. "I have no time for wonder, now, and when I do—Man is the only answer I have."

"A good answer," he said. "Yes, Hungor, Man is the answer. That is why I remember you. Three years before the war, when you were just reaching maturity, you came into my laboratory. Do you remember?"

"The experiment," I said. "That is why you remember me?"

"Yes, the experiment. I altered your glands somewhat, implanted certain tissues into your body, as I had done to myself. I was seeking the secret of immortality. Though there was no reaction at the time, it worked, and I don't know how much longer we may live—or you may; it helped me resist the Plague, but did not overcome it."

So that was the answer. He stood staring at me a long time. "Yes, unknowingly, I saved you to carry on man's future for him. But we were talking of hands.

"As you know, there is a great continent to the east of the Americas, called Africa. But did you know man was working there on the great apes, as he was working here on your people? We never made as much progress with them as with you. We started too late. Yet they spoke a simple language and served for common work. And we changed their hands so the thumb and fingers opposed, as do mine. There, Hungor, are your hands."

Now Paul Kenyon and I laid plans carefully. Out in the hangars of the city there were aircraft designed for my people's use; heretofore I had seen no need of using them. The planes were in good condition, we found on examination, and my early training came back to me as I took the first ship up. They carried fuel to circle the globe ten times, and out in the lake the big fuel tanks could be drawn on when needed.

Together, though he did most of the mechanical work between spells of sickness, we stripped the planes of all their war equipment. Of the six hundred planes, only two were useless, and the rest would serve to carry some two thousand passengers in addition to the pilots. If the apes had reverted to complete savagery, we were equipped with tanks of anaesthetic gas by which we could overcome them and strap them in the planes for the return. In the houses around us, we built accomodations for them strong enough to hold them by force, but designed for their comfort if they were peaceable.

AT FIRST, I had planned to lead the expedition. But Paul Kenyon pointed out that they would be less likely to respond to us than to him. "After all," he said, "men educated them and cared

for them, and they probably remember us dimly. But your people they know only as the wild dogs who are their enemies. I can go out and contact their leaders, guarded of course by your people. But otherwise, it might mean battle."

Each day I took up a few of our younger ones in the planes and taught them to handle the controls. As they were taught, they began the instruction of others. It was a task which took months to finish, but my people knew the need of hands as well as I; any faint hope was well worth trying.

It was late spring when the expedition set out. I could follow their progress by means of television, but could work the controls only with difficulty. Kenyon, of course, was working the controls at the other end, when he was able.

They met with a storm over the Atlantic Ocean, and three of the ships went down. But under the direction of my lieutenant and Kenyon the rest weathered the storm. They landed near the ruins of Capetown, but found no trace of the Ape-People. Then began weeks of scouting over the jungles and plains. They saw apes, but on capturing a few they found them only the primitive creatures which nature had developed.

It was by accident they finally met with success. Camp had been made near a waterfall for the night, and fires had been lit to guard against the savage beasts which roamed the land. Kenyon was in one of his rare moments of good health. The telecaster had been set up in a tent near the outskirts of the camp, and he was broadcasting a complete account of the day. Then, abruptly, over the head of the Man was raised a rough and shaggy face.

He must have seen the shadow, for he started to turn sharply, then caught himself and moved slowly around. Facing him was one of the apes. He stood there silently, watching the ape, not knowing whether it was savage or well-disposed. It, too, hesitated; then it advanced.

"Man—Man," it mouthed. "You came back. Where were you? I am Tolemy, and I saw you, and I came."

"Tolemy," said Kenyon, smiling. "It is good to see you, Tolemy. Sit down; let us talk. I am glad to see you. Ah, Tolemy, you look old; were your father and mother raised by man?"

"I am eighty years, I think. It is hard to know. I was raised by Man long ago. And now I am old; my people say I grow too old to lead. They do not want me to come to you, but I know Man. He was good to me. And he had coffee and cigarettes."

"I have coffee and cigarettes, Tolemy." Kenyon smiled. "Wait, I will get them. And your people, is not life hard among them in the jungle? Would you like to go back with me?"

"Yes, hard among us. I want to go back with you. Are you many here?"

"No, Tolemy." He set the coffee and cigarettes before the ape, who drank eagerly and lit the smoke gingerly from

a fire. "No, but I have friends with me. You must bring your people here, and let us get to be friends. Are there many of you?"

"Yes. Ten times we make ten tens—a thousand of us, almost. We are all that was left in the city of Man after the great fight. A Man freed us, and I led my people away, and we lived here in the jungle. They wanted to be in small tribes, but I made them one, and we are safe. Food is hard to find."

"We have much food in a big city, Tolemy, and friends who will help you, if you work for them. You remember the Dog-People, don't you? And you would work with them as with man if they treated you as man treated you, and fed you, and taught your people?"

"Dogs? I remember the Man-dogs. They were good. But here the dogs are bad. I smelled dog here; it was not like the dog we smell each day, and my nose was not sure. I will work with Man-dogs, but my people will be slow to learn them."

Later telecasts showed rapid progress. I saw the apes come in by twos and threes and meet Paul Kenyon, who gave them food, and introduced my people to them. This was slow, but as some began to lose their fear of us, others were easier to train. Only a few broke away and would not come.

Cigarettes that Man was fond of—but which my people never used—were a help, since they learned to smoke with great readiness.

It was months before they returned. When they came there were over nine hundred of the Ape-People with them, and Paul and Tolemy had begun their education. Our first job was a careful medical examination of Tolemy, but it showed him in good health, and with much of the vigor of a younger ape. Man had been lengthening the ages of his kind, as it had ours, and he was evidently a complete success.

NOW THEY have been among us three years, and during that time we have taught them to use their hands at our instructions. Overhead the great monorail cars are running, and the factories have started to work again. They are quick to learn, with a curiosity that makes them eager for new knowledge. And they are thriving and multiplying here. We need no longer bewail the lack of hands; perhaps, in time to come, with their help, we can change our forepaws further, and learn to walk on two legs, as did Man.

Today I have come back from the bed of Paul Kenyon. We are often together now—perhaps I should include the faithful Tolemy—when he can talk, and among us there has grown a great friendship. I laid certain plans before him today for adapting the apes mentally and physically until they are men. Nature did it with an ape-like brute once; why can we not do it with the Ape-People now? The Earth would be peopled again, science would rediscover the stars, and Man would have a foster child in his own likeness.

And—we of the Dog-People have followed Man for two hundred thousand years. That is too long to change. Of all Earth's creatures, the Dog-People alone have followed Man thus. My people cannot lead now. No dog was ever complete without the companionship of Man. The Ape-People will be Men.

It is a pleasant dream, surely not an impossible one.

Kenyon smiled as I spoke to him, and cautioned me in the jesting way he uses when most serious, not to make them too much like Man, lest another Plague destroy them. Well, we can guard against that. I think he, too, had a dream of Man reborn, for there was a hint of tears in his eyes, and he seemed pleased with me.

There is but little to please him now, alone among us, wracked by pain, waiting the slow death he knows must come.

The old trouble has grown worse, and the Plague has settled harder on him.

All we can do is give him sedatives to ease the pain now, though Tolemy and I have isolated the Plague we found in his blood. It seems a form of cholera, and with that information, we have done some work. The old Plague serum offers a clue, too. Some of our serums have seemed to ease the spells a little, but they have not stopped them.

It is a faint chance. I have not told him of our work, for only a stroke of luck will give us success before he dies.

Man is dying. Here in our laboratory, Tolemy keeps repeating something; a prayer, I think it is. Well, maybe the God whom he has learned from Man will be merciful, and grant us success.

Paul Kenyon is all that is left of the old world which Tolemy and I loved. He lies in the ward, moaning in agony, and dying. Sometimes he looks from his windows and sees the birds flying south; he gazes at them as if he would never see them again. Well, will he? Something he muttered once comes back to me:

"For no man knoweth——"

DETAIL—BUT IMMENSELY IMPORTANT TO ENGINEERING

ALTHOUGH an electric motor represents the most efficient mechanical power known, there are still heat losses. In designing a compact motor, these heat troubles are an important limiting factor, since concentrating the motor concentrates the heat. Insulation of the usual type breaks down rapidly as temperature rises, due to oxidation and embrittlement. Treated cotton, the usual material, chars. Rubber is never used because it is rapidly destroyed. Silk tape, impregnated with mica has been tried, but is unreliable in quality. Asbestos fibers, being a natural mineral product, are unpredictable quantities, and lack mechanical strength.

THE electrical engineer's present joy is glass tape, woven from spun-glass fibers. Synthetic, its properties are accurately controllable and predictable. Its raw materials are immensely abundant. It cannot oxidize, lose strength, or deteriorate with time and corrosive atmosphere. It is extremely flexible and strong, and can be made in extremely thin, yet highly insulating layers. And, of course, heat does not bother it in the least. It remains an effective, undamaged insulator at any temperature the solder in the commutator bars will stand.

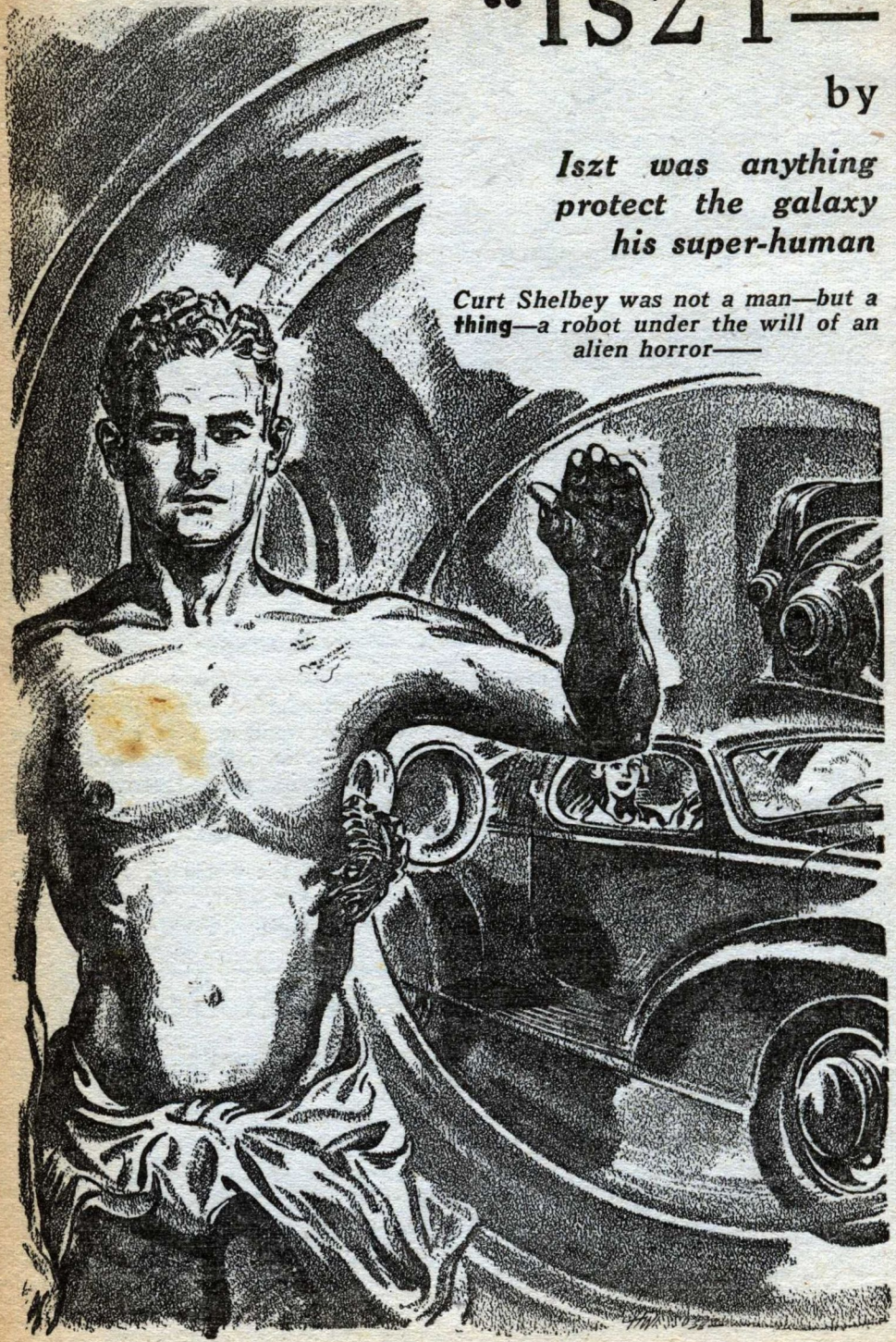
MOTORS using this new material have changed the whole picture for the familiar trolley car, making it an unfamiliar means of transport. The much more powerful, lighter, far more compact motors resulting, allow improved weight distribution, improved smoothness, and acceleration.

"ISZT—

by

***Iszt was anything
protect the galaxy
his super-human***

Curt Shelbey was not a man—but a **thing**—*a robot under the will of an alien horror——*



EARTHMAN"

RAYMOND Z. GALLUN

but human—and his job was to —till humans taught him something race had forgotten—Adventure.

ISZT was a demigod—one of unnumbered trillions of demigods like himself. His people, born out of the flux of universal history, cradled in the rugged lap of circumstance, had attained to a kind of ultimate Nirvana of wisdom and science.

Yet there were other peoples—perhaps a thousand of them, scattered thinly throughout the finite, but unbounded universe—who had reached a similar, exalted state. Coöperating loosely and at long intervals, these races were the guardians—the watchers—of the stars. When cosmic danger threatened, their knowledge was the key to action.

Though any man of Earth would have shuddered at the horror of his small, fragile form, Iszt had a soul. It was a strange soul, full of curiosity and adventurous yearnings. That was why he had been chosen long ago to fight the forces of disaster. He had journeyed across the transdimensional passages of space then, bridging myriad light-years of distance. And, after a long stay on a distant, primitive world, he had returned home for a brief time, to confer with his superiors, and to procure the things he needed.

He was in his laboratory, now. It was a great, polyhedral creation of crystal clearness, resting not on the surface of any planet, but floating in space. A huge, red sun brooded sullenly beyond its transparent walls. In the rays of that sun, other polyhedra—an innumerable, arcing host of them—gleamed like icy crystals. They circled the sun, each in an orbit of its own, and formed, in composite, a vast, nebulous, sweeping ring, grander by far than the rings of Saturn.

Iszt felt the majesty of their endless flight. And he felt, too, the glory of the progress that had changed completely the aspect of the region in which his kind dwelt. Once this great, red star had mothered ten, huge, natural planets. But the eradication of the death of physical decay, combined with the prolific results of a method of extra-corporeal reproduction, had long ago expanded Iszt's race to a point where the planets no longer provided adequate room. And so, during a million years of time, they had been broken up, their elements transmuted when necessary, and used to build the polyhedra.

In these free-floating habitations, Iszt's people lived and thought, and dreamed their wonderful, artificial dreams, their every common need taken care of by their science. They no longer attempted to expand in numbers now, though they might easily have done so. Materials were easy to procure in the vicinities of other stars, had they wished to construct more polyhedra.

For the most part, Iszt was proud of the greatness of his race, and in a way that was quite human. But he preferred a far more active existence than most of his fellows—an existence fraught with the thrills of danger, and of distant and fantastic environments. He

loved playing an almost lone hand in colossal undertakings. This quality enabled him to act as the agent of the immense, though apathetic, wisdom of his kinsfolk. He loved contrasts, and in a way he even loved the tense uncertainty of fear. Though a demigod, with powers at his command that were staggering from an Earthly point of view, he was by no means omnipotent.

HE FELT that uncertainty throbbing within him now. In the calm, slaty expanse of the spacial star curtain, he knew that a threat and a promise of inconceivable catastrophe lurked—a catastrophe of hurtling, smashing forces that might destroy not only many worlds, but a segment of the galaxy. And he knew, too, that it was his job to battle and help check those forces before they could mature.

His myriad, hairlike grasping organs, black as soot, coiled nervously. His dozen little eyes, which saw not quite in a human manner, glinted as he peered through the crystal shell of his polyhedron, viewing the chill sun and the other majestic details of his native region. Perhaps he was contrasting this harsh grandeur with the trees and mountains and sky of that other, tremendously distant world, where he had spent so much time with his preparations. His flat, foot-long body, ridged with horny protuberances, quivered with some inner excitement.

But it was not his shape alone that set him apart from the race he had visited. Their world was, to him, a world of shriveling heat which only science could combat. For his kind had evolved on a giant planet of terrific pressure and terrific cold. His flesh was not a flesh of water and carbohydrates, but of liquified ammonia and of complicated compounds born of an un-Earthly metabolism.

From his beaklike mouth there issued a series of odd, slurring, sibilant chirps, best represented in the English alphabet as *iszt—iszt—iszt*. The sound was not his name, really; but for us, since we have no other way to identify him, it must serve as such. It was an utterance as natural to his kind as laughter is to men. Trilling softly in the frigid, compressed gas around him, it seemed to emphasize, because of its animallike quality, the utter alienness of his being.

Now, as if to make up for time lost, Iszt wheeled about. His body undulating like a caterpillar's, he hurried to a runway that spiralled around a great fluted pillar of lustrous metal. Upward Iszt scrambled, ascending to the floor above. Here was a triangular chamber like the one below, though smaller. Like the first, it was packed with mighty apparatus, nameless to man. The sunlight, slanting bleakly through the clear walls of the polyhedron, made oblique shadows on the black floor and awoke the glint of treasure in the hunching masses of machinery.

Iszt threaded his way to the center of the room. Here, in this place of un-Earthly science, was something which was startlingly incongruous. It was the image of a young man, as perfectly lifelike as truth itself, except that it did not move. It stood on a low pedestal. It sported a mop of curly blond hair, and its blue suit was neatly pressed. On its lips was a gay grin, as though it were ready to say "Hello!" It seemed only to wait for animation.

WITH A KIND of avid energy, Iszt scrambled up the pedestal, and climbed to the torso of the human figure. Little tentacles went to work, unbuttoning coat, vest, and shirt. Iszt crept from view, under the fabric, and attained entrance to the interior of the manlike robot through an opening at its armpit. Deftly, then, the opening was closed and sealed, until only the most minute scrutiny could have distinguished it from a scar.

Iszt settled comfortably into place in his vacuum-shielded refuge, to which no deadly heat could penetrate. His hundreds of tentacles contacted as many delicate controls. His small, black orbs peered into a periscope, of which the humanlike eyes of the figure were a part.

Now the man-robot came to life. The plastic substance of its face, as perfectly fleshlike in appearance as flesh could be, moved, as pseudo-muscles within it contracted or expanded. The smile broadened, showing rows of white teeth. The thorax of the robot heaved gently, as in natural breathing. A pair of hands, angular and bronzed, were raised to button shirt and vest, and to adjust tie and coat collar.

The automaton surveyed the reflection of itself, pictured in the burnished metal flank of a huge chemical vat. A small comb, deftly plied, was drawn through its curly hair in a few, swift, practiced gestures.

"Hm-m-m! Not bad, Curt Shelbey!" the robot commented.

Its voice was soft and accentless, gay. The posture of its head was just slightly and boyishly cocky. Its grin, now, bore a faint and not obnoxious trace of insolence.

Yet there was no human vanity in the soul of Iszt, who ruled the manlike marvel. And he did not truly admire his human guise. His one great satisfaction lay in the minute completeness of the imitation he had achieved. He was like an actor playing a part—the dangerous part of a treacherous agent, whose motives were still, in a broad sense, benign. That the people of one world should be wiped out in order that the inhabitants of myriad other worlds might live, was sound, if Spartan, logic.

SUDDENLY the robot's face had gone Satanic and hard. But perhaps this was not a reflection of its guiding entity's true emotions, but instead just another bit of acting. Iszt would not have been cruel for the sake of cruelty. Bizarre, courageous little mite that he was, he was visualizing catastrophe inconceivable—a catastrophe which he and Earth must help prevent. That it belonged to a future still a thousand years distant made no difference. For demigods see far, and they avert trouble when there is yet time.

Iszt's robot hurried up another spiral runway, reaching at last the little room at the very apex of the polyhedron. Here was Iszt's interstellar vehicle. It looked cylindrical, clear as glass, and only a little taller than a man. Yet there was a puzzling vagueness about it, as though its three-dimensional form possessed projections into mysterious higher dimensions.

Bearing the case of tools and instruments, the robot clambered into the vehicle's opened top, and clamped down the conical lid.

Some remote-control device, operated from within the strange car, caused the peaked roof of the room to fold aside on a hinge. The cylinder bearing the humanlike marionette rose upward through the opening at swiftly mounting speed, a bright wisp of phosphorescence trailing in its wake.

The limitless swarm of polyhedra flickered swiftly past. Strange little ships wheeled and darted in salute to the intrepid agent who was now on his way. Odd, mighty mechanism, resting, half completed on great meteoric masses which were to be used as a source of atomic power in the tremendous task to come, dwindled swiftly behind.

"I go," Iszt thought forcibly. "I go to do what must be done."

He knew that his people would sense his expression of farewell, not by telepathy, exactly, but by means of a natural contact with the state of matter. It was like a sixth sense groping through dimensions unknown to man—a sense which felt and could interpret the nerve

currents of the thoughts in his brain.

Iszt's vehicle hurtled on, through the brittle clearness of the void, toward a small, distant star. Presently, after a certain velocity had been attained, the robot called Curt Shelbey pressed a control. The brooding stars blurred. Space itself seemed to bend and warp impossibly, as hidden dimensions opened before the speeding craft, affording it a shortened path across the distance.

The interstellar voyager had spent ten years on Earth, mingling with its inhabitants as one of them. But time had not obliterated, within Iszt's strange soul, a fear and suspicion born of a thousand abysmal gaps of environment and background. Though he loved danger, though he was far more competent to cope with it than any man, Iszt was still tiny, faintly pathetic, and alone.

HAD ANNE WINTERS known the truth, her cheeks would certainly have gone ashen with terror. But she did not know the truth. Moreover, the night was beautiful and clear; the purr of the big car was soft and hypnotic; and she was in love with the hard, gay, reticent personality beside her.

There were, however, certain disquieting elements to mar this perfection —elements, that is, which she was aware of. Some of them were grimly plain to be seen, though mysterious. Others were just hunches—the promptings, perhaps, of her keen intuition.

She knew, of course, about the unprecedented things that had happened with increasing frequence all over the world, and had already caused more than a hundred thousand deaths. Terrific three-hundred-mile-an-hour winds. Electrical storms that had killed every inhabitant of several villages. Earthquakes and tidal waves and volcanic eruptions of tremendous violence, including in their ejecta vast quantities of poisonous, radioactive gas!

These were eerie, unheard-of phenomena, possessing, for the most part, because of their strangeness, the aspect of a portent.

And Anne Winters knew, too, that this man beside her—this youth who could not be more than twenty-five—was a scientist the equal of which history had never produced. He claimed understanding of the calamities that were taking place, and he had demanded extraordinary things from the world—things which it was ill-disposed to provide.

She offered Curt Shelbey a cigarette. Quite casually and naturally he thanked her and accepted.

Neither of them spoke for at least a minute after that. But she watched him closely, half sensing an unnaturalness about him that wasn't visible. He drove the car with an easy skill. And he accomplished other common parts of life just as well. Dancing, for instance. Taking her to dinner. She had no inkling of the minute care and inventive ingenuity which enabled this thing, which she thought was human, to eat just as did other people. Not the great, but these small things, were difficult for Iszt. Nor, of course, could she have realized that all the precision which her companion exercised in his contacts with the social system around him was the product of the need for secrecy in the perpetration of a vast treacherous, deadly hoax. Discovery of that hoax might easily have dangerous and far-reaching consequences. But even Anne's father, the brilliant Dr. Forrest Winters, did not know——

At last the girl smiled a faint, hard little smile that mismatched her delicate blond beauty.

"Curt," she said, "I'm a fool. Fool enough to admit openly that I love you."

Gray eyes turned toward her. There was no sign of triumph in their glance—just mild inquiry that must have been a histrionic gesture in itself, directed by an intellect that had no personal capac-

ity to feel the emotion she had mentioned in a way that a man or a woman could understand.

ISZT KNEW his human beings quite well, after his ten years of study. He knew that his every move, every gesture, every expression had a value which must not be abused if he wished to maintain control. He sensed a bit of the nerve currents of Anne Winters' thoughts; still he caused his robot to smile gently, and let her go on.

"I love you, Curt," she repeated a trifle unsteadily. "That's one reason why you worry me so much. You've got me puzzled, Curt. Ever since Dad took you into his laboratory—and before, even—it's been like that. You haven't any past—any childhood that anybody knows anything about. You say that you were hurt in an automobile accident, and that everything before that time is a blank. You look so young, and yet you're the world's greatest! Your dimensional and resonance theories, your mathematics, the funny, miraculous devices you build, and—oh, you know all the rest of it!

"And now—the things that are happening—those dreadful storms, and those strange eruptions—tens of thousands of people being killed every day. Fear—horrible fear! No one can even guess what it all means except you. And you can't seem to explain. You can't get your ideas across to the rest of us, it appears—though you try. But you say you can fix things, if you're given the coöperation you want. And such coöperation! Trillions of dollars' worth—the price of a dozen major wars! You say that you can restore normalcy then—that all our troubles are caused by some gigantic cosmic unbalance which needs readjustment. Oh, if it's true, Curt, that you're honest, I'm glad! You'd be something like a gift of Providence then! But some folks say that you're just trying to hold up the world —to get it to meet your terms, like an extortionist, or a madman with a club who wants absolute power. I don't say that that's true, Curt. But a lot of people are saying it. They think that if you were killed, all the devilish phenomena would end—that you're the real cause of them! Tell me, Curt, what does it all mean?"

Curt Shelbey, guise of Iszt, tossed his cigarette away, and lied with a cold glibness that betrayed no hint of conscience. Iszt needed no trumped up arguments to support his position. He felt that it was right, and perfectly justified. Was he, lonely little alien from a far region, to be blamed for this attitude? After all, Earth, extending around him now in a vague, moonlit expanse must have been as repellent from his point of view as the deepest part of a black nebula must always be to a man. It was a place crawling and swarming with ghoulish life, with which, by the very nature of circumstance, it would seem almost impossible for him to have any real sympathy.

Curt Shelbey laughed gayly. "What does it all mean?" he questioned in return. "It means that the people who want me killed have the wrong idea, Anne. I *am* honest."

There was sincerity in his eyes, in his tone, and in his gentle manner. For the time at least, the girl was reassured.

"I'm glad, Curt," she murmured. "Only it isn't safe for you to be driving along a deserted road at night like this. We haven't any real place to go. Let's turn around and start back for the laboratory. The police are there—they'll guard you."

CURT SHELBEY gave a short, hard chuckle, expressing masculine scorn. But when the next farmyard driveway was reached, he swung the nose of the big car easily into it, and backed around. With a leisurely carelessness, he started the return of what

seemed an aimless jaunt, driving at a crawl.

But Iszt, hidden where, in a human form, a pair of lungs should be, had a definite purpose in coming out to this lonely rural spot, so near to Chicago, the vital, throbbing heart of the Middle West. Things that happened in great cities were noticed, had significance, and could create the fear that was the needed driving force for colossal efforts and achievements.

Iszt was not as cool as the outward aspect of his intricate mount. For many hours several of his hairlike tentacles had been not in contact with the controls of his personal robot, but with other controls, attached to an apparatus which, by delicate and far-reaching impulses, could guide other robots out there in the interplanetary vacuum. Streaking silently through those frigid, empty regions, they were drawing things Earthward with their attractive power —things from the débris-littered belt of Minor Planets.

And Iszt was waiting for the results of their activities with a painful tension. His tiny body, cold and alien to every phase of the Earthly environment, ached with that tension, which was like worry to a man.

And in his mind a million memories were surging, forming a checkered backdrop for the present. His solitary wanderings throughout the universe. The passive inertia of his own kind, which led them to accomplish their miracles with a minimum of effort on their own part. His first day on this planet, long ago——

Iszt had been without human disguise then. He'd had just a crude, mobile shell. He'd seen the forests, the oceans, the plains of Earth. The vegetation that the weird, hideous inhabitants admired so much. Green. No, it was not green to Iszt's eyes. The sensations of each wavelength of light, were different to him than to human beings. Color is only the way a mind and eye interpret a given wavelength. And the vision centers of Iszt's brain, and his eyes as well, were different from their human counterparts—as different, almost, as his cold flesh.

Earth he had never thought beautiful. That, of course, was a matter of heredity and conditioning, as he was aware. He had been born and reared to concepts of beauty far different from those of men. Being on Earth, to him, had some of the elements of wallowing helplessly in an oozy, disgusting liquid, filled with living slime and squirming Infusoria.

Fear had stalked him at every step during the early part of his Terrestrial adventure. But he'd blundered through, somehow. A dozen men had perished because he'd been afraid of being found out. By slow stages he'd caught on to the Terrestrial ways of doing a few things, his observations necessarily limited by the danger of discovery, which would have spoiled all his plans.

AND THEN AT LAST he'd built the robot called Curtiss Shelbey. After that the going had been easier. As Curt Shelbey he had attended a famous university. He had engaged in sports and social life, had learned science over again from the Earthly standpoint, using the nights and his summer vacations for his more important explorations and tests. Every continent and large island had known his secret, nocturnal visits. He knew the ocean deeps. His instruments had probed to the very core of the planet, aiding his mole robots which bored deep into its crust. Thus Iszt had acquired a complete and necessary knowledge of Earth's composition—necessary in his battle against the shadowy juggernaut that threatened a universal upset.

Iszt had been happy, in spite of everything. It was the happiness of adventure and of risks and of accomplishment

—one which any active human being could understand.

Now the car rolled on quietly and slowly through the moonlit night, harboring a mood and a significance far different from that which appearances expressed. For several minutes there was nothing to mar the apparent serenity and peace.

Then there came a sudden flash of incandescence from above. Soundless at first, it illuminated everything as brilliantly as the noonday sun. But the quality of its light was hard and blue and artificial in appearance, like the glare of a carbon arc.

Now came the crash, shrill and high and tinkling at the outset, sounding like the shattering of a million windows. This shaded by degrees into an all-enveloping roar, jarring and nerve-shattering. Its volume increased until it not only seemed to rend eardrums, but to tear nerves and brain tissue with its overpowering force. Several distinct and mighty concussions punctuated this Gargantuan song of calamity. The globe of incandescence streaked down, vanishing at last to the south, where Chicago lay helpless before the onslaught. The ground shuddered with the far-off impact. Night closed in again, silent once more except for a vast echo, that sounded like a heavily loaded train fading away into the distance.

Anne Winters was speechless with terror for several seconds. But at last she found her voice.

"Curt!" she gasped. "Curt! What was that? More—more of——"

He was still driving the car quite nonchalantly. "I'm afraid so," he said. "Just an unusually large meteor falling. But things like this are to be expected—now. I predicted the meteor shower last evening, sending my report to the news syndicates. Sometime very soon I'm going to be really believed in. When the texture of space is out of balance, there are repercussions everywhere. I'll get coöperation at last. Meanwhile, the meteor shower is by no means over. We'll——"

Another shrill, shattering scream of a descending missile rent the air, drowning the pseudo Curt Shelbey's last words.

AND THE SOUL of Iszt felt a strange, wild thrill. His hoax would work. He knew it would work! Space out of balance.

No, what was happening wasn't as sensational as that. All the calamities that had come to Earth during the past months were just the results of comparatively simple tricks, perpetrated by his robots. The metal moles, working underground on the internal fires of Terra, had caused the quakes and eruptions, just as the space automatons that had dragged cosmic wreckage from the path of Minor Planets were now causing the meteor shower. The radioactive gas from the volcanoes came from induced atomic breakdown in subterranean rocks. The tremendous storms were the product of intricate atmospheric tampering.

Mummery to impress dazed humanity. The inhabitants of Earth didn't need to understand what it was all about. When they were afraid enough, they wouldn't ask for understanding. They'd have blind faith that would lead them to quick destruction. But the galaxy would be safe once more.

The sky was alight with a dozen tumbling, flaming chunks of matter, now. One huge mass landed several miles away, striking the ground in a fountain of incandescent fire—soil, heated by the terrific impact. Air puffed outward in a hot, searing, crushing gust. The landscape trembled like a frightened monster. A group of farm buildings collapsed and began to burn.

The big car bumped over great rifts in the heaving road. Then Iszt, or Curt Shelbey, brought it to a stop in a clear,

open space. For ten minutes the awful holocaust endured. Then, as abruptly as it had started, it ceased. Over Chicago, near but still a considerable number of miles away, a red glow was visible—a red glow illuminating the night, and speaking eloquently of wholesale death and destruction.

Curt Shelbey drove on again, apparently with a quiet, controlled grimness. The thing that really gave him life must have felt relief that the risk he had had to take to further his plans was past.

Suddenly, though, Iszt, endowed with far keener intuitive powers than a man, sensed the presence of a new menace—in the bushes along the road.

The warning, however, came too late. There was a little spurt of fire, a sharp report, and a high, slurring whine. The bullet—a simple bullet from a high powered Earthly rifle—struck the door of the car and drilled through.

Curt Shelbey gave a start. His fingers tightened on the wheel. Unnaturally, the grim smile on his lips did not change an iota. The expression on the inanimate face remained as unaltered as that of a classic Greek statue, shattered in a bombed museum. No visage of living flesh could have shown such an absolute lack of response.

ANNE WINTERS, in the tense, dazing, unexpected movement of that moment, still could notice this incongruity, this inexplicable and eerie absence of humanness portrayed against the backdrop of her own terror at the unheralded assault. Here was a new touch of the bizarre, associated with her unbelievable companion. But she paid no deep attention to it now, of course. She, herself, was uninjured.

"Curt! You've been wounded!" she cried. "Let me——"

He pushed her away with a muttered word of reassurance. Even if his face did not respond, he now betrayed no error of purposeful intent or coördination otherwise. His foot went down on the accelerator with quick, assured, reasoned fury. The car roared on.

Curt gave no notice to the mocking, half hysterical laughter that came from the rear, or to the challenge that came in thick, mad words: "Go on, run away, you yella devil! We saw yuh! We recognized your car, Curt Shelbey! You're the fiend that's causing all this hell, just so you can be dictator, or somethin'! A friend of ours saw yuh coming down the road, and phoned us to lay for yuh. You——"

The car had climbed over the hill by then and the balance of what the farmer back there had to say was drowned and muffled in the growl of the motor.

Iszt knew that he might easily have been killed, outright and at once, as the result of a tiny slip of carelessness—of a moment of being off guard. He knew, too, that, but for the swiftest, most efficient action, he was still doomed to die—his work of salvation broken off before it could really begin.

He could feel searing waves of heat, touching the flesh of his alien body. And he could feel, too, the anguished ache of lowered pressure. The bullet had not touched him, nor had it seriously damaged his robot. But the protecting metal shell that surrounded him had been grazed, receiving a tiny, though, with time, inexorably deadly puncture. For the shell was meant to maintain the high pressure he needed, and to keep out, with its insulating material, the warmth of Earth, the heat of a furnace to his cold-born tissues.

Iszt, crouched in his dark retreat, responded with a kind of terror, which, instead of paralyzing him, acted as a stimulant. His terror was less personal than cosmic. It concerned far more his duty than his own safety.

And he was angry, too—angry with a dark, bestial fury, directed at the primitive being who had tried to kill

him. Emotions like fear and anger have a universal purpose in connection with all sentient forms of life, be the fluid in their flesh water, liquified ammonia, or other liquid stuff. For those emotions are the spirit of the universal law of self-preservation.

From the instant of the rifle's report, Iszt's keen brain had been busy. Back of its action was the science and the intellectual sharpness of a thousand ages of development. But there was something fierce and vengeful, too. Iszt was not cruel by nature—but now he was enflamed with fury.

THE CAR WAS OVER the brow of the hill now—safe, it should be, from the effects of a withering, inconceivable blast on the other side of that hill, where his assailant was.

A few of Iszt's tendrils were still in contact with the remote-control apparatus that guided his robot ships in space. Before the echo of the rifle's report had died away, one of those ships had started vengefully down. The speed which that glittering, hurtling thing, invisible from the ground, could attain was a matter which belonged to a meteoric scale, rather than to any common Terrestrial standard of velocity. And the range of the bolts it could hurl was tremendous.

Something happened, some cataclysmic thing just beyond the hill, to the rear of the car. What that event was, or just how human nerves and brain received cognizance of its occurence, were matters not easy to interpret. The thing that happened—though of stupendous destructive fury—was not exactly an explosion, as mankind understands such calamities. There was no sensation of a concussion—or of sound—at first. But perhaps this was only because human senses have their limitations. Living organs of sense are not meant to detect cataclysmic blasts and other material manifestations of a magnitude which, under any ordinary circumstances, can take place only at the tremendous pressures and temperatures which exist at the centers of those gigantic furnaces of space—the stars.

Perhaps because of these facts, Anne Winters was conscious of catastrophe only as a blurred, disordered, incoherent impression that suggested the end of the world. And if that impression were analyzed, it would have proved to be only the shock of nerves, jolted by forces both beyond their capacity to feel accurately, and their experience. Anne did not know that what was taking place was a tiny sample—an infinitesimal analogy, so to speak—of the kind of catastrophe that Iszt was trying to prevent.

For a minute fragment of time Anne Winters could hear or see nothing that she could interpret on the basis of past familiarity. Luckily, anyway, her eyelids were tightly closed, and held that way by a defensive reflex. Movement was perhaps too swift for human eyes even to capture. Then came what seemed a slow, painful, stunned awakening. Now she could hear an avalanche of sound—sound which must have been caused by air snapping back into a vacuum from which it had been forced. Now there was a blaze of light, stabbing searingly through eyelids themselves. If Anne's eyes had not been closed, she would have been permanently blinded.

Now she could hear the clatter of falling rocks and tree branches, and instinctively she huddled up in the seat. She tried to scream, but her terror was too great for her to utter even a faint, agonized squeak. She stayed in a huddled position until the roar of the disturbance dwindled away to silence.

THEN, ready to meet as best she could whatever new threat might make its appearance, she sat up. That she had not lost consciousness and was still game, spoke well indeed of her pluck

and stamina. Her whole body burned as if seared over a fire—the effect of rays like those of radium, weakened by passage through massive obstructions, but still lethal. She could scarcely see out of her pain-wracked eyes. But she could tell, in the moonlight, that the tops of the trees were sheared off at an up-slanting angle, as neatly as if cut by a knife in the hands of an Atlas. The air was alight with a barely perceptible, fluorescent glow, such as might be induced by radioactivity.

And Anne knew, too, that the assailant and his companions, back there, had perished. But she did not know that this was an act of vengeance.

Unbelievably the car was still on the road. It was going faster and faster. But, of course, it had been protected from that nameless blast by the intervening bulk of the hill.

Curt Shelbey was behind the wheel, steering calmly. But there was something more than mere courage in that calm. Courage is admirable up to a point. But beyond that point its aspect is too demoniac to be admired. That grim, unchanging smile, revealed by the glow of the dash lamps. It was—inhuman!

And then Anne saw the windshield—a little area of it right in front of her. It was pitted in an odd way—pitted as if by acid. No, not quite. Little punctures. A thousand of them. A million of them. And a strange, blackened flaw within the glass that somehow didn't suggest minute foreign bodies shot into it, but rather the transmutation of elements—the transmutation of silicon into the black of free carbon!

And then Anne's scattered thoughts coalesced into an explanation. She, the daughter of the noted Dr. Forrest Winters, was herself a scientist.

What had happened back there on the other side of the hill was—an atomic explosion! A small mass of material changed in an instant into a hurtling mass of energy! No crude explosion, this, no feeble, expanding gases tearing and hurling simple chunks of steel. But a blast of almost pure energy! Inconceivably concentrated radiations, mostly of short wavelengths, like cosmic and X-rays! Such radiations were born in the hearts of stars, but before they reached space they were filtered and thinned and changed in quality by hundreds of thousands of miles of stellar material!

The fading atmospheric fluorescence, seemingly radioactive in origin—that helped in itself to prove Anne's atomic explosion theory. For radioactivity is one of the manifestations of the disruption of atoms. And the carbon there in the silicon compound of the windshield—that was an apparent example of transmutation. A thin shaft of unobstructed radiations, holding all their original, terrific force, had somehow stabbed over the brow of the hill, and had hit the car and had passed through it. The fearful impact of those radiations had changed the very character of the elements they had touched.

GLANCING around, Anne could see a small, ragged circle of burnt upholstery behind her and, visible through a hole in the crumbly stuff, she saw bright metal of the car's body. But that metal had a yellow lustre which told beyond doubt that it had ceased to be steel!

Anne knew, then, how close she had come to death. Just a few inches. That beam of radiations must almost have grazed her head! And she was aware, too, with a vivid acceptance of reality, of the unbelievable fury of the more cryptic forces of the universe. The stars—the interiors of the stars!

But she did not know how closely this illustration dovetailed with fearful, hidden fact!

Curt Shelbey—Iszt—beside her, was now regretting a little that he had al-

lowed stupid anger to get the better of him, imposing upon himself and his plans an unnecessary risk.

It wasn't till now that Anne paid any real attention to the fact that the car was being driven with demoniac speed. The swift, dazing, unprecedented movement of the past few moments had reduced the fairly commonplace velocity of a hundred miles an hour to the position of a trivial thing, scarcely worthy of notice. But now the utterly reckless negotiation of curves along the moonlit highway, which, after what had happened, might have dangerous obstructions, and the recession of events to the near-normal, made her conscious once more of present and more simple danger.

"Curt! Be careful!" she advised. And then, with the memory of the atom blast still ringing in her brain: "What does it all mean? Oh, God! What does it all mean? Do you understand what it is that's happening to everything, Curt? Do you *really* understand?"

Her attention shifted once more, as she recalled something else, which had been smothered in the welter of an un-Earthly episode.

"You were shot, Curt!" she cried. "That man with the gun back there! Let me drive, Curt! I've got to get you to a doctor—to a hospital!"

There was love in her plea, and tense, selfish loyalty.

There was grave danger that he would fail in his immediate objective, and so he was driving like a reckless devil, his actions backed up by a demigod's fierce, indominable will. Without that will, he would already have lost consciousness.

BUT HE DID cause his man-guise to speak four toneless words, which held no trace of human inflection: "No doctor. No hospital."

Anne Winters must have found something eerie in those words, yet it was not surprising that she attached no special significance to such a discovery. Concern for the man she loved led her to yield to impulse.

She clutched at Curt Shelbey's clothing in quest of the bullet wound. Iszt's fading mind was already too blurred for him to be quite aware, at once, of what the girl was doing. He drove on unheeding.

Thus Anne presently touched warm pseudo flesh, which, because of the perfect imitation it achieved, offered no obvious enigma in itself. But beneath Curt Shelbey's collar bone, there was a wound —a bloodless rent.

And Anne's fingers, in contact with it, felt the unmistakable hard smoothness of a piece of broken metal!

She withdrew her hand quickly. But even after her instinctive retreat, realization of an unheard-of mystery lurking here was slow to come. Earthly minds, like Earthly flesh, are conditioned to the ordinary. Extraordinary phenomena tend to confuse and confound both. And so Anne Winters was more inclined to doubt the evidence of her senses, than to concede the reality of that evidence. A man—a sentient and tangible personality—composed partly of metal—in a vital region? Impossible! Everything in the mere idea fairly shrieked "Impossible!"

And then the girl heard, from the depths of the human chest of Curt Shelbey, a muffled, eerie, animal noise of anguish. It sounded a bit like the chirping of an injured and abhorrent bat: *"Iszt—iszt—iszt—iszt—iszt——"*

There was a faint odor, too, which Anne now noticed for the first time. The pungent smell of ammonia, seeping from Iszt's punctured refuge. To the girl it suggested a noisome, bestial reek which belonged to a dark, unplumbed lair of horror.

To her mind, then, there came a little of the truth, which she could less than half believe. Yet the trans-stellar gro-

tesqueness of it made her stammer wild, confused words.

"You're not—Curt," she accused, almost in a manner of apologetic embarrassment. "You're something else that —— You're the thing that's causing—the—the—everything that's scaring people! And killing them! You're trying to—— Oh, Lord!" Her last words ended in a rasping scream of revulsion.

She tugged at the handle of the car door feverishly, as a cat being dumped into a river might claw at its captor.

Iszt, his senses worn to a thin, glimmering thread, still could think a little. He knew that at last he had almost been found out. And he, knew, too, the deadly danger that would follow his exposure. Even his vast powers would not be enough to ward off the fury of mankind, face to face with horror, unless he destroyed the entire species. And if he did that, the aid the Terrestrians could have provided would be gone. Even with the aid of his robots, how could he then accomplish that which he had been ordered to do?

THERE WAS a simple way out of the present danger, of course. One of Curt Shelbey's arms came up. The false muscles that moved it were backed up by the fearful power of disintegrating atoms. One terrific blow, and that puny girl-shape would be reduced to a limp, bloody corpse, its head smashed as if hit by a sledge hammer. The death of Anne Winters would be easy to explain in these troubled times.

The arm of Curt Shelbey was poised to strike. For a brief moment the girl's life seemed to be forfeit. Then—need intervened. Iszt's consciousness was almost gone.

The robot's hand groped out, clumsy in the absence of adequate control, yet still with that terrific potential power behind it. It clutched the shoulder of the cringing, struggling girl, and pulled her away from the door she was trying to open. It took hold of her left hand, and guided it to the rim of the steering wheel.

"Steer," came the flat, yet compelling order.

And Anne obeyed as best she could from her position, for to do otherwise, in that careening vehicle, was death. She felt numb now, as though she were acting in a dream—a hideous dream which she found incomprehensible.

Curt Shelbey was slumped in the seat like a loose sack of meal. But his gaze was fiendishly intent, watching, always watching the highway, with a supreme effort of will.

Since he still occupied the driver's seat, his foot was on the accelerator. Presently he slackened speed, so that when a side road was reached, the car was traveling at a comparatively moderate rate.

"Turn left," came the command. Hypnotized with fright, the girl obeyed.

Bumping along a rough road, still at dreadful speed, the beams of the headlamps bobbing in the gloom. Then a jolting, screeching stop, as brakes were applied with a drunken abruptness.

Here was a lonely wilderness of rocky ground, elder thickets, and scrub pines. This was a place useful only as a hideout.

Something gleamed in the darkness—a sphere of crystal that floated in the air. The mechanism had companions, a half dozen of them. They darted in close.

Once more Anne tugged at the handle of the door beside her. Cold tentacles of metal, dangling from one of the spheres, yanked the door open. Now the thing was resting its massive weight on her lap, its tendrils fastening themselves around her arms, her legs, her body and her throat, so that she could neither move nor cry out. She could scarcely breathe.

Others of the crew of half sentient automatons hoisted the limp man-form

out of the car, and it carried on ahead through the darkness.

A SPHERE crouched behind the wheel of the car, its various appendages placed so as to duplicate the movements of a human driver. The motor purred. There was a smooth whirr of gears being skillfully shifted. The car rolled forward, and turned into a driveway that led into the woods.

Presently, a rectangular section of ground, covered with elder bushes, folded upward like a trapdoor before the vehicle. An incline of stone was revealed, down which the car was now coasting. To the rear the trapdoor was folding back into place. The light ahead was soft, flickering, eerie and bluish, made to suit the best comfort of eyes different from those of men.

Here, concealed in caverns blasted out of Earth, lay a little bit of another region, another culture. And here, surrounded by the minute and gigantic evidences of a science stupendous, the car was brought to a stop.

Anne Winters, courageous though she was, and accustomed to the natural miracles with which her father's work brought her into daily contact, had fainted.

Slowly she regained her senses. She was still in the car, and the spherical automaton still clutched her, though it had released its grip on her throat.

The air around her, she noticed, was tainted with the strong odor of ammonia. But this air, admitted from the Earthly atmosphere above, she found quite breathable. The cavern was large, and its roof was supported by fantastic arches. Weird apparatus, some massive and some as incredibly delicate as frost and spiderweb, were arranged here and there. There were stall-like compartments along the walls, some of them harboring stout, ugly-nosed vehicles designed for subterranean boring. Other compartments were empty.

Near a pillar was a strange little device which was certainly a radio of some sort, invented by other-world people. From it an excited human voice was speaking:

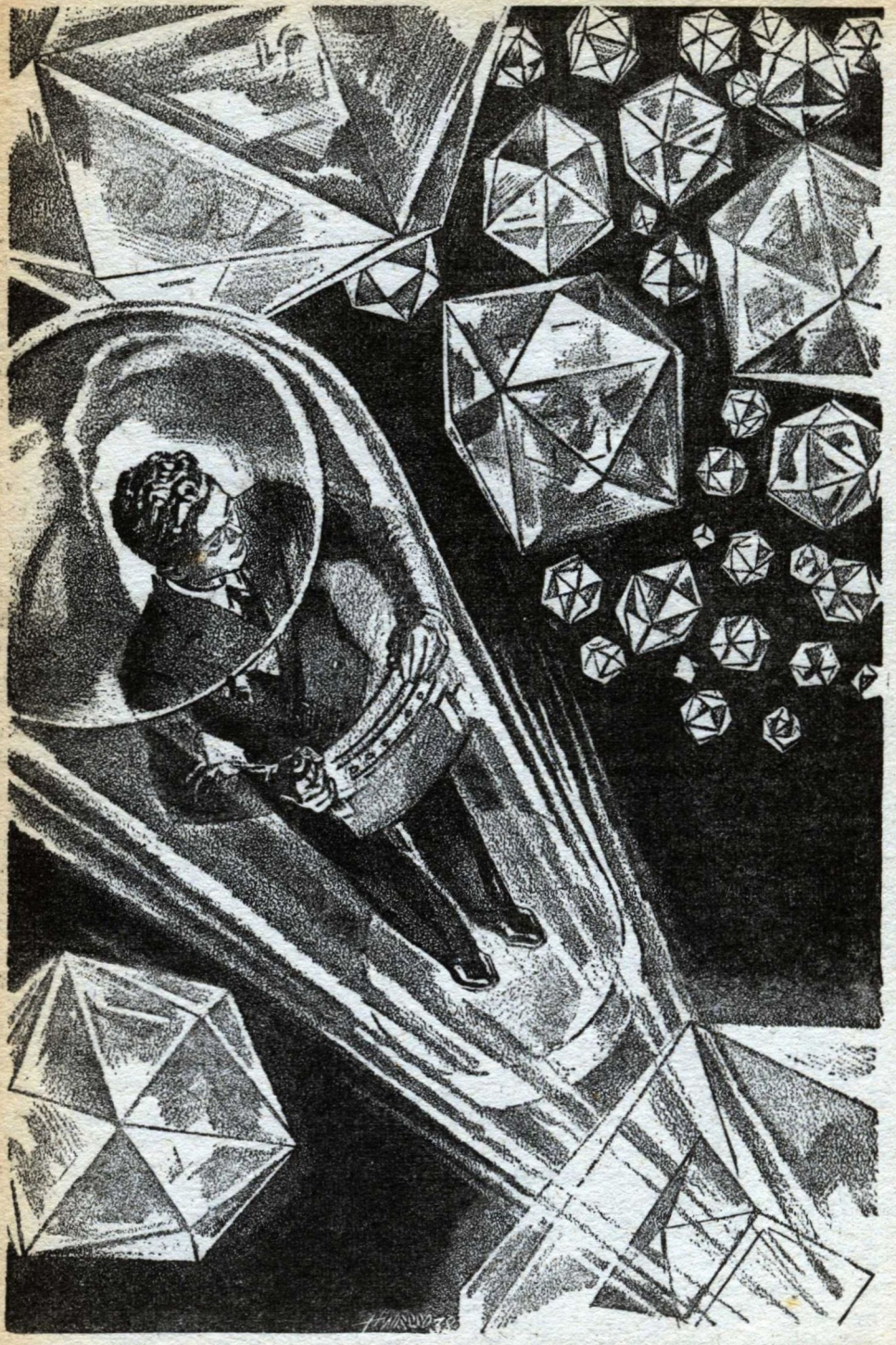
"Meteors—Chicago—great craters blasted—— A million and a half people killed—— London——"

Anne Winters scarcely noted the broadcast. Her eyes roved to a massive crystal door. Beyond it another, smaller, eerily lit chamber could be seen. And there, stripped to the waist, was the form of Curt Shelbey. It stood erect on a pedestal. And the entire front of its chest seemed to be cut away, revealing vitals that nothing but a machine could possess—vitals which were the key to a vast deception.

And crouching on a sort of table, surrounded now by a temperature and pressure that was suitable to his physical makeup, was the master. Anne didn't recognize him as such at first—he was to her just an unspeakably hideous creature the like of which she had never seen before. His writhing tendrils, as he directed his automatons in the intricate task of repairing his human guise, made the girl shudder with revulsion.

BUT IT WAS not until several minutes later, when the repair was complete, that the full shock of realization came to her. She saw Iszt, like a great, black, horn-ridged leech of some kind, climb into the figure of Curt Shelbey. Then she knew that he was the pivot, the central personality, of—all the mysterious, abhorrent miracles around her. Her lips curled, and she wept, a little child scared out of its wits.

The manlike marionette was adjusting its clothing now. Now it came through the crystal door, which was double, forming an airlock. The figure trailed a draft of harsh, alien pungence and cold. But its lips now were smil-



From within the human robot, Iszt directed the glistening cylinder up and away from his polyhedral laboratory.

ing in a perfect imitation of boyish reassurance.

"Now, Anne!" the pseudo Curt Shelbey pleaded. "Don't get so fussed! Please! This situation is a difficult one for me, too!"

The automaton that had clutched the girl now released its hold, opened the car door, and floated away into a shadowy corner of the cavernous room. Curt Shelbey approached.

Anne screamed. She struck at him. She barked her knuckles on the cold man-figure. Yet the disarming smile persisted.

"Don't Anne! That can do no one any good. Please take it easy and I'll try to explain it."

She knew his speech must be acting that masked a hidden soul, just as the human form hid physical horror.

"I'm not of Earth, Anne," said Curt Shelbey, who stood at the window of the car. "You know that now. I'm from the neighborhood of one of the stars—it doesn't matter which one——"

And so the story of Iszt's people was told.

"But what are you trying to do?" Anne asked weakly. "Conquer Earth?"

"Not exactly," returned the disguised demigod. "You see, two stars are going to collide—head on. Considering how widely scattered the stars are, and how much room there is between them, that's a thing that can't happen more than once in a billion eons. Sirius is one of the fated pair, and a dark star, invisible from Earth, is the other. The collision isn't to happen for a thousand years. That seems a long while, Anne, but isn't, if you hope to work far enough ahead to stop the smashup. And I suppose you think that a star collision taking place at the distance of Sirius doesn't matter, as far as Earth is concerned. But you're wrong there—terribly wrong!

"The heat within stars is something you can't imagine. Millions of degrees at their centers. Matter there is of a nature which your scientists have no way to determine. Much of it remains matter only because of the colossal pressure caused by thousands of miles of material bearing down on it from above. In a way, it is like the water in a superheated boiler. That water remains liquid only because of the pressure. Relieve that pressure, and it flashes instantly into steam. Relieve the pressure on the insides of a star and——

"Much of those insides—much of the matter—is converted at once into energy. And energy, when sufficiently concentrated, is a lot more 'solid' than any substance you can mention!

"THAT IS what must happen if stars collide. Their substance is spattered outward, and the internal pressure is relieved. The matter of their cores—heated beyond conception—is exposed directly to space, its intolerable radiations unscreened by a deep layer of cooler material. What happens then? In an expanding sphere the energy released shoots outward in all directions, at the velocity of light! It is untold times more fearful in its force than a hurtling wall of steel. The atomic blast behind our car, after the farmer shot at me, is a tiny sample of what happens. And though, of course, the fury of the results of the collision diminishes with the square of the distance, things in the path of that expanding hell of energy are swept into chaos. Planets are broken up, and other stars are spattered like raindrops against a windowpane, multiplying the fury of the cataclysm with their own store of internal atomic power!

"Untold billions of years would be required for the galaxy to regain its balance, for the fragments of the catastrophe to unite once more, forming normal suns and worlds. Perhaps this sort of thing has happened before in our galaxy. But the probability of a direct stellar smash is remote indeed, considering how thinly the stars are distributed through space.

The fact that the body which is now aimed at Sirius gives no light, diminishes by nothing its potentialities. It is dark because it is surrounded only by a vast, whirling mask of dust. Inside, it is as hot as Sirius itself.

"And now for Earth's part: we—my people and other peoples similarly advanced—have made arrangements to deflect the invisible star of doom enough to prevent the collision. The dark star's course will have to be changed by only a tiny fraction of a degree, and the velocity of its flight reduced by only a very little, to produce the desired effect. For, when there is a thousand years of time, and when the speeds involved are measured in miles per second, it does not take much change to produce a wide deflection. Nevertheless, the task of altering the path of a mass of so many myriad trillions of tons of matter is an enormous one by any standard. But Earth is just the right sort of thing from which to apply an important part of the required power. Unfortunately, though, the crust will be burned from the planet to a considerable depth. I am sorry, Anne, but it is the end of your people."

Anne Winters glared at Curt Shelbey's solicitously solemn face.

"You fake!" she hissed. "You're trying to use us as pawns to build those machines which you've talked about. And then—reward for our toil—we'll just be wiped out! Why don't you devils build your own machines at least!"

SOMEHOW ANNE was managing to be coldly antagonistic when she was sure, herself, that she should be hysterical with fright and horror instead.

"I'm sorry," said Curt Shelbey. "There are other worlds, Anne. Thousands of inhabited worlds with living, intelligent beings on them. Many of those peoples are less advanced scientifically than the people of Earth. But all are capable of feeling pain, sorrow, and love in their own way. They'd be wiped out if it weren't for the martyrdom of your kind. And humanity would be wiped out, too—in a thousand years. As for my race building its own machines——"

The voice of Curt Shelbey broke off there, and his face suddenly lost its animation, as though Iszt who ruled this robot was, for the moment, too busy with regrets and unrestive thoughts of his own to continue to play a human part.

Anne had heard his perfectly human words. She had seen his perfectly human benignance and manner. His logic, too, was perfectly human—up to a point. But it was all a sham—the mask of a personality that no man or woman could ever know or understand! Or so she thought. And then, somehow, through the veil of fury and revulsion, Anne Winters glimpsed a bit of a broader view. Other worlds, other peoples destroyed, but for Iszt's—Curt Shelbey's—secret and colossal activities. Unquestionably there was something big and genuine and courageous here. And she saw Iszt, Earthman, in a less malefic role. Yet, considering her position, Anne Winters could not be expected to accept, without cold bitterness, the fate of her kind.

"Why have you told me all this?" she demanded resentfully.

Curt Shelbey's shoulders shrugged. "I do not quite know," he said. "You saved my life when you drove the car for me."

And in these words Anne thought she glimpsed the evidences of a vast loneliness—the loneliness of an entity far, far from home, an entity needing at least some slight touch of friendship.

She noticed that Curt Shelbey's face was raw and blistered, even as her own must be, from the radiations of the atom blast. Here was something almost funny. A robot with a blistered face! Just a bit of simple trickery, effected

during the time of the thing's repair! She could remember now the spherical automatons working around its head, though she hadn't been able to see just what they'd been doing. Make-up—that was all. And in this imitation man's daily existence, she knew now that there certainly were many other curious deceptions.

"What happens next?" she asked. "I know the story. Are you going to kill me, or are you going to keep me captive? You know, if I go free, I'm not likely to keep quiet. And that might be very inconvenient!"

Shelbey chuckled a little then, and looked very youthful.

"You'll see, Anne," he responded. "But first I want to show you something."

HE HELPED HER out of the car, and she followed him without protest. He led her to a crystal casket, which had been shielded from view before by a massive buttress. Within the casket, immersed in a milky fluid, was the body of a young man.

"The real Curtiss Shelbey," said the thing beside Anne Winters. "He is the pattern of my Earthly form. I captured him on a lonely road one night long ago, as he was driving along. Now he is neither alive nor dead. His flesh knows no decay."

Anne could see only the youth's face, vague and peaceful through the cloudy wisps of the fluid around it. His suit—all his clothes—were strangely outdated. But she could recognize the exact similarity between this calm, lifeless face and the visage of the wondrous animated robot which she had once known to be the man she loved.

"Loved?" She said the word out loud, in an odd tone of puzzled reminiscence. And then at first with what seemed bright humor: "The girl who fell for a clothing store dummy had nothing on me!"

Her poise broke at last, under long continued strain. She began to chuckle. The chuckle became laughter, and the laughter changed to a humorless, choking cackle of hysteria. Her fingers clutched at the front of her now bedraggled dress, expressing a vague incoherence of thought.

Just then it happened. An invisible beam shot out from an intricate apparatus on the wall. It struck Anne Winters. And she felt weak and relaxed and happy, as a Lethean sleep rushed into her brain.

Dimly she heard Curt Shelbey—the Curt Shelbey she had known for so long—speaking to her.

"You will forget everything, Anne," he said. "It is best."

She could not have known anything of the strange gentleness with which Iszt caused his man-guise to lift her limp form into the car.

Nor did she see the return of his robot spaceships. Settling slowly from out of the sky, their positions marked by only the faintest of phosphorescent glows, they were admitted to the subterranean cavern.

When Anne awakened, the car was being driven along the road toward the Winters laboratory. She found herself relaxed in the seat beside the wheel. Since the atom blast she remembered nothing. It was as though that blast had stunned her.

The car radio was blaring hideous history of wreckage and destruction, brought about by the merciless hammering of huge meteors.

Fearfully, as if seeking protection, Anne groped out, putting her hand on Curt Shelbey's arm.

DAWN, made red by the light-absorptive effect of suspended meteoric dust. The great isolated Winters laboratory had remained untouched by the avalanche of hurtling, extraterrestrial matter.

Curt Shelbey had apparently slept well. But actually, Iszt, who required little rest, had thought with a fierce, unsettled tension all through the four hours of supposed slumber.

Now Curt Shelbey arose. His room, located in the living quarters of the lab, was quite like that of any young man, even to its evidences of disorder. Curt went through the motions of doctoring and gently shaving his blistered face, meanwhile whistling gayly.

Then breakfast, with Anne and Dr. Winters. Curt ate his food and drank his coffee quite as naturally as any one, though these acts served no purpose other than that of completing, to the last detail, a minutely marvelous masquerade.

The substances thus taken into the mechanical body were lodged in an artificial stomach. Iszt could use no Earthly food; at long intervals he must eat quantities of super-chilled, highly complex compounds prepared in his own workshop.

The benignant old scientist, Dr. Winters, tall and slender, with iron-gray hair and beard, looked unusually haggard and weary this morning.

"The United States has yielded to your proposition, Curt," he said. "I received a phone call a little while ago. Didn't want to awaken you, on account of the evidently harrowing experiences you two were up against last night—the meteor shower, that strange explosion and all. But I find you cool, Curt. I might have known you'd always be cool—and self-assured."

Curt nodded seriously. "They realize," he said. "The Chicago catastrophe convinced them. This destruction can't be allowed to go on, while there is any hope of its being stopped. The other nations will come through presently. By the way, there's going to be a meteor shower in East Prussia at eight-fifteen to-night—their time. My spacial balance formulae predict it perfectly."

Dr. Winters had gotten over most of his outward revelations of awe at this strange youth. But now he frowned in a way that expressed perpetual and hopeless puzzlement. Those spacial balance formulae, capable though he was, constituted an enigma that he could never understand.

After breakfast, in one of the workrooms of the laboratory, Curt Shelbey tried again—or seemed to try—with every show of earnestness to explain his formulae to Anne and the Doctor, using intricate charts and symbols for the purpose. But the task was hopeless, as of course it was really meant to be. The formulae had little real meaning, and were designed merely to confuse.

"You might as well attempt to teach Einstein to a worm," Dr. Winters admitted at last, with a sorry shake of his head and a forced laugh.

AND ISZT, Earthman, detected in this admission of defeat, the attitude his practical purpose required. He could not tell humanity the truth; he could not tell them about the black juggernaut hurtling straight toward Sirius. For it would not be till a thousand years that the galactic catastrophe was scheduled to mature, and a thousand years is many lifetimes to mankind. They would be awed and fearful if they knew. But they would not be prompted to act on the gigantic scale that was necessary. Certainly, if their informer went further with truth and told them that they were doomed, no matter what they did, they would merely denounce him.

And so Iszt was forced to use his robots to create fear by means of artificially induced tragedy. It was cruel, brutal action—but it got results.

That day the British Government, confronted by the London catastrophe, duplicating and coincident with that of Chicago, fell in with the Curtiss Shelbey scheme. Germany, on the following day—having submitted to the smashing effect of a swarm of meteors pulled

from the path of Minor Planets by Iszt's re-sallying spaceships—bowed its arrogant, capable head. Italy and Japan, victims of fearful quakes and volcanic eruptions, induced by two of Iszt's mole robots long afield, were next to submit. Russia and France remained aloof for a longer time. Tremendous atom blasts in the vicinities of Moscow and Paris, respectively, won them over at last. Singly and in groups, the less important nations fell in line.

And so a kind of world-dictatorship was born, with Curt Shelbey, the young miracle man, the masquerader, the inscrutable Iszt from across the desert of the stars, in the role of master.

Iszt had no difficulty in directing his mechanical agents of destruction while playing his human part. The remote control apparatus was inside his manguise, and could be used without a hint of suspicion.

Presently his gigantic project was under way, rolling slowly at first, then with a vast, roaring, swelling momentum. Iszt's plans of construction had long ago been drawn up.

Inspired by fear, sustained by regularly occurring calamities, people everywhere placed their loyalty and trust with the scientist who seemed like a young god to them. They believed in his predictions of those calamities now, and so the danger areas could be evacuated. There were a few dissenters, of course—individuals who doubted Curt Shelbey—but they were carried along by the limitless power of mass faith. It was blind faith, that accepted without question. And so mankind began its mighty march toward swift extinction.

Great factories were made over to produce strange, new parts, which, when assembled, turned out to be huge, half sentient robots, each of which could do the work of a thousand men. A horde of these colossi were built, and as soon as each individual was put together, it climbed ponderously onto a flatcar, to be carried by train to some destination, near or far, where one of Curt Shelbey's "readjustment stations" was being built.

These huge creations were scattered everywhere, one for approximately every ten thousand square miles of land area. They might loom like great, burnished, simple-appearing bosses, half a mile across, and two thousand feet high, from the midst of land devoted once to the raising of cotton or corn or grain, but now scarred with railroad sidings, and trampled by millions of feet, both living and mechanical. Or they might glitter in the blazing sun of the Sahara desert, to which the parts that composed them had been laboriously borne by an army of metal giants. Or they might bulge, gleaming and bizarre, from the dank heart of a Brazilian jungle, or from the frozen desolation of the Antarctic. But all were joined by the vital connections of huge cables, plumbing seas, spanning continents—forming a world-wide network.

ISZT USED the primitive trains and the primitive ships of Earth for transportation purposes because of the need for haste, and because he was without outside resources—alone and isolated from his great, inert people.

Curt Shelbey, the man-shape, was everywhere, flying from place to place openly now, in a marvelous vehicle which every one thought was the product of his own wizardry. No Alexander or Napoleon had ever possessed such vitality, such indominable energy as he. And no hero had ever received such tremendous—or such unmerited—adulation!

Stopping at some hot, dusty scene of operations, it was a constant occurrence that some one should speak worshippingly to him.

"Reckon youse almos' as good as Jehovah, ain't you, Mist' Shelbey?" a young colored man at the readjustment station near Jackson, Mississippi, had said with ready awe as he was dying

from an injury caused by the collapse of a scaffold. "Reckon I'm glad to go to glory for you, Mis' Shelbey, if it do you any good."

All of which must have pleased the cold, practical part of Iszt, the unknown, the unseen. Yes, Iszt surely was pleased, for such devotion simplified the culmination of his purpose—simplified it at least up to a point.

Anne Winters was his frequent companion—Anne who had known his secret, and had lost her knowledge in the Lethe of a hidden and wondrous science of psychology. She'd try to keep up with Curt Shelbey in his hurried, superhuman pace, and she'd look hurt and tired and rueful when she found she couldn't. And she'd laugh and say that he was perfectly right in his haste—that nothing mattered now except getting the job done.

Could a super-being see and appreciate the irony and pathos of situations like these? Human faith, human toil and sweat and sorrow, against the background of black treachery? But what should a creature like Iszt care? Injustice? Perhaps. But then there was a far greater thing at stake—the preservation of the galaxy! The lives of little, primitive dabs of slime were surely a cheap price to pay.

Such should surely have been Iszt's attitude, and in part it was. One view of him was that of an adventuring demigod. But there was another view, another personality, full of a deeper understanding and a greater kindliness. For Iszt was a tiny, fragile thing, fighting a solitary battle with forces gigantic, living on a world that was utterly alien, and removed by a tremendous distance from his native haunts. Scared. Slightly unlike the rest of his people.

Iszt went on with his job with only one minor change of plan; but that change clearly indicated that something out of line with duty was going on inside his brain.

Great metal rings were built around all the larger cities. Did Iszt mean to protect them in some way from what was to come? If so, there was grave doubt, indeed, as to the value of his efforts. He might save the cities, and the people within them, but what then? Earth with a two-hundred-yard depth of its crust stripped away, its oceans depleted, and its atmosphere permanently thinned and poisoned, would be a hell of slow, creeping hideous death! Nor did Iszt have any personal resources that would enable him to combat these conditions. He couldn't rebuild a broken world, nor was there a world, suitable to mankind, within five light-years of distance. Anyway, of spaceships there never would be a sufficient quantity.

And so Iszt's motive in the construction of the rings around the cities would have held certain elements of mystery to one who knew his true nature and the true purpose of his being on Earth.

THE WORK of building the reajustment stations went on. Two years of furious, aching effort that used up the major portion of the planet's wealth, and brought accidental death to thousands of martyrs. And Curt Shelbey was the guiding star of it all.

Often, when he was supposed to be asleep at night, his intellect, in the body of Iszt, shielded by a special insulated integument of light weight material, crept from within the human robot, and sped on the magic wings of science to the buried, alien laboratory, which, now as always, was a secret.

There, alone in the silence, Iszt conversed across the void—and through the mysterious transdimensional passages of space—not only with his own kind, many light-years away, but also with other beings, as far, or farther distant.

Something fierce and restless inspired the brain and will of the tiny horror during those stolen hours. Flashing in a view-screen before him were many

pictures, drawn from realms as strange as anything a man's fancy could conjure. Worlds—tumbling worlds! Clouds glowing with the reflected colors of bizarre, gigantic suns! Pressure and vacuum thinness, cold and heat—all expressing unbelievably diverse environments.

Sinuous shapes with glinting eyes, and delicate nerve filaments of mushroom pallor. Pulpy blobs with no eyes at all, but possessing a vast wisdom. Gigantic, crystalline things of intellect incredible. Creatures that oozed up out of the thick, fetid substance of hot seas—seas that shimmered under the rays of a half dozen great, blue suns! In such varying shapes were cast the peoples of Nirvana.

Iszt talked with those scattered, mighty clans, not by means of words, but in the swifter, subtler, more universal language of the mind. That language was not telepathy, exactly, but something hyperdimensional—something depending on an unhuman sense that could grope through the hidden texture of space, and feel the thought currents in a brain. But for swift and possible communication across the light-years, the indescribable impulses on which this odd means of exchanging ideas depended must be artificially amplified and quickened, until they could bridge interstellar abysses far, far faster than any vibration known to man. For this purpose, and for the purpose of bringing the pictures to his view-screen, Iszt employed an apparatus dimly comparable to a Terrestrial radio.

Always Iszt seemed to plead with his varied audiences, and to ask for the answers to his questions. But always he was met by apathy—the apathy of too much, and still, perhaps, not quite enough—wisdom. What he asked for demanded swift action, a change of viewpoint, and real effort and danger even to demigods. And the recompense——? Try as he might, Iszt could not present it effectively to his listeners. The spanning of tremendous distances, and the immaterial gain of colossal, dangerous work, did not appeal to them. They had made no preparation, and haste, when it was not really needed, was beneath their dignity.

Iszt was not pleading primarily for Earth, but for something that Earth had helped teach him. His attitude must have been slowly growing in his mind for many years. But now, met by flat refusal and even threats of vengeance, Iszt was a little discouraged in his quest for understanding.

TO-DAY, beautiful and clear, was the day. Curt Shelbey was at the Winters lab, which had been much altered and enlarged. Around it ran a ring of bright metal. Everybody on the planet had been warned. The populace was gathered within the similar, though much larger, protecting rings of the cities. Each city had taken in a vast store of provisions.

Curt Shelbey looked out of a window toward the rising sun, and smiled a smile of cool confidence—a feeling which Iszt could not now have shared. With Curt were Anne and her father. No others.

The youthful man-shape clutched a great black switch, and moved it the few inches that were necessary. At once there was a faint thud, as an aura of cold, shielding fire sprang from the ring around the laboratory, and formed a bubblelike dome above it. Not until then was the major effect of the moving of the switch made evident. Fire rippled up the sides of the great readjustment station, bulging from a row of hills in the distance—dazzling, sparkling, incandescent fire. Then, like the thunder which follows a spurt of lightning, the crash came, thin and high and nerve-shattering. It was as though the crystal silence of the morning had been broken into a billion, glittering fragments.

Trees and grass broke into flame—

the flame of real combustion, flame which was now ripped and torn upward by the force of strange luminous gases, rising everywhere from the substance of the ground. Swiftly the sky was flooded with the ghostly, fluorescent glow of those gases, born of the dissolving soil and rocks of the Earth. Transmutation, it was, and the release again of atomic energy. But this transformation of matter into power was comparatively slow —at least as yet.

Over the entire land surface of the planet, it was going on, induced by the presence of those massive readjustment stations, which, like the protecting aurae of the cities, were all controlled from the Winters laboratory. To a lesser degree, since there were no stations there, the waters of the ocean were also being converted into gases and free energy. Ionized helium and hydrogen were among those gases.

Viewed from space, Earth would now have been seen to assume a stubby tail, like that of a comet—a tail which extended farther and farther out toward a point beyond Sirius, the Dog Star. It was gaseous in structure, but the substance that composed it was restrained from indefinite expansion by a tight web of force. And it was moving at an ever-mounting speed toward a transdimensional passage, which shortened enormously the distance it had to go to meet the gigantic dark star it was meant to resist and to help deflect.

By now, other force-bound gaseous masses were hurtling from other sources scattered throughout the galaxy—sources under the direct control of one race of superbeings or another, and involving no lesser people in the apparent certainty of destruction. Superbeings who had taken sure precautions that would neutralize any danger to themselves.

IN COMBINATION, these several hurtling clouds of gas were meant to, and were capable of, producing enough drag to create a tiny difference in the dark star's velocity and direction. Even gas is capable of offering considerable resistance, and when tremendous stellar velocities are involved, that resistance is proportionally much greater. And in a thousand years, the minute change in the dark star's course would naturally be magnified many fold, so that what seemed an inexorable collision with Sirius would not take place.

All, then, seemed quite according to plan. But there was one thing wrong. And the trouble was on Earth, which had been selected for use in this immense task because of its ideal location in the complex structure of space, and because its size and mass and composition were correct for the proper energy output needed for its position. The finger of gas, stabbing from Earth, was not accurately aimed. It wouldn't touch the dark star at all!

Was it possible that Iszt had blundered? Considering his vast scientific erudition there was slight room for doubt here. Almost certainly he had not blundered!

But then—what was his purpose? To suppose that he would throw a galaxy into the teeth of fate to save one race for a few more centuries was hardly to be expected of him. And he must have known, too, that what he was doing must mean swift punishment.

But whatever his objective, his manguise, Curt Shelbey, remained cool and assured. Curt watched the streaming, phosphorescent haze out there beyond the shielding envelope of force, and he watched the trembling heat waves. Already it must be hot enough out there to fuse lead. The vegetation was ablaze in fitful, gust-torn spurts. You could see the ground reddening with heat. And it was dissolving, too—dissolving as zinc immersed in sulphuric acid might have done—the substance of it hurtling away into space. Now the wind was rising—assuming cataclysmic proportions—

seeming to swirl like a glowing vortex around the bulging shape of the great readjustment station that influenced all the ten thousand square miles around it —creating, in the atomic structure of the soil, the necessary instability.

The intellect that animated Curt Shelbey knew the truth that concerned all this giant undertaking, but his companions didn't. Or were they beginning to suspect at last? Anne Winters' fingers were on Curt's arm, clutching and unclutching nervously. The scene out there, assuming fresh fury every moment, was scarcely reassuring. The flickering, white light from the holocaust of the readjustment station held an element of catastrophe beyond any danger that a human being at home on Earth might ever reasonably expect to meet. It lit up the faces of the three in the laboratory with its grotesque, trembling flashes, awoke weird gleams in the instruments and controls all around. Somehow there was in it a vivid suggestion of a moving, immeasurable universe, and of the efforts of little mortals to control that immeasurably grand movement.

"You're a very strange person, Curt," Anne murmured with apparent irrelevance. "Sometimes I think I know you, and sometimes——"

ISZT MUST HAVE remembered, then, other things that she had said—things expressing faith and hope. Did justice, as it is conceived on Earth, have any genuine meaning to him? Had his strange defiance been influenced in any way by the knowledge that the people of this planet had toiled to the utmost? Did he glimpse a little of the potentially glorious future of these, to him, hideous, primitive folk?

Curt Shelbey waited passively for evidences of realization in his companions.

At last Dr. Winters spoke. "Something's wrong, Curt," he said quietly. "Already every living plant out there has been destroyed. You couldn't have planned that. We'd better open the switch."

Curt Shelbey did not respond in words. But his arm came up to restrain as gently as possible the old savant's forward step.

And something deep and human ached in the cold soul of Iszt, the demigod. Was it admiration for the courage and control of this odd creature that had befriended him? Did he see in him a quality which his own people had lost, and might find again? It was true that Iszt's kind had both courage and control. But most of them did not—had never needed to—sacrifice their comfort and risk their lives for the attainment of an objective.

Curt Shelbey gave his companions no chance to speak further. He lifted a small box from his coat pocket, and pressed the switch it bore. A vapid something was ejected from fine holes at one end of the container—a vapid mystery created by an alien, hyperchemical science. The coiling threads of it were visible only to the eyes of Iszt, who could see ultra-violet light. The threads wandered quickly across the room.

Dr. Winters gave a low gasp, and crumpled to the floor. With a hurt look in her eyes, expressing thoughts of reproof which doubtless Iszt could sense in that miraculous way of his, Anne submitted a moment later to the same spell. The two of them were asleep—lost in the slumber of a kind of hibernation that could last for months. They scarcely breathed. Their pulses moved scarcely at all.

Iszt and his robot were unaffected. And he knew that almost coincident with his release of the sleep substance here, his automatons in all the cities had released much larger quantities of the same agent. The entire populace of Earth was now sinking into slumber. At least

the dangers of panic, in the events to come, would thus be avoided.

Now the being from the depths of interstellar space was alone in the laboratory. From without, his auditory organs could detect only the mounting, unnatural scream of the wind. Streaming flame, the ground out there beyond the protecting force shield was red like hot iron, heated by the breakdown of matter. For two Terrestrial months the processes which Iszt had started must continue in order to be effective. What he did now depended on whether fortune favored him or not in his next move. Certainly he had already dared to do that which once he would have considered beyond the realm of sanity.

There seemed to be plenty of time. Nevertheless, Iszt hurried as if pursued by a devil, or inspired by something mighty—something so old that it was new.

CURT SHELBEY was now just a machine that did not trouble to act like a man. With swift efficiency it donned a massive, protecting armor. It ran out of the laboratory building. The momentary short-circuiting of a portion of the encircling ring of metal, accomplished with a curious, forklike device, allowed it a passage through the force shield. Thence it bounded on, in long, superhuman leaps of a dozen yards, at last making full use of the tremendous power latent within its artificial muscles.

The ground was soft and crumbly, half disintegrated. Invisible rays were shooting up from it—cosmic rays, X-rays, and radiations of the same kind as those of radium, though tremendously more intense. The heat, too, was terrific, though of it, and of the other manifestations, Iszt had no immediate fears, for he was amply protected. The armor his robot wore was immune to the disintegration processes, for in the materials from which it was made there was an atom-locking web of energy.

Through the shrieking, furnacelike gale he hurried on, covering miles in a few minutes' time. Presently he reached the site of his own secret laboratory, over which there was also a shield of force, tenuous as a curtain of thin flame, but effective. The ring of metal that induced it had been built by his automatons, and was concealed several feet under ground.

Iszt negotiated this bubble of energy as he had negotiated the one which enveloped the Winters laboratory. Within the shield there still were wilting bushes and scrub pines. The concealed entrance to the lab folded upward like a hatch.

Iszt passed below. Here robot mechanisms rested, inactive now, and here, beyond the crystal door, was the superchilled chamber where Iszt could really be himself.

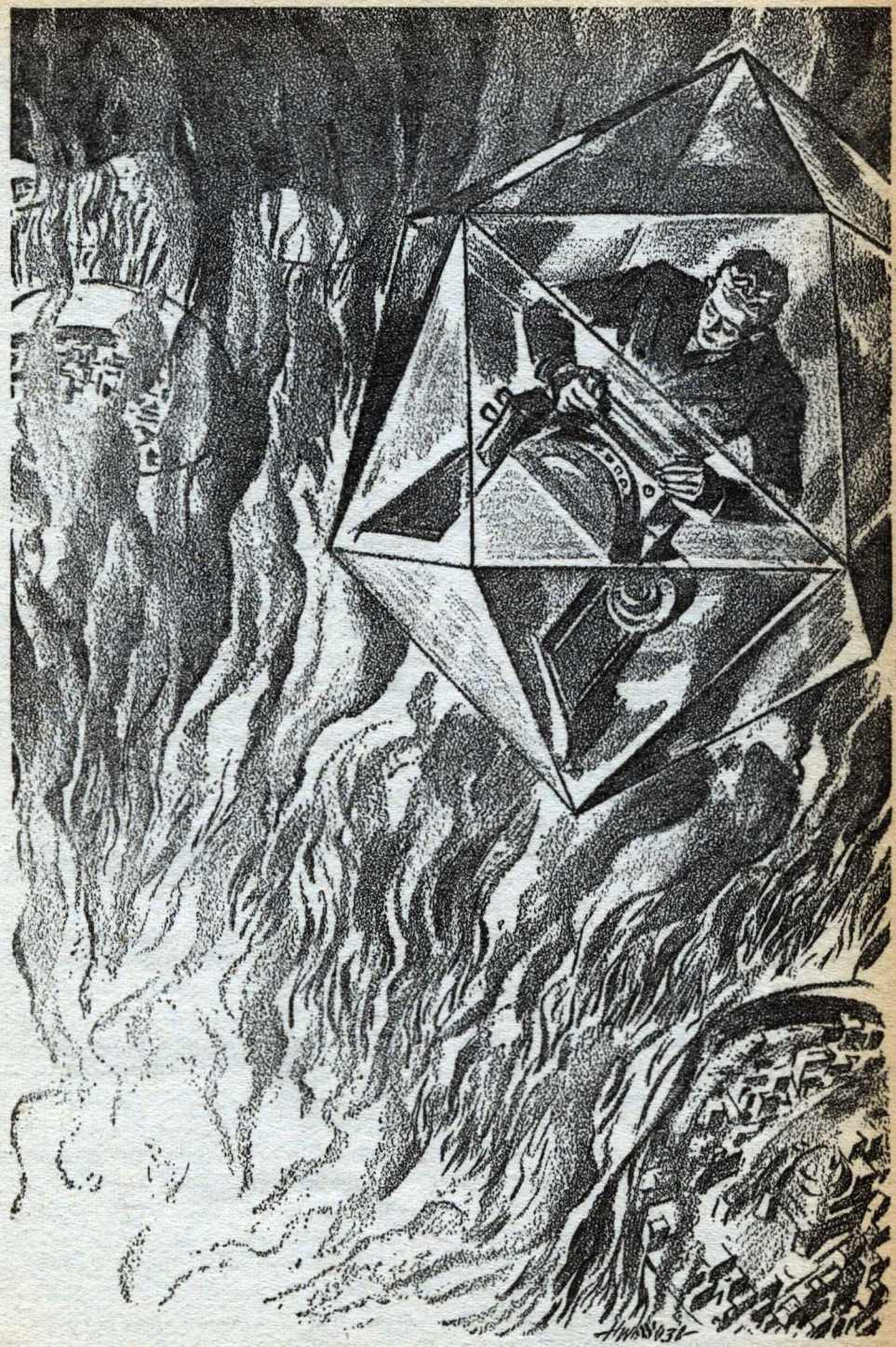
Iszt dismounted now from his robot and switched on his vision screen. His little black eyes gleamed feverishly as he waited. His leechlike body trembled with excitement. In his mind an ultimatum had formed itself.

And then he seemed to be face to face with a score of small, black baroques of his own kind. They were gathered in a great, crystalline tetrahedron, packed with massive machinery. Beyond its walls were visible huge meteoric masses that were practically miniature worlds floating in space. From them, extended tremendous streamers of hurtling gas.

Did Iszt's purpose in desiring to communicate with his kinsfolk seem ridiculous to him now? And dangerous out of all proportion to its possible benefits? Perhaps so.

But this did not daunt him. He went on with his intentions, arguing and pleading as he had done before. And the impressions of stout refusal came back to him in reply, as he had expected.

After that, however, he did not plead. He demanded instead. He knew that his kind had not lost their mental keen-



The robot Curt Shelbey made a last trip across the disintegrating Earth—up and away from the hidden refuge of the alien Iszt.

ness, or their capacity for action. But they had been inert through all their tremendously long lives—most of them. They had depended on a few individuals to accomplish the tasks beyond the normal capacities of their robots, while they lived in an ethereal world of beautiful, artificially created dreams.

ISZT STATED his case clearly, even seeking to portray, in mental impressions of feeling, his own, personal viewpoint. Then he gave his motives—his thoughts of justice and of need—need not only for Earth, but for them, his people, too. And he stated his terms.

"Do what I ask, and I will readjust the direction of the energized gas cloud streaming from Earth, as must be done in order to save us all from the galactic destruction that would result from the star crash. Without my coöperation here, the other gas clouds will not be effective to the degree that is necessary. Failure to do as I request can mean only that I will not help you at all, and that I will use the forces at my command here to neutralize and to hinder the effectiveness of the other clouds."

Such was the substance of his message.

Iszt did not mean what he said. He was only trying to bluff, perhaps prompted to some extent by motives beyond those which he had stated. Adventurous mischief could easily have been part of his bizarre nature. He was strong, and self-opinionated, too.

Now Iszt studied the creatures pictured in the vision-screen. Did he see doubt and fear in the nervous twitchings of their tendrils, or merely hot hatred, provocative of his destruction? After all, though, he held the master trump. If he should *really* decide to play the game he had mentioned—well it was possible that, with hurry, he might be killed, and his mischief corrected. However, peril to a galaxy—even a far lesser peril than the one introduced by Iszt—was not to be tampered with. And—he had learned the meaning, the idea of bluff here on Earth. They had not.

Iszt shut off the apparatus of the viewscreen. Mounted again in his human robot, he placed this apparatus in a shielded box. Then he wrapped the casket which contained the inert form of the real Curt Shelbey in a thick, fabriclike material of the same texture as his armor. Very heavily burdened, both with the box and with the casket, but by no means enfeebled in spite of this, he waded back through heat and wind, and the potential death of lethal radiations, to the great force-shielded building of the Winters laboratory.

But he did not immediately correct the controls of the holocaust of disintegration. He wanted first to make good his bluff to the various beings, both his own people and the other great ones, able to watch at least the broader aspects of his operations by various transdimensional means of their own.

Here on Earth, pathos and fury were all around Iszt—but who may say that he, marvelous, enigmatic little devil that he was, did not possess the capacity enjoyed by some men of tempering pathos with humor?

He set up certain intricate equipment which he had hidden away here at the Winters lab. He opened the casket which contained the inert, though not-dead, body of the youth who had served as the pattern for his human robot. For a while he was busy doing certain very complicated things. The body warmed a little, but the vapid substance of hibernation still in the air did not allow the man to awaken.

THE MECHANICAL Curt Shelbey lifted his living original to the porcelain top of a table. There radiations were applied—radiations which carried a few fragments of Iszt's own vast knowledge.

Those radiations touched the cortex of the slumbering man's brain, and permanent impressions were made in the delicate fabric of living cells.

Iszt caused his robot to divest itself of its clothing, and to transfer the garments to the body of the genuine Shelbey. The latter he allowed to slump to the floor beside Anne and Dr. Winters. For a moment Iszt's human-guise stood surveying the room, this act perhaps betraying pensive thoughts on the part of the strange little master. His understanding of mankind must have been far deeper than one might expect.

Now Iszt set up the apparatus of the view-screen. Thus, presently, he was looking into his home region, seeing the great red sun and the limitless host of polyhedra. A horde of those polyhedra were already tearing themselves from their orbits, driven by power units that were a necessary part of them. Accompanied by numerous spaceships, they were moving at increasing speed. Soon they would shift into a transdimensional passage. And in a matter of weeks they would be in the neighborhood of Earth. Were the creatures aboard them merely coming to inflict vengeance on Iszt, and to attempt to correct this mischief? Maybe they were—now. But by the time they arrived—and they would come all the way, of course, since they must now feel that Iszt could not be trusted—everything here would be all right, as far as the battling of the dark star was concerned.

They would have no reason to seek vengeance then, except for the threat itself, and for the trouble they had been forced to take. And by then, in traveling across the interstellar vacuum like that, and in feeling the grim grandeur of reality, they would have done something old, that was, nevertheless, new and strange and intriguing to most of them. Perhaps——

At any rate, their vast capacities had truly been aroused to action. They were the folk who had broken up the ten huge worlds of their native solar system, transmuting the elements of those worlds when necessary, and fashioning the myriad swarm of polyhedra. When the time came, then, could they not rebuild the half-ruined Earth, replenishing its depleted oceans and atmosphere, replacing its disintegrated soil, perhaps using the substance of some of the asteroids for this purpose? Plant life might be brought in the form of spores and seeds from some distant, Earthlike world. Of animals there would be enough kept alive in the protected cities—enough at least to start replenishing the fauna of the planet. A few alien animals might, of course, be added.

Such must have been the path of Iszt's thoughts. These were things which he could never accomplish alone. But his people could—if the urge gripped them, if the spirit of adventure which might be awakened in them out there in the void made them more subject to persuasion. But, of course, Iszt could not be sure of anything. This uncertainty made him half afraid, and yet gave him a wild thrill of sheer ecstasy. Would he have to flee far into the depths of the cosmos? Maybe. Maybe not. He was working more for his own kind than for Earth, and if he could really arouse in his people the ecstasy that was his, then he knew that his battle was won.

He toiled over massive controls, setting them perfectly. The energized gas cloud streaming from Terra was perfectly aimed now.

Then, still ruling his man-guise which he caused to redon its armor, Iszt returned to his own laboratory. Guiding a crystal car, he catapulted away from it, having first shut off its force shield, thus assuring its destruction. That lab held too many wonders to be left for men to discover in their present state of development.

Now he hurtled out above the surface of Earth, tearing through a hell of hot, chaotic fire. He saw cities sweeping below him—cities where mankind slept, awaiting either salvation, or death by asphyxia when they awakened. Already the cities, enveloped in shielding flame, stood on low plateaus, for the unprotected hills and plains around them were dissolving and sinking appreciably. Iszt's craft shot out over the boiling, steaming madness of the ocean.

Presently he guided the crystal car on a brief excursion into space, where, in the still, cold, emptiness, he could quiet his wild, feverish feelings.

ANNE WINTERS awakened without knowing that nearly six months had gone by since she had last been conscious. Almost before she opened her eyes she listened, with a touch of panic, for the sounds of destruction going on in the world without. But she heard only a dreamy murmur, which might have been that of a light breeze. She could see, now, that the sun was shining through the windows of the laboratory room, gilding the accumulated dust on the floor, and awakening slumberous gleams in the levers and meters along the wall.

"Anne!"

She recognized the voice without effort, and with a deep thankfulness. Curt Shelbey was bending over her—the real Curt Shelbey, though she was never to know for certain that there was any difference.

And this young man inert for so long—what of him, after his many years of suspended life? His face, gaunt and wasted now, bore a faint frown of puzzlement. He knew Anne Winters perfectly, though he had never really seen her before. He knew much of the tremendous happenings that had recently taken place on Earth. But his own life was a tangled skein of the real and the unreal, that he would never try seriously to unravel. He did not know about the implanting of a few scraps of alien knowledge in his brain. But he was vaguely conscious of the existence of an entity called Iszt, and of another science and another people. He was dimly aware, too, of a great purpose that had marched on to successful fulfillment, bringing security to myriad worlds. Earth had done its part. In the real Curt Shelbey's thoughts there was now a sense of solemn benignance, and yet of happy peace.

For a long moment he looked into the girl's beautiful face, grown thinner now during her months of hibernation.

"Everything's quite all right, Anne," he said gently. "The world's changed a lot, but it's still a nice world."

He helped Anne Winters rise, and together they walked to the window. No force shield burned beyond it now; the metal ring that had produced it had been melted into a shapeless mass, perhaps by the action of some weapon of tremendous power. Only Iszt had known the secret of those rings, even though he had had human help in building them. There were no more of them left on Earth, which perhaps was best.

But from the window the steep slope of the hill, on which the laboratory now was perched, could be seen. Below was a sunken plain, scooped out by the disintegration of a two-hundred-yard depth of Earth's crust. But it was green with a dense, fast-growing vegetation that looked like giant moss. Odd, bright-colored fruits grew on it in luxuriant profusion.

Curt Shelbey expressed to the girl his vague ideas of what had happened. A thin layer of rich new soil created out of the transmuted substance of the asteroids. New air and new water, similarly manufactured, and poisonous radioactive substances taken away. It must have been a great time—that rebuilding of a world. New plants from across the interstellar void——

"It'll be tough going for a while," said the youth. "Getting used to new conditions, and all that. Lots of folks will wonder what really happened, and I'll be blamed for things I can't explain. But there's food out there in this new Earth—food and hope and promise."

ANNE POINTED toward the place where the readjustment station had been. But the great bulging shape wasn't there any more.

"Nothing but a big flattened mass of metal," she said. "It's been melted down—destroyed."

Curt nodded. "All of the readjustment stations have," he returned. "Nobody will ever learn anything from the junk that's left. Don't ask me how I know, but the robots in the cities have been fused, too, and even the factories in which their parts were made, have been wrecked. Engineers will remember a little, of course, but nothing fundamental, for they were always in the dark there. Still, somehow, I have a few ideas, Anne, that won't give us a science ahead of our mental and moral progress, but still will help us a lot. They aren't my ideas, since, as far as I can say, I'm just a middling-good cub engineer myself. New inventions and things. New laws. Somewhere out where the stars shine, there are beings far greater than us, Anne. Our kind is going to be like them someday. But it won't be getting there that'll be the most fun. It'll be the work and adventure of climbing that'll count. Each people must climb most of the way alone——"

Anne Winters listened dreamily, not trying too hard to reason out the incongruities of the past and the present.

A party of people was coming across the plain.

"From Chicago, I think," Anne said quietly.

And then she saw her father's body on the floor. But it stirred with the reassuring evidences of returning animation.

FAR, far away, Iszt, guiding a cylindrical car, sped through a transdimensional passage toward an island universe, bent on exploration. But he was not alone now in his pursuit of adventure. Behind his car trailed thousands of others, bearing demigods cast in twenty different forms. In the super-chilled fluids that flowed in Iszt's veins, there throbbed a fierce exultation. He had won his point. He had shown his kinsfolk the way. And already several other super-clans had submitted to the same call. Nirvana was going beyond itself. Dreams had beauty, but though there was danger in reality, there was also more substance, more purpose, more thrilling satisfaction.

Did Iszt, strange, unfathomable little giant, benignant, hard, with flesh that was not like the flesh of Earth, still feel an ache of gratitude for the primitive world that had been his inspiration?

Radiation in Uniform

by

Herbert C. McKay

An illustrated science feature on polarized light

TWO sheets of perfectly transparent material combine to produce opacity. A colorless crystal scintillates with gorgeous color. Brilliant reflections disappear.

These phases of polarized light are familiar, now that polarizing sheets are available in every photographic stock house in the country. But there is a little more to it than that.

Polarized light is not new. It was among the problems studied by Huygens and Newton. Seventy years ago a book was published which gave complete details for making "artificial tourmalines," the forerunner of the modern polarizing sheets. A half century ago polarized light was one of the favorite subjects for scientific study; and one is tempted to say that familiarity with the subject was more general then than it is today.

Every high school student of today has experimented with the fascinating polarizing sheets which apparently disobey fundamental natural law; and every one of them is familiar with the "crossed grating" mechanism used to explain the phenomena. But, can this device really explain polarized light? For example, if a mica plate is placed between the "crossed" or black polarizing sheets, and given a specific position, light passes freely, regardless of the "black" positions of the two polarizing plates. A simple explanation jumps to mind; the light has become depolarized. However, the interposition of a crystal proves that this is not true, for the crystal exhibits the splendor of the polarization interference colors. Here we have polarized light which does not act like polarized light. What is the cause of this?

Again, we find that a sheet of mica, when placed between the polarizing sheets, displays a certain amount of color, plain color. But when we examine this self-same mica between the elements of an optical system which refracts the polarized rays in specific manner, we find the most beautiful designs in concentric bands of color, crossed by shadowy brushes of gray. What is the explanation?

The planet which we inhabit has been bathed in polarized light ever since its birth, for even the light reflected from the clouds, even the diffuse light from the sky, is to some degree polarized. Yet what is it? How is it produced? What are its variations?

To answer these questions it is necessary to remember that the radiation we know as light has much in common with the radiations we know as heat and those we call "radio." In these longer wave radiations we find analogies which help answer our inquiries.

THE CONDUCTION of heat by a metal is a rough guide to its efficiency in the conduction of electricity. We shall see that the conductivity of heat exhibited by certain crystals is an index to their "conductivity" of light, a factor of the greatest importance in the understanding of the cause of color production

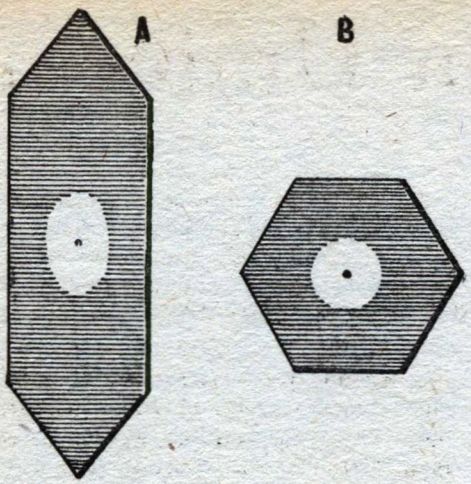


Fig. 1. Unsymmetrical heat conduction of the assymmetric crystal A results in an oval melted patch in the wax coating covering it. The wax covering melts uniformly about the heated wire through the symmetrical crystal B.

under polarized light. Primarily, however, we find that the basic phenomenon of polarization, double refraction, is explained by this conductivity of light.

In crystalline forms which are symmetrical, such as the cube, we find the conductivity uniform. In short, the crystal acts just like ordinary glass of similar density. However, when the crystal is not equilaterally symmetrical, but is in, let us say, a prismatic form, we find that the conductivity depends upon the *direction in which the light passes through it.*

We can demonstrate this assymetric conductivity with two slices from such a crystal. A thin slice is cut directly *across* the longitudinal axis of a prismatic crystal and a fine iron wire passed through a hole in the exact center of the slice. The crystal plate is covered with a thin coat of wax and the iron wire heated. The wax will melt equally around the wire. But if the slice is made *parallel* with the long axis, and a similar test made, the wax will melt more rapidly in the directions of the ends of the crystal so that the melted patch is elliptical in shape rather than circular.

Now if we pass a ray of light through the first plate, the light will be transmitted without significant alteration. But if we pass a ray of light through the second plate, there is a most significant change. To understand this alteration we must bear in mind the path of the photon with reference to the axis of the light ray. If we look directly into the path of the ray (so that the axis may be represented by a dot), the path of the photon will be the complex curve we know as *Lissajous' pattern.* As this "pattern" path will itself revolve about the axis, the photon will at some time or another travel in every conceivable direction

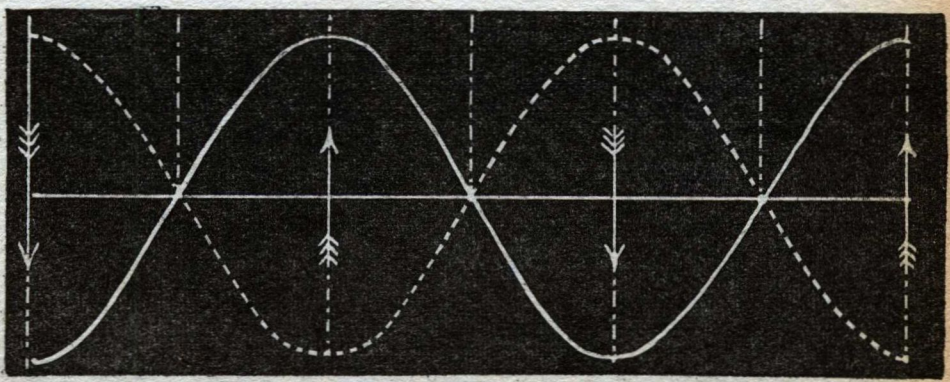


Fig. 2. The familiar "side view" of the undulatory path of a ray photon through space.

transversely to the axis. Looking at the path from the side we would see the path as a sinusoidal curve, the familiar radiation waveform. Reference to the figure will show that, while the path is continuously elliptical in form, the amplitude remains constant.

If this ray is passed through the longitudinal crystal plate, the photon is able to vibrate more freely in the direction of the crystal axis—the direction in which the wax melted most rapidly. The vibrations at right angles meet with more obstruction. In short, the crystal has, in effect, a *greater density* in one direction than in the other. We find that it actually has two different indices of refraction! As the path of a ray of light is bent by any transparent body to a degree depending upon its index of refraction, we should find the original ray divided into *two* rays, one bent more than the other. This is exactly what happens. A crystal of Iceland Spar, laid over a spot on a sheet of paper, will show *two* spots. If the crystal is turned, the spots revolve around each other, showing that the two images owe their origin to different degrees of refraction.

If the spar is split in a specific direc-

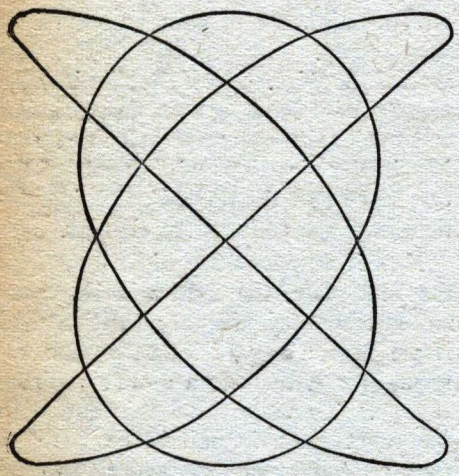
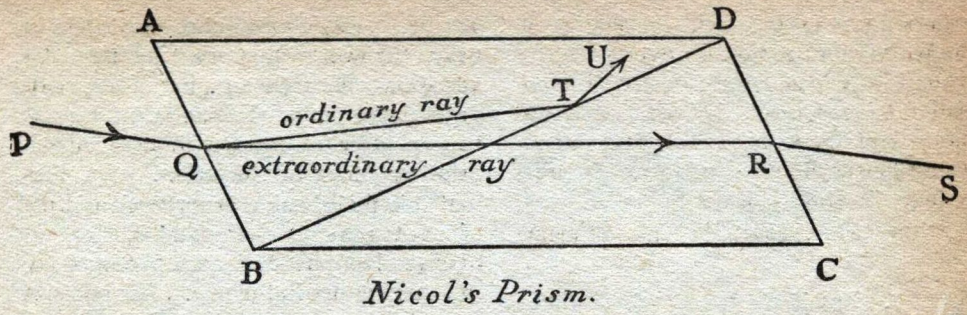


Fig. 3. The less-familiar "end view" of the ray photon's path through space. The path is undulatory and curved not only in two, but in three dimensions. The effect of the assymmetric, optically active crystals which polarize light is to damp out all but the oscillations in a single plane.

Fig. 4. Below, Iceland Spar, actually a huge crystal of marble, calcium carbonate, is almost unique in its polarizing action. The entering light is separated into two rays, the crystal acting as a sort of selecting machine. A pack of cards might be separated into reds and blacks by machine, and each half of the deck separately treated. Spar crystals separate light rays into two sections, depending on their plane of oscillation. Each section is differently treated, differently refracted, and follows a different path through the crystal. Thus, each imaged spot is doubled, since the light bearing that impression is sent in two rays instead of one.



Nicol's Prism.

Fig. 5. Taking advantage of this unscrambling effect, a Nicol Prism employs Iceland Spar to separate the two rays. The prism ABD is used to separate the light. Along the surface BD a layer of Canada Balsam is spread. Since it has a different index of refraction, rays striking it at one angle are reflected, while those striking at a different angle are transmitted. Thus, the ray PQ is separated into the two rays QR and QT. QT strikes the Canada Balsam at such an angle as to be reflected away in the ray TU, and lost. QR, striking at a different, and admissible angle, passes through to emerge from the second prism BDC as ray RS, which is plane polarized.

tion and recemented with Canada balsam, one ray will pass through the cemented joint while the other (the *extraordinary ray)* will be reflected at the balsam joint and deflected to one side. However, the ray which has passed through the joint will be found, upon examination, to have a definite peculiarity. The photons no longer travel in elliptical orbits about the axis, but vibrate in a plane parallel to the axis. The light is *polarized.* But do not lose sight of this fact; as the vibration takes place *in a plane,* the light is *plane* polarized. In polarization by tourmaline—or artificial polarizing materials—the extra ray is absorbed just as ordinary light is absorbed by black glass, or other opaque material. This is a detail; the fundamental result is the same, the vibration of the ray which is transmitted takes place in a *plane.*

SUPPOSE we pass this ray through a polarizing prism similar to the first (or a sheet of polarizing material), so placed that the axis is in the same position as the original—and nothing happens. Turn the second polarizer so that its axis is perpendicular to the original position.

Now, with respect to the second polarizer, the polarized ray becomes the *extraordinary* ray and is treated as the extraordinary ray was at first—in short, the ray disappears and we have the familiar phenomenon of two transparent substances becoming opaque.

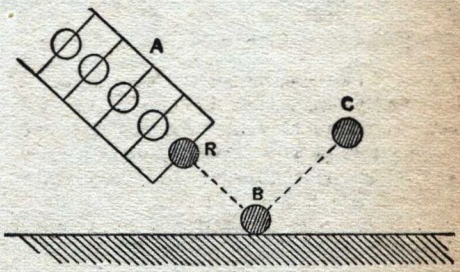


Fig. 6. Round rods rolling down the tube A and striking the surface at B so that their length is parallel to the surface, are simply reflected.

Polarization by refraction is recent; polarization by reflection is as old as light itself. It is so simple that a brief illustration will suffice. Assume we throw round sticks into water so that the length of each rod strikes the surface of the water all at once. There will be a tendency for the rods to rebound from the surface. This is reflection. If the rods are thrown in a plane perpendicular to the surface, so

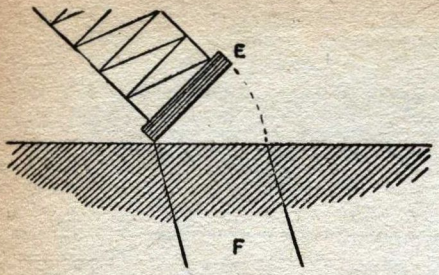


Fig. 7. But if the length of the rods is at an angle to the surface, the reflection of the rod does not take place. In the case of light, the condition of Fig. 6 represents reflection, while Fig. 7 represents the condition necessary for refraction and transmission of the light. This accounts for the fact that no matter how clean a sheet of glass may be, it still reflects some of the incident light striking it at any angle from the vertical.

that one end strikes the water first, that end is retarded and the stick swings in an arc, so that its direction of path is altered—*just what takes place in every case of refraction.* The diagrams illustrate this more clearly than mere description.

However, suppose the sticks are arranged in all directions perpendicular to the path of travel. Those which strike the surface full length will be reflected, those perpendicular will be refracted, and those in intermediate positions will be given a tendency to assume one of these positions, or the other. The significant fact is that all of the sticks which are *reflected* at the normal angle will be travelling in the same plane—a polarized plane. The sticks which hit at intermediate points will be reflected at different angles, and in irregular planes.

The same thing happens to light. The vibrations which strike the surface at just the right angle are fully polarized, while rays reflected at other angles show varying degrees of polarization. The angle of polarization is definite. When light strikes any reflecting surface at such an angle that the reflected ray is at exact right angles to the refracted ray travelling through the refracting medium, the reflected part of the ray is polarized. It is obvious that the polarizing angle changes with every alteration of index of refraction.

This polarization by reflection is utilized in making cheap and efficient polarizers. Glass sheets are piled, a dozen to twenty-five in the pile. The polarized reflection and normal refraction take place at every surface of the pile, but we find a peculiar condition. The reflected rays are polarized as we might expect, and the transmitted beam is also polarized, but in the opposite phase (perpendicular to the first plane).

Assume that we have a ray of light polarized in a definite plane. In the path of this ray is placed a sheet of doubly refracting material, such as mica. If the polarization axis of the mica is parallel or perpendicular to that of the polarizer, no particular effect is noticed. But if it is turned to a 45° position, a definite color effect is produced. This color is caused by interference. A mechanical analogy will explain this.

IF YOU TRY to cut diagonally across a coarse-grained plank, the saw is constantly forced off its path. The 45° mica acts the same, but as the ray is heterogenous, it will divide into two parts each following a different path—paths at right angles to one another. Assume that the original polarized ray vibrates in a *vertical* plane. Passing through the mica it is divided into two rays; one ray vibrates in a plane at 45° to the left of the vertical and the other at 45° to the right. But as mica is a doubly refracting material, one of these rays will be retarded; the individual waves in the two rays will be out of phase. So far there is little spectacular in this, but now pass the rays through the second polarizer (analyser). When the analyser is placed in one position (vertical), the two rays at

Fig. 8. Representing plane-polarized light, vibrating as indicated by the double arrow heads.

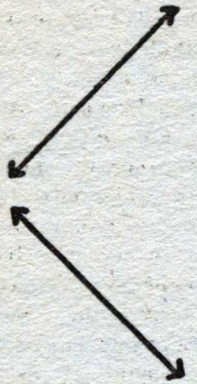


Fig. 9. When the plane-polarized light of Fig. 8 is passed through a mica plate, it becomes bi-polarized. Mica, in effect, is a polarizing sheet which has two planes of polarization, at right angles to each other. Thus, if the mica's planes of action are at 45° to the plane of polarization of the incident light, the light cannot pass in that plane. But it could pass if it twisted its plane of rotation by 45° in either direction. The light was originally polarized by a crystal which was assymmetric, allowing the ray-photon to oscillate more readily in one plane than in others. Now it enters a medium which allows two planes of vibration, neither coincident with its present plane of vibration. It tends to fall off, to seek the easier path that lies to either side. The ray is split, thereby, into two rays, each representing half of the original ray that sought easier passage. The result is two rays of plane-polarized light vibrating at right angles to each other. A stream of bullets striking exactly on the corner of a steel right-angle would, similarly, be deflected, half to the right and half to the left, their resultant lines of flight forming a right angle.

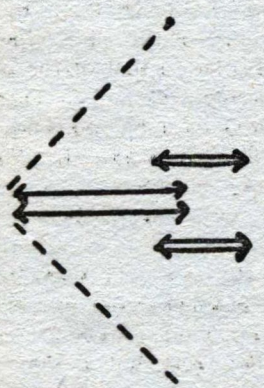


Fig. 10. If the two rays of bi-polarized light are passed now from the mica crystals into a plane-polarizing crystal whose axis is set *parallel* to the original, a new change must take place. Again the rays find themselves in a medium unsuited to their present plane of vibration, and are forced to change. The line of least resistance in this case is a rotation of the planes of polarization toward each other till they again lie in the plane of polarization demanded by the plane-polarizing crystal. The two bi-polarized beams are turned back to each other so that they are reunited into one.

But a second effect has taken place. One of those two bi-polarized rays was retarded in passing through the mica, so that the other is advanced beyond it. Perfect coincidence is, therefore, impossible. The result is that the phenomenon of interference takes place, the crest of one series of waves tending to lie in the trough of the waves of the other ray, partially cancelling the light. The effect is not complete, resulting, instead of in darkness, in the production of color effects. White light, by this cancellation and interference, in brilliant spectrum colors.

Fig. 11. A similar sequence of phenomena takes place if the light from the mica is passed into a plane-polarizing crystal *crossed* with respect to the original plane-polarized beam. Now the bi-polarized beams are rotated away from each other, again seeking the plane of least resistance. Again the rays are reunited into one plane-polarized beam, now at right angles to the original. An effective rotation of the plane of polarization through 90° has taken place. But again, the retardation of one of the bi-polarized beams in passing through the mica brings about interference effects, with resulting brilliant color display.

Not only mica, but many other substances can be used to produce the bi-polarized beams. Ordinary cellophane produces the same effect.

right angles are brought back to a parallel position, and we have an "out of phase" waveform which, through reinforcement and opposition, produce an increased brightness and extinction, respectively, of the light.

However, if the analyser is turned to the position (horizontal) where the two waveforms are opposed in the same plane, the rays will be in opposite phase which will produce an opposite or "complementary" effect. If the original light is truly monochromatic, and there is a retardation of a definite fraction of a wave, we should have simple strengthening or extinction of the light. However, when we use daylight, we have the phase effect dependent upon wavelength. This suppression of some wavelengths and strengthening of others alters the relative spectral composition of the light and color effects are produced. Thus we find that in actual practice, one position of the analyser will give one definite color, while the 90° position of the analyser gives the *complementary* color. If a double-image prism is substituted for the conventional analyser, the two complementary colors will be shown side by side.

If the mica plate retards exactly a half wavelength, the usual polarization phenomena are reversed, that is, light passes through the *crossed* analyser and is blocked by the *parallel* analyser.

In making use of the mica plates, or other similar materials, we have emphasized the importance of thickness. That is because the retardation is uniform per unit of thickness, so that the thicker the material, the greater the retardation. In other words, with each change in thickness the color changes. If a design is ground into the plate, different depths will produce different colors. (Or if the design is built up of ordinary cellophane, different thicknesses will cause different colors.) The half-wave plate which has just been mentioned, if placed beneath the design, will cause a complete reversal. That is, all colors change to their complementaries. These polarization designs were quite popular some years ago, and many amateur experimenters spent long winter evenings building them.

With modern, cheap polarizers this could be developed into a most fascinating hobby. As polarizers can be made of two simple polarizing sheets, any one may work with them.

FINALLY, we come to one of the most interesting phases of polarization. We leave plane polarization and consider elliptical and circular polarization. Just as the vibrations in plane polarization move back and forth *in a plane*, we now consider a phase of photon path which is not in a plane, and not in the original path of revolving ellipses, but in an uniform elliptical, or circular, path about the axis.

Imagine a pendulum swinging. As it swings from the extreme right to extreme left it covers a half wave, and as it swings back to extreme right we have the second half of the wave. It is obvious that as the pendulum passes the midpoint of its swing, it has completed either a quarter or three quarters of a wave. Now imagine a second pendulum whose path is perpendicular to that of the first, and whose midpoint is coincident with the extreme end of the swing of the first. Seen from above the two paths appear as the letter "T." If the pendulums are in phase, they will continue to swing without interference, although both pass through the point where the two paths intersect. If a half wave out of phase, the same thing will happen. But if we throw them out of phase a quarter wave (start the cross pendulum just as the first one is at midpoint), the second pendulum will strike the first one at the point of intersection. As a result, the second pendulum will lose its motion, and this cross motion imparted to the first one will alter

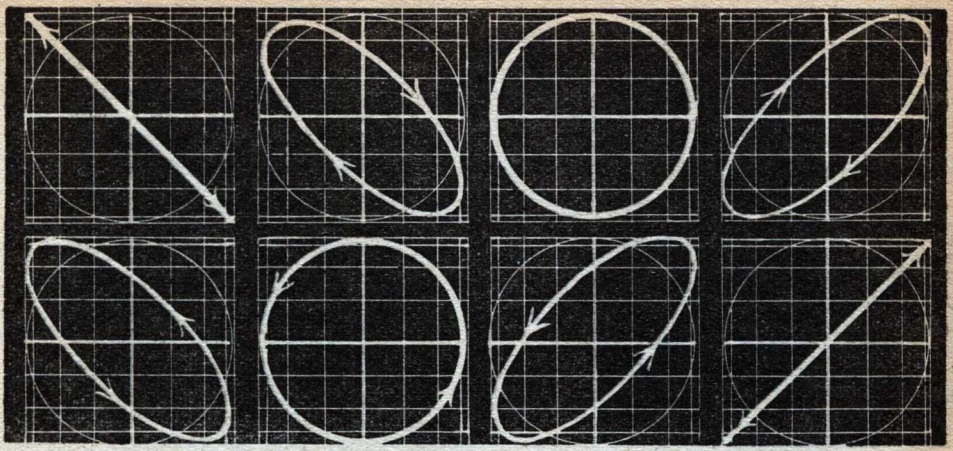


Fig. 12. Types of polarized light derivable from the original mixture shown in Fig. 3. The first and last types represent plane-polarized light oscillating at right angles. The intermediate figures show varying types of elliptical polarization and circular polarization. Each represents a type of polarized beam that can be produced and demonstrated, and each is truly polarized.

its path from a straight line reciprocal to that of an ellipse or circle.

This is what happens when we interpose a quarter-wave mica plate in the path of a plane-polarized beam of light, provided the axis of the mica retardation plate is at 45° to the plane of polarization. If we pass the quarter-wave retarded beam through an analyser, there is no visual effect, that is, no extinction. It makes no difference to what angle we rotate the analyser, the beam is not altered in brightness. The first impression is that the light has been depolarized, but the introduction of a design or crystal which normally shows color will continue to show the interference colors which are characteristic of polarized light.

You photographers who have had difficulty in reducing the reflections in polished silver when making photographs with a polarizing screen will be interested to know that light is largely elliptically and circularly polarized by silver, and to that extent cannot be affected by the polarizing screen.

We must now consider a new phase of polarization. So far we have consid-

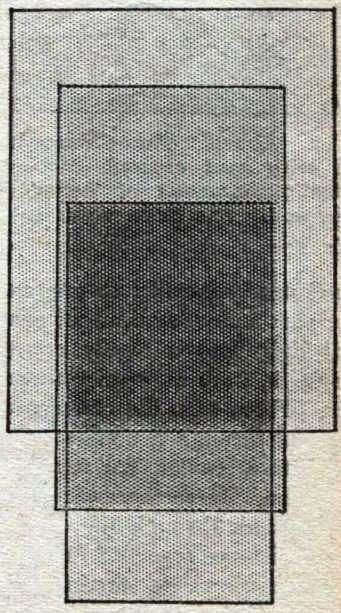


Fig. 13. Two polarizing sheets and a mica sheet piled together to show the normal absorption of light by the three thicknesses.

ered the effect of restricting the polarized beams to planes at various angles, but in all these cases the rays of all portions of any polarized beam travelled

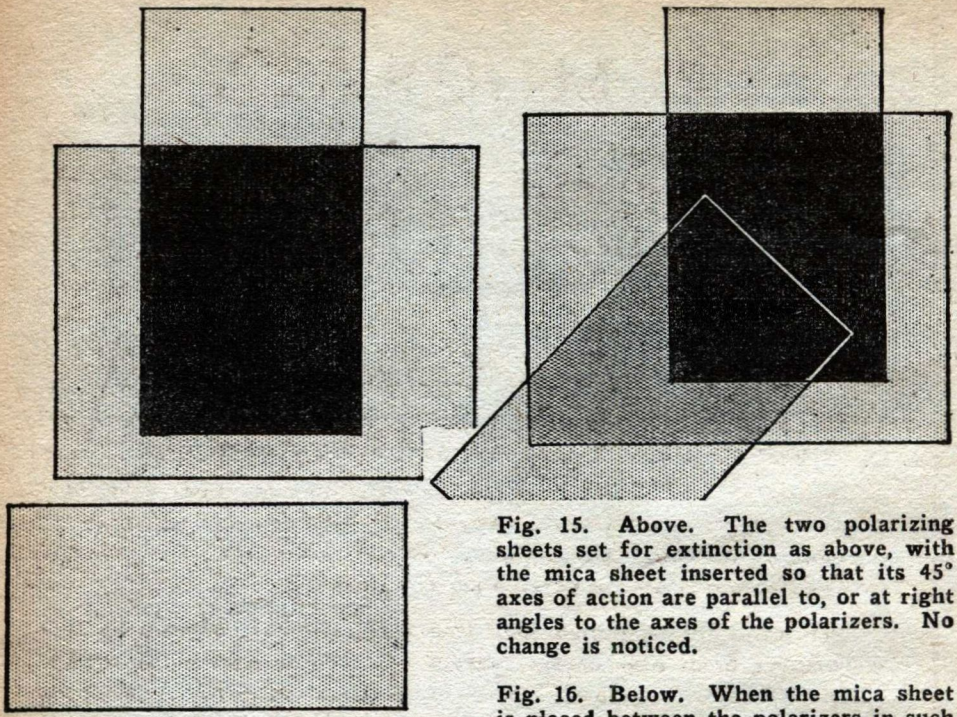
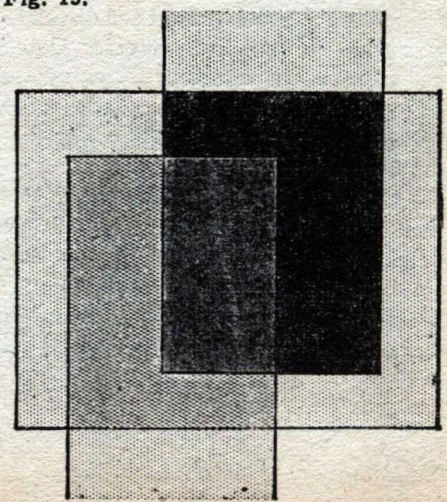


Fig. 14. Above. The plane-polarizing sheets with axes crossed, showing the familiar phenomenon of extinction by polarization. The mica sheet is shown below.

Fig. 15. Above. The two polarizing sheets set for extinction as above, with the mica sheet inserted so that its 45° axes of action are parallel to, or at right angles to the axes of the polarizers. No change is noticed.

Fig. 16. Below. When the mica sheet is placed between the polarizers in such position that its angled axes of action are at 45° to the axes of the polarizers, the action of the latter is apparently cancelled. The mica has brought about circular polarization, which is not extinguished by the upper polarizer (analyser), although the light is still truly polarized as can be shown by other effects. The apparent extinction is caused by the general absorption. Compare with Fig. 13.

forward nearly parallel to one another. Let us pass a circular beam of plane-polarized light into a highly converging lens system, such as a microscope condenser. From this, the converged rays are passed through a doubly refracting crystal into a similar, but reversed, optical system. Here the rays passing at decided angles through the crystal will have the distance travelled increased for each concentric circle starting from the axial ray. This will increase the interference in each such concentric zone—the result is a series of spectral bands of interference colors disposed concentrically about the axes of the crystal. The resulting figures are not only rarely beautiful, they indicate definitely the direction of the axes and give us definite information regarding the structure of the crystal under examination.



DEMOCRACY

A magazine is not an autocracy, as readers tend to believe, ruled arbitrarily by an editor's opinions. It is a democracy by the readers' votes, the editor serving as election board official. The authors are the candidates, their style and stories their platform.

I can't and won't print all the letters received; if I devoted half the pages of the magazine to that alone, I could not publish all of them. But, neither are all the votes of the political election published. Instead, a summary of views can, and will be given. The flood of letters that has resulted from the restoration of ***Brass Tacks*** has been immensely helpful in forming and directing the continued expansion that ***Astounding*** is undergoing.

Those new authors I am seeking, you know. There are many trying now, many new names coming in on manuscripts. Which type of author shall I encourage most, which style of writing? That is an expansion of supply that must be directed according to the votes of readers.

New artists are being tried, too. Next month the cover will illustrate Jack Williamson's great new-concept ***mutant*** story, ***"The Legion of Probability"***. That cover is the result of a contest among the artists ***Astounding*** has been using—but not in color work. Color is definitely a different medium. I believe we need more variety of technique on those covers, and this will be an answer to that feeling. I want votes on that.

In the past three issues, I have introduced M. Schere, John Victor Peterson, Kent Casey, and now Lester Del Rey. Remembering those four new names, and their four stories, you will notice no two of them are vaguely similar in style. That is added variety, but which variety is most popular?

And as to features; do you like the present ***"Radiation in Uniform"*** type of article—heavily illustrated and with extensive captions? Or do you prefer straight text articles? That, really, is a triple vote. Heavy or light on illustrations, and a separate vote on the quality of the article McKay produced. It would be unfair to rate McKay's material on the basis of reaction to the illustrated make-up.

Not only are new authors helped by reader guidance, but old ones, too. John Russell Fearn's ***"Red Heritage"*** was much better liked than was his ***"Dark Eternity"***. Your votes showed that, and Fearn has been given the results. Nat Schachner's ***"Past, Present and Future"*** series have been outstandingly liked; therefore he is working on another which may be available next month.

For ***Astounding***, at any rate, is not a dictatorship!

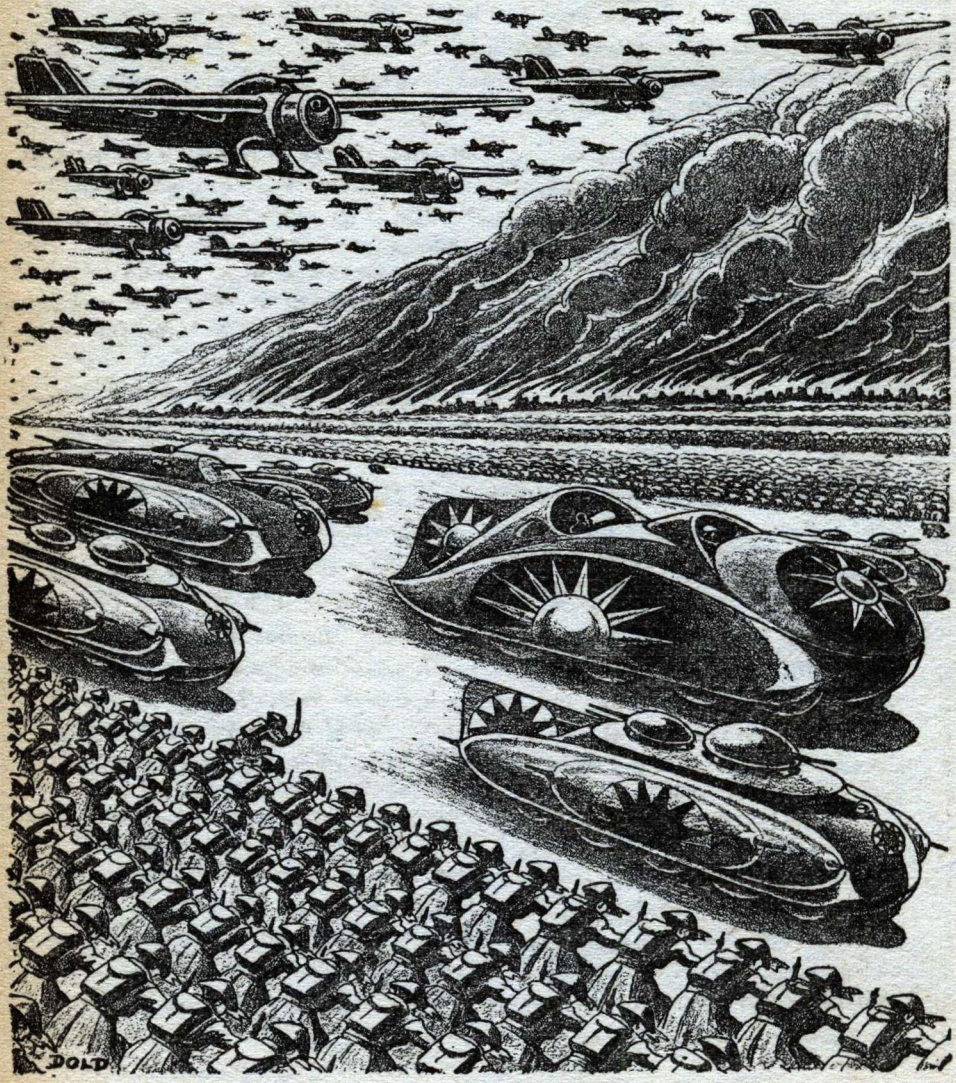
The Editor.

JASON SOWS AGAIN

by

Arthur J. Burks

Concluding Burks' great novel of a general and a mighty weapon he could not use!



Hetira had landed. If madmen before, now the fifty million would be doubly mad!

SYNOPSIS.

FIFTY million men—the marching, grinding armies of the roused Orient, combined and welded into one stupendous, invincible army! Out of the East, under the leadership of Hetira, a great military leader, a modern Ghenghis Khan, believed in with the fanaticism of one near godhood. Fifty million that trampled down San Francisco—all the West Coast in the first launching of their stupendous assault. Monster submarines that spewed forth armies—planes of radical and deadly design—frightful gases that ate away flesh it touched——

Unhindered, they marched over America till they reached the mighty ramparts of the Rockies. There, buried under masses of rock so vast that not even the terrific new explosives of the Yellow Girdle could reach them, the American army stopped them for a brief moment.

But briefly, for the vast hammering of the fifty millions of the Yellow Girdle were pounding the very mountains down. General Daryl Strang, responsible for stopping that incredible army, knew that nothing guessed by America had the power to do that—and prayed for a miracle.

Then—out of the reeking, death-soaked ruin that had been San Francisco, a wreck of flesh and blood stumbled. Eyes eaten away by new, frightful gases—feet and flesh gnawed away by corrosive, gaseous horror that flowed along the ground—fingers gone when, stumbling, they contacted the poison-drenched ground——

Yet he—the wreck that had been Jarl Harvey—stumbled on, a black box clutched in his fingerless hands. The Yellow Girdle saw him—and did not waste ammunition on that dying hulk. Through half an army he staggered, because he was no more than a walking, rotting corpse. Gases seared his throat—his mouth—his tongue, till it rotted away between his lips. But somehow—he went on.

At the ramparts in the Rockies he stopped. There, with the stub of his hands, he wrote in the dust before General Daryl Strang: "I AM YOUR MIRACLE!"

They gave him what he asked—bits of metal scrap—meat—foodstuffs—and a dark room. Fifteen minutes later—a man walked out. A whole man, bewildered, and carrying in his hands—strong, fine-fingered hands—the black box of Jarl Harvey. The black-magic box—a "camera" that took three-dimensional images by cosmic ray illumination, and recorded them in a queer metalloid-jelly, images that were both images and analyses so exact, so accurate, that "projected" with electric power, they reproduced, atom for atom and molecule for molecule, the exact thing the "camera" saw.

"I'll raise you an army of fifty—a hundred million—men!" Harvey tells Strang. "I'll reproduce cannon—machine-guns—planes or any other thing by the million! I'll raise your dead—as reproductions of the living man—to fight again and again a thousand times. I'll give you a thousand men for every man of the Yellow Girdle."

"No," Strang groaned, "you won't—because you must have the raw material. Three hundred pounds for every man you make—and we can't get it. We can't make planes or guns because we haven't the steel—the iron to make them of. Your camera is the greatest tool man ever had—but a tool that must have raw material. It is useless!"

VI.—CONTINUED.

THE PANEL of a televisor screen glowed and sparkled; the scene changed. "General Strang. General Strang. Urgent. Intelligence reports His Majesty, Emperor Hetira, has landed in San

Francisco." The screen blurred again, sparkled, and a new face appeared. "General Strang. Urgent. Reported landing of His Majesty Hetira confirmed. A demand for immediate, unconditional surrender has been received. Colonel Morrison will bring you official notification." The voice and the man clicked off together, and another scene appeared. Two circling planes—then suddenly a swarm that dived from the blue above to annihilate the one that bore the ringed star of the United States.

In the headquarters room General Daryl Strang looked at his staff, at Jarl Harvey and the strangely little, incredibly powerful tool in his hands. The little black case——

His staff looked at him, and at Jarl Harvey. And in their minds was the thought that fifty millions ground onward, onward, wave on wave battering against the ramparts of the granite mountain range that had stood a million—a score of million—years, and was being churned and ground away under their feet now.

Feet of men who were hypnotized, fanaticized, in the belief of Hetira, the god-being for whom death was glorious. And now this half-worshiped leader, this newer Khan, was there, there on the soil they'd won, to inspire them to yet-madder efforts——

Jarl Harvey spoke, his voice low, and incredibly intense. "There is a way. There must be a way. No thing so powerful as this, no mechanism with such potentialities as this has, can be completely defeated by the lack of raw matter. There is a logic in this—somehow—somewhere——"

He stopped and looked at Strang. General Strang's shoulders were squared, an intense frown of thought on his face. "The men of the Yellow Girdle will go quite mad now," he said softly. "There must be some use for that thing of yours. Wealth—diamonds, I suppose, that sort of thing endlessly. But wealth is no good now. Except wealth of men, which we cannot make for lack of material. Anomalous—that we should be able to make diamonds, but not something we can use."

"We can use leaders," sighed the Chief of Communications. "Colonel Morrison—and your official notification—will never arrive. The section of tunnel he was traversing was just—traversed—by a 12″ Yellow Girdle shell. Perhaps, even with our scanty material, it would be advantageous to prepare duplicate impression-cubes of our most important men. I would strongly recommend, General Strang, that you permit the duplication cubes be prepared that you may not be lost to the country in case of penetration."

Strang nodded absently. "You can prepare more of those impression cubes?" he snapped.

"There are more under way now, General Strang." Harvey nodded. "I think it would be an excellent idea if duplication cubes for your staff were prepared at once."

STRANG laughed shortly. "Give me that camera, Harvey, and stand against the wall there. We'll duplicate you to begin with. If this war is won, you'll be the one who does it. How do you operate this thing?"

"Here, sir. Exposure is instantaneous. A wave of energy spreads through the cube at the speed of light when you touch this stud. That fixes the impression. There are twenty-two cubes remaining in the case. As one is used, a second is dropped in place automatically."

"Then I'll use ten on you. You're worth more than the combined generals——" General Strang stopped abruptly as Harvey started. A flush mounted over his face slowly, his eyes brightened. There was the minutest

possible whisper from the reproducer, then a soft thud. Nine times more, and Strang straightened. "You thought of something?"

"Yes," said Harvey woodenly. "From something you said. I can make more of these devices—unfortunately, the reproducer cannot take impressions of itself—and if those ten copies of me are set at work at once, a second camera will be ready quickly. From that to an indefinite number is easy, then.

"But—please keep my copies separate from one another, and out of my sight. In spite of this seeming miracle, I'm human, and being among so many of me—I think I'd go quietly nuts.

"And, in reproducing yourselves, gentlemen, remember this: it is not an effective immortality, so far as the individual is concerned. You die—you cease to exist, to have consciousness, as completely as ever. Only—a duplicate takes your place in society. If anything, it diminishes your immortality, for you—your disappearance will not be recognized, your loss will be neither mourned nor remembered.

"But we must hurry. Those reproductions of myself, sir, must be made at once—so that any of all of them can be ready to die for the idea that has just come to me! Speed is necessary, sir—for if the enemy should suddenly decide to take prisoners, and were by some impossible accident to capture two or three or four men together who were copies—well, sir, they might seek the reason. And then——"

"Then?"

"Then, general, the idea that just came to me—which I feel is of such vast importance that I will tell it to the general alone, and no other way—is destined to failure. And if it fails, we'd best surrender, as the Yellow Girdle suggests, before we are utterly destroyed."

"Surrender? Surrender?" said Daryl Strang. "That reminds me, we haven't answered the enemy's suggestion. Intelligence! Radio word to the enemy that their Emperor is just another yellow man who means nothing to us, and that as far as surrender is concerned, we'll see them all in Hell first!"

HOPELESSNESS hung over the fortifications of the American army, as Jarl Harvey and Daryl Strang faced each other behind locked, soundproof doors, in a room off Strang's headquarters office. The arrival on American shores of His Majesty Hetira had turned every Yellow Girdle soldier into a starry-eyed, invincible fanatic. To die for his Emperor was the greatest glory a member of the Yellow Girdle could attain. Thousands, receiving the word that their God-Emperor had landed, raced to die on American bayonet points, before American bullets, in the midst of bomb-bursts, from sheer exuberation—from sheer exaltation. Their God-Emperor had landed! The Godhead under whose inspiration Japan, China, all the races of color in the Orient, had been welded together into one vast whole, that whole the Empire of the Yellow Girdle.

Napoleon, long ago, had fired men to great deeds with a little piece of red ribbon on their left breasts. Hetira, copying everything that conquerors before him had used to inspire men and make themselves great in history, caused his followers to wear belts of yellow. And thousands went into battle and died, because they believed that while they wore the yellow girdles they would not die.

And those who wore them saw men die all around them, and still believed in the efficacy of the yellow girdle. *Those* men died, perhaps, because their hearts were weak, or evil, or their faith in the yellow girdle faltered. If a man died, sure of his faith, and his belief in the girdle, he could not tell the living that the girdle had betrayed him.

If the girdle itself, a mere yellow strip of cloth, could inspire men to such deeds, all America realized what the actual physical presence of His Majesty Hetira would do to them.

Nothing could stop those soldiers!

"Yet there is a way to stop them, sir," said Jarl Harvey quietly. "I think it will work. I am almost sure it will work, so long as the Yellow Girdle does not know the secret of the atom-camera. That means we must move fast, before there is any possibility of the secret getting to the enemy. For all we know, they may have secrets of telepathy, may know what we are thinking this moment, hear what we are saying. So, sir, I am not even going to put into words the plan I have in mind. I am going to ask you, sir, to trust me, and my copies."

"Your copies?"

"Yes. I gave the plates to Colonel Holcomb, asked him to have them developed immediately. They should be ready at once. I also told the Colonel what materials were necessary for the construction of the atom-camera, and the dimensions of the actual parts. I think, if he comes through, we shall be able to duplicate this camera far faster than I had any right to hope. Given all the parts, I could put it together, adjust it, have it ready to operate, as fast as one of your machine-gunners can disassemble and reassemble a machine-gun."

"Then what do you propose?"

"Simply this. Dress each of my copies exactly as I am dressed. Give each the camera he has made. Leave at least one camera at headquarters. Then, ask for volunteers from among your best aviators. Get parachutes. Issue orders to each and every Jarl Harvey. This shall be his order: to reach the presence of His Majesty Hetira, at all costs."

Daryl Strang gasped, half rose to his feet.

"You'd be shot the second you landed! Your camera would fall into the hands of the enemy, the thing we most wish to avoid——"

"Each Jarl Harvey will carry a bomb on his person, for use in the event that he cannot talk himself out of being shot by the enemy. When he lands he will hold this bomb in such fashion that if he is shot it will explode automatically —destroying not only Jarl Harvey, but every trace of the camera——"

"You don't hesitate to expend your *alter egos!*"

"I shall expend myself if necessary. I shall also save myself if it is humanly possible. And as for my copies—I have no more feeling for them, I assure you, than I have for any other American who might volunteer for the service I suggest."

"It sounds impossible, Harvey. No American plane can fly to altitudes possible to Yellow Girdle planes. No American plane could approach to within a hundred miles of Hetira——"

JARL HARVEY nodded, his face thoughtful. "Still, it seems to me that with ten flyers trying to land ten men, at least one of them should reach his objective. But, suppose, for a moment, I agree that it is the forlornest of forlorn hopes. That every one of us will be shot down by enemy airmen before we can even get in sight of Hetira's 'palace', what's the alternative? Can you radio His Majesty to the effect that you are sending him emissaries, to discuss peace terms?"

Strang considered a moment, then shook his head. "He won't listen. Unconditional surrender, the Yellow Girdle said. That means, literally 'no argument' and therefore, 'no emissaries'. And frankly, I can't see for the life of me why you want atom-pictures of Hetira. We can develop them here, if you accomplish the impossible and reach him, and the triply impossible feat of getting back, but then what have we? Hetiras, all we want of them, since

we can re-photograph the copies as often as we wish. Can we hold them as hostages? No. We can claim we've captured Hetira, and all the Yellow Girdle officials will do is laugh. They'll have Hetira himself as proof that we haven't captured him. You might as well try to capture him anyhow, as get his photograph."

"I don't intend, naturally, to go after it openly. Please, sir, I'd explain myself completely if I were sure at all that what we say here is absolutely unknown to the enemy. Maybe, even now, we've said too much. Maybe, if I told you, you'd refuse me permission to make the attempt."

"You'll make the attempt, Harvey, but what then? We can't hold here forever——"

"You must hold, sir, until I've had my chance. You must hold these mountains with dead men, if you have to. You must fill it with copies of the living, even if they have to fight with sticks, stones and fists. But hold them you must, until I've got into enemy territory, accomplished my mission, and got back."

Strang rose, sighing. As he walked to the door he walked like a man on a ship's deck at sea in a storm, because the ceaseless bombing and cannonading of the Yellow Girdle kept the mountain in ferment. Throughout the Rockies, great landslides, loosened by the vibration of so many guns, rolled into canyons, coulees, ravines—destroying, burying from sight everything in them that lived. Give the Yellow Girdle time, let the American forces hold them back long enough, and the mountains themselves would be shaken down.

Strang went to his radio, sent out, in code, a request for volunteers to fly into enemy skies, with no slightest hope of returning. Strang knew, as did Jarl Harvey, that the latter—and his *alter egos*—had little chance of reaching their objective, none at all of returning, even though all of them could perform miracles.

A forlorn hope, indeed.

But they did not hesitate in the least. In an hour's time, eleven men, eleven Jarl Harveys, gathered at eleven different hidden clearings where the fastest ships in American forces were in readiness.

"Should your *alter egos* be told what to do?" asked Strang.

"They must be advised only of what occurred between the moment my picture was snapped by the atom-camera and the moment they emerged whole from the integrators. Up to the first-mentioned moment, they are myself. Up to that moment, brain, memory, experience, everything, they are—myself. Furnish them with the information of the interim, and they are up-to-date. After that, they are on their own. Of just one thing you can be sure: they will proceed with as much, and no more and no less, intelligence as I will myself. Our conversation and plans are their only blank spot."

STRANG WISHED Jarl Harvey good luck as he departed, with guards and guides, for his own particular plane, far deeper in the mountains, but accessible via vehicular tunnels because Uncle Sam's engineers, in the days of great national building projects, had builded in great detail, and for every conceivable contingency. Shuttle cars travelled almost with the speed of bullets through some of these tunnels.

Jarl Harvey, bidding good-by to Daryl Strang, felt that it was perhaps for all time. No human being, in any war, had ever undertaken a mission so nearly impossible of accomplishment.

Jarl Harvey shook hands with his pilot.

"Has everybody gone crazy in the army?" grumbled the latter. "I've been hearing the damndest things. Stuff about the army being miraculously filled

with more twins, triplets, quadruplets and quintuplets than anybody could imagine. I had no idea there were so many multiple births in this blasted, doomed country——"

"Not all parents of multiple births," said Jarl Harvey, "tell the world about it. But don't believe all you hear; you know what it's like in the army. Now, oldtimer, how do you feel about this hop? Do you expect to come back?"

"I intend to do my double-damndest. I'm going to make it if I can."

"But if you don't?"

"I'll still do my damndest, feller. And a man can only die once. And it's beginning to look as though all of us were going to die anyhow. Personally, I'd rather pass out fighting than have to take orders from a bunch of yellows. So, let's take-off and mote. Where do we go?"

"To the imperial headquarters of His Majesty Hetira, ruler of all the Yellow Girdle states!"

The pilot turned around and looked at him. "Don't want to go by way of Mars, or the Moon, do you? Of course, I'm agreeable to anything, you know. This is my job."

"I'm serious, my friend, more serious than I'll ever be able to tell you. Pick your spot on the map. You must reach it at exactly eleven o'clock tonight, or God help you. And me! And America! Let's go!"

The time of the take-off was ten thirty. Thirty minutes remained in which to reach the place of rendezvous —thirty minutes in which death might come, horribly, on the wings of the wind.

VII.

FROM THE MOMENT of the take-off to the moment Jarl Harvey left the plane, his life was in the hands of Captain Thorgerson, his pilot. There was nothing he could do save sit back and wait. And he knew, and Thorgerson knew, that sound detectors, adjusted to anti-aircraft rifles, would be searching the heavens for enemy aircraft attempting to probe Yellow Girdle-held skies. That Thorgerson knew his business, as well as anyone could have known it, was shown by the manner of his flight. He never flew straight in any given direction for more than five or six seconds, so that his flight might have been compared to that of a bullet which repeatedly ricochets.

Harvey watched the broad, capable back of Thorgerson, and knew that he could have no better pilot. He thought of the other Jarl Harveys and hoped they had done as well. If all the pilots were sufficiently intelligent—there was a chance.

At Thorgerson's signal, Harvey opened a switch which showed him the land below, through night-television. He saw the land he had known in the past, from the coast to the base of the Rockies, encumbered with the soldiers of the enemy. Bivouac fires were everywhere, like fireflies, far below. The altimeter read thirty thousand feet. Thorgerson was down to half the ceiling of his plane—which in turn was little more than half the ceiling of ordinary Yellow Girdle planes. And Harvey thought, as he flew, how the chickens of many white powers were coming home to roost. While Japan had been fighting China, white nations had furnished China with their best scientific brains, in a vain effort to keep Japan from winning. Japan had won over and subdued China, and with her had conquered the fruits of white man's teachings. And while Japan almost never created or invented anything, she could take anything invented by others, and adapt it, or advance it, to a state of marvelous perfection.

Give Japan a plane, and she would develop that same plane into one of her own that could fly twice as fast and far, twice as high, and on half the fuel the

original would have needed. Then she could further develop her own plane——

Well, there seemed no end to it. And after conquering China, Japan had taken all other nations of color in her stride, because her Chinese vassal had the manpower she had always lacked. And so —the army of fifty millions which Hetira could expend without thought. For there were so many millions more behind them growing into manhood, and they were not his people anyhow, save by conquest, so that he had no reason to care why they died.

Not that the conquered ones knew that. They knew nothing of the sort. They had been propagandized into the belief that Hetira was their god, that his family were their guardian angels.

And this attack was the result. Harvey, watching the zagging flight of Thorgerson, whereby he must have escaped annihilation by enemy anti-aircraft a thousand times, knew how hopeless was the case of America.

What did it matter that the Rockies were honeycombed throughout with the greatest fortifications ever built? The Yellow Girdle had bombs that could shake even the mountains down, given time; projectiles that could probe through the wrecked mountains, wrecking them again and again. It was only a question of time.

A YELLOW GIRDLE army a third as large as the entire population, men, women and children, of the United States! What did the Yellow Girdle care if all the white race were aligned against her? Their numbers were so insignificant they would be lost in the shuffle, staying not in the slightest the march of the enemy. The enemy did not mind slaying, for if it destroyed all Americans, it left their land for the tilling of their own people.

The "rising tide of color", as Lothrop Stoddard had once indicated, was preparing to engulf the world; had already engulfed the major portion of it. America was, almost literally, the white race's last stand. Here, if anywhere, the nations of white skins must cooperate or perish, might even perish despite inspired cooperation cloaked with sublime courage.

"It all depends on me," thought Jarl Harvey, "and the lust of Hetira for world dominion!"

Warplanes were converging on Thorgerson's planes when Harvey knew that they were within seventy-five miles or so of the "throne" of His Majesty Hetira. It was already a race between Thorgerson and death. Harvey studied the skies everywhere, seeking other American planes which, this far west of American lines, must carry in their bodies his *alter egos*. Eleven Jarl Harveys, trying to save America.

"If ten of us die," thought Jarl Harvey, "the one must somehow find a way to go on with the work started."

Great flowers of the archies burst about Thorgerson's plane. That plane rocked and rolled in the fringes of the concussions—concussions which would have erased the planes of last year as though they had been made of tissue paper. Part of Thorgerson's crazy flight was caused by his own masterly hand on the stick, part by the concussions, the vibrations of the air set up by anti-aircraft explosions.

And now, as enemy warplanes converged on Thorgerson's crate, their bullets, too, were reaching for the lives of pilot and passenger. And what hideous bullets! If one of them so much as touched the outermost tip of a wing—plane, pilot, passenger, would drop into oblivion so swiftly they wouldn't have had time even to die. For the bullets fired by the enemy were incendiaries, but incendiaries beyond even the wildest dreams of earlier scientists. One of those bullets could blast a submarine

into bits too small to see with the average microscope. One of those bullets could——

Harvey's mind reeled with the potentialities of one of those bullets. And he knew that many of them, but for the incomparable flying skill of Thorgerson, missed the lancing plane by almost nothing. Thorgerson might even zig-zag into one of those bullets, so completely was this flight in the lap of the gods of the white races—who, as the seconds and minutes sped, seemed inclined to fly with them, at least for a time, on their mad mission.

And now, converging on the spot on the map—or rather on the air above that spot—Harvey saw other American planes, each being fired upon, each being flown crazily by its pilot, each subjected to archy fire, and knew that his *alter egos* were trying to accomplish their mission, with all his stubbornness, with all his courage—which he often doubted—with all his intelligence, which he doubted most of all, because no human being with any intelligence at all would have attempted anything so certain to fail dismally.

Yet—so far he had not failed.

HE KEPT his eye on one of those planes. He had counted eight of them, proof, he thought, that three had been destroyed. He included his own plane in the count. His eyes were on one darting plane when it vanished. It vanished instantly. Thorgerson's plane rocked, rolled over and over, an instant after that plane vanished. Something had hit that eighth plane, and it had simply disappeared, like smoke in a high wind. It just wasn't there. Its pilot, passenger, the plane itself, were as nothing. One little Yellow Girdle bullet. One fragment ripped from an archy shell—for even the fragments of archy shells were explosive when they struck anything—and the plane was gone.

Harvey mused on that business of explosive shell-fragments. Those fragments could not tell what they struck, whether it was friend or enemy, so many of the Yellow Girdle themselves must have died when archy-fragments fell to the ground. Yet the leaders of the Yellow Girdle did not care. Why should they bother with thousands, when they had so many millions?

Always the mind came back to those countless millions, because they were the one ghastly fact of this war, the one thing in the great composite mind of the white man. Without arms in their hands, that many millions could charge across the continent, into the mouths of American guns, and millions would live to reach the east coast.

Harvey groaned with the hopelessness of it all. There was just one ray of hope—Jarl Harvey, multiplied by seven, combined with Hetira's lust for world power, his lust to be the greatest conqueror of recorded time. If Hetira were the kind of ruler who would permit nothing to stand in the way of world dominion——

"But he *must* be," thought Harvey. "He *has* to be. All the evidence we know of points to that one fact. He has no conscience, for rivers of blood drip off his soul like water off the back of a duck. He has no fear; why should he have, bulwarked by his own conquered millions, who idiolize him all the more because he conquered them with ease?"

To get his mind off the impossibility of any hope for the white races Harvey examined the fortifications he had left, via television. The Yellow Girdle was swarming into the foothills, reaching up and up like a series of tidal waves, for the entrances to the catacombs. Ahead of them went a thin white gas, impalpable as mist. It did no harm to the Yellow Girdle who marched through it, for each wore a mask no bigger than

Another of the planes bearing the Jarl Harveys was gone. Six now—six left to reach Hetira!

a nose guard, goggles to protect the eyes, and shoes and leggings to protect the feet and legs.

And in the gas itself, in the creeping white mist, a hideous thing now happened. A soldier was shot. He fell. The creeping mist devoured him, almost instantly, as it devoured any American soldier who fell, and the stuff flowed over him.

"Great Scott!" muttered Harvey. "They had already found a way to keep their own dead from being a handicap to their advance. Instantaneous destruction of corpses! A soldier falls and vanishes, like—like—that plane carrying one Jarl Harvey. Leaving no trace whatever!"

This, certainly, was no scene to watch to bolster one's hopes. Harvey hopped the Rockies with his television, to see how the civilians who had fled through the mountains ahead of the retreating armies of Uncle Sam fared. He knew, then, that the "regional strongholds", built in a era of vast government projects—so many of them that there was at least one within reach by every living person in the country—were little better than useless. For the Yellow Girdle had their war maps, knew the exact location of every such stronghold. And

bombs dropped on them with unerring accuracy. And though they were a hundred feet underground, and buttressed by reinforced concrete, the bombs found them.

It was safer to be outside, in the open, where they could see what manner of doom burst about them. But even there——

BOMBS BURST, and where they burst clouds of mist came forth, to creep along the ground. It caught at those who fled, and they were gone. So that everywhere were the thousands and millions, fleeing from the creeping mist. And the Yellow Girdle varied its attack. In many places, especially in cities, where "regional strongholds" had been more carefully constructed, and so withstood assault for longer periods, the Yellow Girdle released bombs which exploded—and freed in the crisp air the horror of disease!

Disease which was worse than any gas. Disease of which medical authorities knew nothing. Disease bred in Oriental tarns and swamps, in eastern slime, from the bodies of eastern carrion. Disease which mottled bodies of babies and women, and ate them slowly away——

Harvey, his hands trembling, his heart filled with horror, shut himself off from all this by shutting off the televisor. A few more minutes of watching and he would go entirely mad. He fought for control, telling himself: "Succeed, Jarl Harvey, and make an end of all this. Millions have died, but millions may be saved. It all depends on you. Yours is a forlorn hope which may succeed. If it does not, nothing can. You have come this far, why can't you go on through to the end—and die when your work is done?"

He knew that. There was no escape. When he left Thorgerson's plane, there was no way he could ever get back to it. Thorgerson could not land to pick him up. If he could, Harvey could not reach his plane anyhow. Thorgerson himself would not succeed in getting back.

Original Jarl Harvey had succeeded in reaching the mountains after the beginning of the holocaust; but he had started before Yellow Girdle feet had touched American soil. And only a miracle had taken him through.

Harvey smiled thinly to himself, "conditioning" himself for what he must face.

"I am not Jarl Harvey really," he told himself. "He is dead. I have no father, no mother. I am nothing, really. I was never born, though I can die. I would not, in nature, be here at all, but for Jarl Harvey. If I die I take nothing out of the world. I will not be a life lost from the count of the world's population, because my birth has never been a matter of record. Yes, I know all this; yet to myself I *am* Jarl Harvey, and I do not care to die. However, I must keep thinking like this, until the end, to keep up my courage."

Another American plane vanished, and Jarl Harvey saw it go.

"That leaves six Jarl Harveys," he thought. And then he began to pray a little himself. Somehow, he felt, the number of Jarl Harveys must not be reduced below six. It seemed to him that there was mystic power in the number, six. He didn't know why, but felt it—like something psychic, deep down inside him, nagging at his consciousness.

"There must be six of us," he decided. And he knew, without knowing why he knew, that each of the other five had the same realization; that each of the other Jarl Harveys realized the value of the figure six.

For with what weapons must they fight, to battle their way to the foot of the throne of Hetira? Not with guns, for there were millions of guns against them. Not with bombs, for the bombs were——

THEY HAD only their wits. They must use them to the limit. They must be inspired men. They must all do their utmost to succeed, for the sake of that eyeless horror from whom, indirectly, all of them stemmed. They must regard him as their ancestor, who had given them courage, who was their tradition——

And their tradition must be measured against the traditions of the Yellow Girdle. For no peoples of the world believed as much in tradition as the Yellow Girdle, each of whose states inherited other traditions reaching back, in the case of China, for example, to Pan K'u, the first man—almost a million and a quarter years!

"Somehow we must play on the curiosity of Hetira. Somehow we must use his lust for power. Somehow we must trick him, and through him his followers. Somehow we must treat even this monstrous one as a pawn in our game. But first of all, we must see him, face to face."

And now Harvey touched Thorgerson on the shoulder. They were, he knew, almost directly above the "throne" of His Majesty Hetira. Thorgerson nodded, tilted the nose of his plane down, dived at bullet speed.

As he dived, down to an altitude from which it would be safe for a man to drop into space with a parachute, Jarl Harvey looked about him. Plunging down the sides of the invisible funnel, aping Thorgerson, were five other planes. And they, like Thorgerson, were depending on the speed of their dive alone, to keep them safe from bullets of the enemy.

Harvey waited. He made sure of his 'chute, and of his atom-camera. He questioned his own courage and found it, now that the crucial moment was on him, sufficient. He kept turning this way and that, to mark the diving progress of the other five. They would jump from nine thousand feet. They would fall as far as they dared before opening their parachutes. Falling bodies would be hard for even Yellow Girdle gunners to hit in the dark. And when the 'chute flowers opened, they were gambling on the curiosity—on the confidence in their own numbers—of Yellow Girdle soldiers below, to spare their lives.

They could do nothing else. Stealth was useless. Speed was all they had—speed, courage, and the wits of Original Jarl Harvey.

Harvey watched the altimeter as the speed of the dive, under the full drive of Thorgerson's motors, increased. Swiftly, it showed lost altitude. Thorgerson and his five fellow pilots were keeping as close together—on orders—as they dared. All would dive out at nine thousand. All would open 'chutes at a signal. Jarl Harvey of the Thorgerson plane would give the signal when he opened his own.

Thorgerson, at fifteen thousand, was looking back at Jarl Harvey, a question in his gray face—that showed no hope whatever for his own survival. Thorgerson was concentrating on just one thing: finishing his job. After that, he would die, and he knew it. There was no alternative. He could die fighting, and as bravely as possible, that was all.

Thorgerson leveled off. He pressed a button. Jarl Harvey dropped through the bottom of the crate at the very moment it flew level, like a pebble hurled from a slungshot. But even so, his drop seemed slow compared to the speed of his dive from thirty thousand.

ONE HAND held the atom-camera with a grip of desperation. The other held the mechanisms of the parachute. Jarl Harvey, as he turned over, head downward, looked about him for other tumbling dots in the sky. And so well

had everything been timed, the other five turned over, too, head downward, a split second after Jarl Harvey had.

Harvey now glued his eyes to the black ground below, figuring his time in split seconds. His neck hurt from craning it to look down. But he must make no mistakes.

As far as he could tell, no shots were being fired at him or his *alter egos*. But when he looked up, the second after he had turned head downward, he had seen four of the American planes vanish from sight. The enemy had got them the second they flew level for split heartbeats of time. One of the vanished, he knew, was Thorgerson.

But they had all done their part of the strange work that was under way.

The black ground down there began to show certain detail. Jarl Harvey could make out banked fires, could make out soldiers in columns, in hollow squares, awaiting their descent, their landing. Would they meet him and his *alter egos* with bullets, with bayonets —or with the curiosity he prayed for?

He had fallen as far as was safe. He pulled the ring. The parachute flowered behind him, straightening him to a sitting position. The jerk almost lost him his camera, but did not. He held his breath until he saw five other 'chutes open. He held his breath as the black ground came swaying up, filled with yellow, upturned faces. So far, with belief in the invincibility of their own numbers, the Yellow Girdle soldiers were holding their fire, to satisfy their curiosity.

"Dollars to doughnuts," thought Harvey, "Hetira has told them to do that, even at risk of their lives in some possible 'suicide attack' on our part. Yes, he would do that, in the hope of learning something about us, about our weaknesses. If only they hold fast to orders!"

Yellow Girdle soldiers, as their feet reached for the ground, gave back reluctantly, to give them—the Harveys—a place to land. The Harveys landed, almost together, in a vast hollow square. And no sooner had they touched than they were ringed about with bayonets, and yellow hands caught at the shrouds of their parachutes, to rip them away, lest their silk mask some hellish destruction brought from the skies by the Americans.

The six men from the sky, stood, side by side. And Jarl Harvey of the first "photograph", spoke quietly.

"Our general understands that the command of His Imperial Majesty was for unconditional surrender——"

Harvey knew better than to mention the great one by his name; knew that the instant he dared to insult His Majesty so, a bayonet would slide between his ribs. With many bayonets against them then, the Harveys stood, side by side, while Jarl Harvey continued: "But the general still had hopes that something more advantageous might be arranged. So, he selected us, and sent presents by us—the richest in our command. We have been bidden to present these trophies, contained in these boxes, to His Majesty, and plead with His Majesty that if surrender we must, it shall be with honor, and with arms in our hands!"

HARVEY KNEW, as he talked, that the Yellow Girdle officers who listened heard not a word he said, were paying those words not the slightest heed, though they must have understood them had they paid heed. No, their eyes were darting from face to face of the Harveys. Mutters of amazement were fleeing through the ranks of Yellow Girdle soldiers, as all eyes were fixed on the Harveys, whose faces were white and plain in the glare of many lights.

Finally a high-ranker found his voice. "All six of you are the product of a single birth?"

He did not look at any one of the Jarl Harveys, but at some spot in their midst, as though he could not make up his mind as to the spokesman. None of the five Jarl Harveys spoke, but the sixth one did—silently selected by the other five, because he had been the one whose signal, the opening of his 'chute, had signified his leadership.

"Is it so miraculous?" said Jarl Harvey. "It is even less miraculous, I assure you, than the gifts we have brought from our general!"

"Six children, all boys, of a single birth," gasped the officer. "It has never been heard of before, in all civilized annals——"

"And if I were to tell you that five others, exactly like us, were slain enroute here, and that still another remains behind in the mountains——"

"What idocy is this?" snapped the officer, while Jarl Harvey held his breath, knowing how thin was the ice he trod on. "As well say that you sprang from the ground, whole, and armed, from a planting of dragon's teeth——"

"Or that we were not born of woman at all? If I were to swear to you that we were never conceived nor born, would you then think it worthwhile to take us to His Majesty, as being worthy to bear tribute"—he choked a little over the word—"to His Majesty from a doomed people?"

If only, he thought, they would attach no significance to the black boxes! If they guessed the secret—but someone, at any moment, would surely guess close to the truth. Maybe, even, the Yellow Girdle *had* apparatus like this, and such apparatus was the secret of their trained millions. But no—their High Command would have boasted of it, as they had boasted of the landing of His Majesty Hetira in America.

But a wild guess——

That must not happen. Attention must be guided away from those black boxes in the hands of the Harveys, until their chance came.

"Surround His Majesty with walls of steel, if you fear a trap," said Jarl Harvey, "though I swear to you that His Majesty's person is safe from harm at our hands!"

JUST WHAT the Yellow Girdle officer would have done will never be known, for suddenly a cry went up from the soldiers. And to the west their cordons parted as the Red Sea had, long ago, parted for the Israelites. A cry went up: "Make way for His Majesty! Cast down your eyes, for His Majesty approaches!"

First, through the great lane came the imperial guard, led by a prince—Harvey guessed—of the royal house. He halted, some yards away, cried out: "Why do you keep His Majesty waiting? What do you fear of these Americans? The person of His Majesty cannot be harmed by anything they can do! It is an insult, punishable by death, to believe for an instant that human hands can work injury to the Emperor-God!"

Jarl Harvey glanced right and left at his *alter egos*. Then he dropped to his knees, facing that imperious voice, head bowed. But he was careful, and he knew that the others were careful, that their heads did not mask the "view" ahead of the atom-cameras.

They all waited, then, with bated breath, for what was to happen next.

"Rise, barbarians!" sang out the voice. "Turn your backs. Then march backward toward His Heavenly Imperial Majesty!"

The Harveys did as they were bidden. Jarl Harvey's heart sang with excitement. If curiosity had led Hetira to this extreme, curiosity would make him look upon the faces of the emissaries—and when they turned, with the black boxes in their hands——

VIII.

TO THE RIGHT and left of the six, stretching away and away until lost in the night, were rank upon rank of Yellow Girdle soldiers, the guards for His Majesty, now demeaning themselves in the dust, banging their heads on the ground in the ancient *"ko'to"* which His Majesty had revived. They would not lift their heads, ever, to look upon His Majesty's face, unless some great cataclysm impended.

If it were possible to bring about such a cataclysm——

Jarl Harvey was too numb with desire for success to even pray. Could he fail, having succeeded so miraculously thus far? He did not believe that fate could possibly deal such a cruel blow. Was he being baited, tricked, played with as a cat plays with a mouse? Would Hetira and his counsel, in the end, laugh at him, tell him that they had known the secret of the black box from the beginning? Or would Hetira swallow the hitherto unbelievable fact of six men born of a single birth, who were all alike as peas in a pod? How *could* he accept that, when in all medical science only quintuplets had ever survived?

Lap of the gods—lap of the gods—and he couldn't even pray. He could simply feel the surge and flow of great events all about him, as he backed toward His Majesty, with his *alter egos* to his right and left. He did not even whisper to them, nor they to him, lest somehow they disclose their secret. But they had no need of communication, for each was, in effect, the others.

They stopped at command. Words were sputtered in the Yellow Girdle tongue. Jarl Harvey heard His Majesty hiccough loudly before he answered.

"It is useless for the barbarians to think that we can be bought with any gifts they may send. Why should we barter for gifts, when all we have to do is move forward and *take?"*

So His Majesty's words were interpreted to the six whose backs were turned to him. Then the high-ranker into whose hands the six had plunged from the skies, had his innings. He spoke haltingly, with terror in his voice, terror of His Majesty, fear that he would not be believed. The interpreter spoke English, so that the six should understand.

"Six born at the same time, of the same mother?" ejaculated His Majesty. "It is palpably untrue. We do not believe it."

"Your Heavenly Majesty has but to look upon their faces," said the high-ranker.

"Then we shall look upon their faces. We grant them absolution of the rule that none may look upon our face, so that they may turn, and we may see whether this officer speaks with the tongue of falsehood. And we warn that officer that if we do not see the resemblance he mentions, he dies at once for trying to trick us. For suggesting that we are so senile as to be susceptible to such trickery!"

A strange, pompous man was this Hetira! He was the master of an Oriental psychology that had welded half Earth's people to him—yet that same psychology mastered him, too.

"What a joy it would be to make him run the gantlet of a brigade of American doughboys," thought Harvey, "with every soldier granted the right to kick him as he ran!"

"Well, well," said His Majesty, "we have granted a revocation of the divine rule, so let the six barbarians turn!"

The prince cried out to them. "Turn slowly, with your eyes cast down unless His Majesty himself bids you raise them! Turn, each of you, to his left, your heads bowed!"

Slowly, almost holding their breath, the Harveys turned.

HARVEY HEARD His Majesty gasp. He almost chuckled, but not from mirth. He felt like laughing, hysterically. He could picture the stupefaction of His Majesty. He realized that in the oneness of the six lay their sole chance of hiding the importance of the black boxes. The faces and figures of the six must rivet attention, keep it away from the boxes. It was a place for magicians, except that the Yellow Girdle would have had none of magicians. Scientific facts, these days, were too startling; what were tricks before facts? There *were* no magicians; but sleight-of-hand performers——

The Harveys were not sleight-of-hand performers. There was no use wishing.

"We are pleased to save your life," said His Majesty, awe in his voice, and Jarl Harvey knew that he spoke to the high-ranker. "There is no mistaking their amazing similarity. Lift your faces, barbarians, and be blinded by sight of our person!"

Together the six lifted their faces. But Jarl Harvey was not blinded. He saw an arrogant, bearded man, garbed in all the glory of the rainbow—an arrogant yellow man who had a strangely keen face, and sharp, wise eyes. Here was the greatest military teacher—and psychologist—the Orient had produced in a millennium. But he had the arrogance only an Oriental leader could possess.

"We shall address you, barbarians," said His Majesty, speaking fair English, suddenly, "and we give you permission to answer. You, there on the left, what is your dishonored name, if your mother saw fit to provide you with one?"

"My name is Jarl Harvey, Your Majesty!"

"Jarl Harvey, a barbaric name. And yours, the next in line?"

"My name is Jarl Harvey, Your Majesty!"

Even Jarl Harvey, the leader, gasped —for the second voice had been the first voice, as though the one had been the electrical recording of the other.

For a brief moment His Majesty said nothing whatever. Then he exploded: "This is ridiculous! Not only are you apparently the same man, standing beside himself, but you have the same name. We warn you, that we are of no mood to jest with doomed barbarians. The next in line, what is your witless name?"

"My name, Your Majesty, is Jarl Harvey!"

Thus spoke Jarl Harvey, the leader, feeling it necessary, ever so little, to vary the formula. For His Majesty, in referring to the first two as "the same man, standing beside himself," had come close to the truth.

"And we suppose," His Majesty's voice was now almost a snarl, "that the name of each of the other three is likewise Jarl Harvey?"

For a long second there was no answer. Then, one after the other, the remaining three replied. "That is true, Your Majesty!"

"It is a lie!" said His Majesty.

JARL HARVEY, the leader, spoke softly, without permission, thus risking his life more than he had since he left General Daryl Strang.

"It is true, Your Majesty. I swear it on everything we hold sacred!"

"And what, pray, do you hold sacred? On your fighting men? They are as nothing, for they crawl into holes like vermin when they hear the heavy tread of His Majesty Hetira. On your gods? We deny them, for what have they availed you in your feeble attempts to withstand us?"

"However, Your Majesty, we believe in our gods enough to entrust them with our immortal souls. And on our immortal souls we swear that we have spoken truth."

"You bring us begging words, and gifts," said Hetira. "We spurn your words and disregard your gifts, because you have nothing anywhere in your land that we cannot take. So, for relaxation, we shall set you a task worthy of an Emperor's brain. Prove to us that you *have* immortal souls, and we shall spare your lives until—sometime tomorrow—it pleases us to drop you from one of our bombing planes atop the mountain headquarters of your juvenile general! Otherwise, you die tonight, before we become sleepy enough to retire. Accept this regal command, barbarians!"

"We cannot prove that we have immortal souls, Your Majesty," said Jarl Harvey quietly, "but we shall do something else. Your Majesty knows, naturally, that down the ages alchemists have sought for the secret of transmuting base metals into gold. We cannot bring forth our souls to show Your Majesty, and we believe that we still may interest him in our gifts—our one gift—the transmutation of base metals into gold! That is something not in the land, that conquest cannot take—knowledge."

His Majesty gasped. "Do you think we are a fool? Our own wise men have sought that secret for thousands of years. And you try to trick us with the tale that you possess the secret. It cannot be done."

"It can be done, Your Majesty. Your Majesty's history shows no record of sextuplets growing to maturity, either. But I say to Your Majesty, here and now, that with a small amount of gold as a base——"

"You dare ask us for gold?"

"Your Majesty's men will guard it. We cannot escape with it. We challenge Your Majesty——"

"You, barbarians, dare to challenge *us?*"

"Yes, sir. We challenge Your Majesty to refuse our gift, when we have proved its worth! Separate my brothers and me. Put us in cells miles apart, where we cannot communicate with one another, where there is no chance for trickery. Have us guarded by as many thousands of Your Majesty's troops as Your Majesty wishes. Give each of us a little gold—no more than a rich man wears in his teeth—and fill our cells with base metal of all kinds. With iron, silver, copper—anything and everything. Furnish us with helpers. A chemist to each of us. A carpenter to make our crucibles——"

"It is utter nonsense. Transmutation is as impossible——"

"As sextuple births, Your Majesty?" asked Jarl Harvey softly. "We barbarians will go even further. Since Your Majesty's gowns are of the richest cloth, let us turn them, also, into gold——"

"Take them away!" roared Hetira. "They dare make a mock of us!"

"YOUR MAJESTY," said Jarl Harvey quietly, "accept our challenge, and if we fail, we ask this of Your Majesty: that you pluck out our eyebrows, our toenails, our fingernails, one by one. That Your Majesty subject us to the Death of a Thousand Cuts, if we do not succeed. We are so sure of our success that we challenge Your Majesty to give us any sort of punishment if we fail. Put anything into our cells. Tin cans. Brass bowls. Bronze ornaments. Glass. Anything Your Majesty can conceive of to——"

"Your Majesty," said the prince whom the Harveys had first heard, "your humblest subject feels that these men are charlatans and tricksters. But might we make so bold as to suggest that nothing is really lost if they are given a chance to prove what they say? Just because, down the ages, transmutation has never been done successfully—does it follow that the quest is hopeless? Your Majesty's rule has fostered miracles. Our armed troops for example. Our planes, thrice better than

any others that fly. Our submarines, of a kind none dreamed of ten years ago—except, perhaps, Your Majesty! Would it not be a mistake to destroy these barbarians without giving them a chance to prove their doubtlessly lying words? What can be lost? If, however, there is a modicum of truth in what they say—if by some queer chance it has been given to barbarians to discover an inkling of the truth of transmutation—then Your Majesty's wisdom will study that inkling, and perhaps, on the ruins of their failure, actually find the secret of transmutation. Your humblest subject feels that Your Majesty should overlook nothing. For if it were possible to transmute other metals into gold, and that knowledge were possessed by Your Majesty alone——"

"Who among you, barbarians," thundered the flattered monarch, "back in your flimsy strongholds, also possess this secret you claim to have?"

"We assure Your Majesty," said Jarl Harvey, almost holding his breath, "that not a living soul—save ourselves—in all this doomed land, possess the secret of transmutation."

"Understand, barbarian pigs," said Hetira, "that we believe not a word you say. How could you possess a secret that our own wise men have failed to find?"

"If we fail, Your Majesty's torturers will do with us as they will."

"They will do so anyhow!"

"But if we *did* possess the secret of transmutation, Your Majesty, and Your Majesty discovered it from our generals, after our country had fallen, and we, my brothers and I were dead—when it was too late——"

It struck Jarl Harvey himself as a pretty good argument. Hetira would be a fool to take a chance, even on such an absurd impossibility as this. What could he lose by giving them their chance?

"It is decreed!" thundered Hetira. "Separate them. Put them in cells. Give them all the help they wish. Ho—give them rubbish and carrion of the cities! Surround their cells with cordons of troops. Give them an hour—at the end of which time we would sleep!"

"You'll forget all about sleeping," said Jarl Harvey, deep down inside himself, however.

And so each went into a cell, a cell far-separated from each of the others. And each cell was surrounded by a cordon of troops. Then, into that cell Yellow Girdle coolies brought rubbish, Yellow Girdle men brought power cables, and built a cabinet, crudely and hurriedly, at the direction of each of the six Jarl Harveys.

A chemist stood over them as they worked. They asked for all manner of things—and the Orientals had their strange humor. They brought all manner of things—— There were scraps of broken buildings, and broken bodies of men and women. They dumped garbage and rubbish in the cells of the prisoners and demanded that they turn *that* into gold!

For half an hour the six worked, connecting things and directing the work on the strange cabinets. The chemists watched and mocked. Then—six Jarl Harveys grinned, their lips lifting back from their teeth, and closed a switch.

The light was poor, there in the prison cells. But it flared in the cabinets with snaking, writhing streamers of moaning fire. The garbage and the rubbish twisted and rustled under flames that danced and purled man-high. Rubbish of broken cities—rubbish of broken men and women—and something moved upward from it, shifting, solidifying——

Six Yellow Girdle chemists shrieked in fear; two in fear and horror. Six Jarl Harveys started forward; two fell back in despair. Two who had not attained complete exposure, and watched the man-things that rose from garbage

writhe in an instant agony, and fall, broken things but half complete.

But from four widely separated places came, suddenly, cries of amazement and reverence. And——

"His Imperial Majesty! Bow down! *Ko'to!*"

Hetira in multiple was sprung from—

Let it be recorded here that in spite of the excitement attendant on the opening of the cells, not one of the Harveys got more than a mile from the place of his own martyrdom before bullets destroyed him.

IX.

JARL HARVEY, the leader, had been wrong in just one thing; four, not five, of his *alter egos,* had died on the flight from the mountains. The other had been recalled, at the last moment, by Daryl Strang—to serve him in case the others died.

And now the only remaining, complete Jarl Harvey, stood at the right hand of Daryl Strang and waited. Had their "emissaries" reached the court of Hetira? What had they done there? What was the mission they had set themselves, that was so important that not even Strang had been given all the details? The general knew only that the future of the United States had flown into the west with the Harveys. He knew, too, that six of them had reached the skies above the "throne." He knew that six had plunged from those planes. He knew that not one of the planes had returned, or ever would return. But concerning the subsequent fate of the six Harveys he had no slightest inkling. How would he ever know? By results—by the conduct of the Yellow Girdle after the six had landed, if they had landed alive?

Who could tell?

"There has to be something soon, Harvey," said Strang. "We can't hold out much longer, simply because there will be none of us left to hold out. If we were possessed of enough of the atom-cameras to throw a hundred brigades into action where one were annihilated, we might have a chance—if he could equip them. If, in short, we could send a million men in to match a given million of the Yellow Girdle—but with weapons twice as effective as those we now have. Have you any idea what you would do, if you had gone on that mission with the others?"

"Yes, sir, I have an idea. I also believe that somehow, anyhow, they will succeed—at least in part. We can only wait, and hope, and trust that my hunch is right."

"But during every second that passes we lose a hundred thousand men, Harvey!"

"Granted, sir. But the general forgets something: we are now losing men we did not have, in the beginning, to lose!"

"They look human enough to me!" said Strang. "And their loss is just as hard to take."

"We can only wait, as I said before," said Jarl Harvey—whatever his number was. "I think we agree that our only hope went west with my—with our —with Jarl Harvey."

The general studied his television panels. In another hour or two—this was shortly after midnight—the Yellow Girdle, trampling over American dead and dying, would be at the entrances to the catacombs proper. Their gas-throwers, which sent forth the creeping stuff in flowering jets, would probe through the first chrome steel doors. Then through the next, and the next—for the gas, as nearly as Strang had been able to tell penetrated anything it touched, as though it had been the etheric flow. The fortification doors would be as nothing. Everything, every living thing in the catacombs, would die —horribly, gasping and choking for breath.

And when the army went, the civilians who were left were slaves of the invader.

"PERHAPS we should surrender, get the best terms possible," said Strang. He stared around at the faces of his staff. Those faces were granite hard. His staff knew that when the armies surrendered, the generals and their staffs—on the fantastic chance that one might survive to challenge the might of Hetira—would be executed. But it wasn't that fact that made them hesitate. It was simply that during all the life of the nation, no army had ever surrendered. To surrender was not American. But, as far as that went, no alien foot had set itself on American soil, for purposes of conquest, for generations. The staff, in its most tragic hour, thought only of the future of the country. The staff might blunder, some of its members might be dodos of a bygone age, but it was loyal, and it had plenty of courage.

"I'm a stuffed shirt, always have been," said Colonel Greene testily, "but if I can't die like a soldier, I'd like to know who can. I'm for staying right here until the last dog is hung, and shooting it out with the enemy as long as a man lives. I have a feeling that is how the others look at it, too."

The others nodded, briefly.

"Nevertheless, if a truce could be arranged, on any terms, to give us time—or rather to give time to the Harveys, and their forlorn hope, I feel I should make the effort. Jarl Harvey told us to hold out. Maybe a truce—like a rest between rounds—will help give them time. Certainly, since we were to hold out until we heard, it will give *us* time. So, Intelligence! Contact His Imperial Majesty, Hetira, and ask on what terms he will give us a truce for one hour—or two. Three if you can manage it. Hurry! For if the battle continues, the fortifications will fall before an hour has passed!"

The Intelligence officer sped away, to direct the radio communication to His Majesty.

Shortly he came back, and his face was a mask of amazement. His eyes were popping. His mouth hung open. "It's the strangest thing I ever heard of, sir. I wouldn't believe it, if it weren't for what we've all seen done by the atom-camera."

"What is it? What is it?" snapped Strang.

"I have *five* replies from His Majesty Hetira!" said Intelligence. "They are variously worded, but the sense of each is that a half hour's truce will be given us, only on condition that we agree to surrender at the time and place named by Hetira, at the end of that time. The truce is simply for our use in organizing our forces to surrender. But, sir, *five* messages, all at practically the same time, from Hetira!"

Jarl Harvey looked at Daryl Strang, a slight smile on his face. Strang almost smiled in answer. His whole body shook with eagerness. His eyes glowed.

"It looks as though we made it, sir," said Jarl Harvey softly.

"And His Majesty Hetira has been delivered into our hands! Now we play our cards with all the skill we possess. Intelligence, send this message to His Majesty Hetira: 'We, the armies of the United States, will discuss a truce with His Majesty, the true Hetira, and with none other. We are prone, in the circumstances, to doubt the authenticity of anyone calling himself by that famous name.' Get that off at once, Intelligence!"

The officer sped away. He had scarcely left, when he came back, his face flushed with excitement. "I have," he said grimly, "five answers. They are identical. Here they are."

Strang took the flimsiest, read: 'I am the only Hetira!' "

Strang laughed aloud. "Send this answer. 'Is Hetira quintuplets, or is he so nervous with fear of us that he does not remember how many messages he sends us?' Send it out immediately!"

THE INTELLIGENCE man darted into his own bailiwick, sent the message with great gusto. Perhaps he didn't grasp the significance of what was happening. Perhaps Strang didn't. Perhaps the staff didn't, individually or collectively. Perhaps even Jarl Harvey didn't.

But this they all knew: there was uncertainty and confusion in the ranks of the Yellow Girdle—wherein, for days and nights on end there had been the harmony of a perfectly made machine. One Emperor made fanatics of the members of the Yellow Girdle. Would five Emperors, presumably garbed in the gowns of the authentic one, multiply their fanaticism by five?

Daryl Strang asked himself that question, then leaped to his feet.

"Praise Allah!" he shouted. "Send out word to our men to fight with everything they've got, for fifteen minutes. They won't be required any longer, I'm sure. Then, Intelligence, send this radio message to His Majesty Hetira. Now I know what Harvey didn't tell me!"

Strang paused for a moment, to get the message straight in his mind, even as his staff jumped to the detailed job of spurring what was left of the armies to further superhuman efforts. Then, he dictated his message, speaking slowly and distinctly.

"In the name of the people of the United States, we agree to unconditional surrender—*to the one and only real Emperor Hetira, and to none other!* Get it off at once, Intelligence!"

This done, Strang motioned to his staff.

"If I know the arrogant vanity of His Majesty Hetira, that message does the business. Now, let's go to some lookout, where we can see what happens. What does it matter if we get killed? I don't mind dying, now that I'm sure the Yellow Girdle, just as Jarl Harvey predicted, had overreached itself. Come, outside, where we can see friend and enemy, close at hand. The catacombs will be death-traps in a few minutes anyhow. Send out the word to everybody inside to get to the open, where they have a chance. If worst comes to worst, we all die, fighting hand to hand. But I've got a hunch——"

Ten minutes thereafter, Daryl Strang and his staff stood on the highest pinnacle in the sector, and looked down the mountainside into the west. Up those slopes surged the foot troops of the Yellow Girdle. Into their faces, in wave upon wave, charged the doughboys of Uncle Sam. They fell by thousands, but they slew by thousands, too. And yet the Yellow Girdle marched on, preceded by its barrage—behind which it had advanced twenty miles since yesterday—and by the misty jets of the gas hurlers.

"Watch carefully!" said Daryl Strang.

He looked aloft, now, to where airplanes were wheeling above the advancing Yellow Girdle, spotting objectives, furnishing covering fire—all they had left to do, since no American plane now flew west of the Rockies—and keeping the high commands behind the lines posted as to results.

A strange thing happened, almost as Daryl Strang looked at his watch. Wave after wave of the Yellow Girdle rose from cover and, instead of charging forward, as it had done for hours and days on end—*it turned its back and fled!* It was sped forward, whipped back down the mountain, by withering fire from the American survivors.

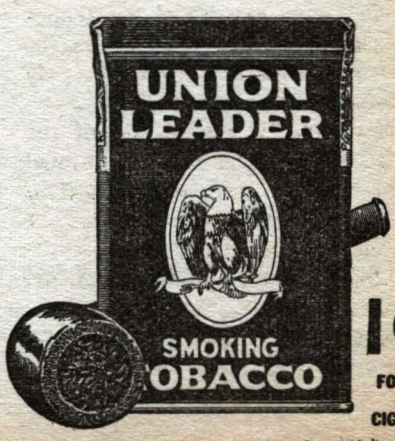
"Radio all buglers to sound retreat," said Daryl Strang quietly. "I don't want our people to be drawn into what's going to happen!"

Shortly there came up the mountain, faint with distance, the sound of many

It's True Love...
when it Lasts for 30 Years

WHEN a feller wins the right gal he don't go blind. But, if he's smart, the only wandering he does is with his eyes . . . and not too much o' that.

It's kind o' like that between a man and his pipe tobacco. Take me . . . . I been married to Union Leader 30 years, come Fall. Sure, I've flirted with other brands in my time. But I've always had the horse-sense to come back to Union Leader. I figure that a sweet, easy-goin' disposition should be treasured in a tobacco . . . or a woman. That's why Ma and me and Union Leader are still a happy family.



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THE GREAT AMERICAN SMOKE

bugles, sounding retreat. But though no Americans pursued them, the soldiers of the Yellow Girdle continued their flight into the west. And some seemed headed for one destination, some for another.

AS THOUGH brought by some dreadful urgency, planes that had been harassing the country to the east of the Rockies, sped back over their crests into the west, at top speed.

"Watch!" said Daryl Strang. "Watch until it starts, anyhow. Then we begin our own reorganization, and be ready to move in on them at the exact moment to do them the greatest harm! It will be a delight to live long enough to make Yellow Girdle prisoners rebuild all they have torn down!"

It was inevitable, the thing for which they waited, and it started within fifteen minutes, as Strang had promised. It started with the retreat of the Yellow Girdle.

But it really started—and the Yellow Girdle showed its true power for destruction—when some of the millions of them believed that one of the five Hetiras was the right one, some another, until each Hetira had his millions of adherents. Until each Hetira, arrogantly believing himself the Emperor-God of the Yellow Girdle, denied such divinity to all the other four—and declared civil war against them!

And so, five Emperors, each believing himself the right one—each one having a modicum of justice on his side—took what followers he could from the millions of the Yellow Girdle, and went to war.

Even the Original Hetira may not have been sure, before long. But of one thing he *was* sure, with a dreadful, ghastly surety: some of his millions believed in one Hetira, some in another, so that each of the five had his millions of followers——

And each Emperor was as arrogant as the Original. Which he could not, of course, help being.

And so five "empires" met between the mountains and the Pacific, and the might of the Yellow Girdle, divided against itself, smashed together like a Gargantuan, impossible series of tide-rips. The American armies, re-formed, reinforced, and resting against the day of retribution, sat in ringside seats and waited for the victor among the "empires" to emerge.

Those fifty millions were destroying themselves, cutting themselves down to the size of the American armies, with all the fervor, with all the belief in their "emperors," that they had carried into battle against the "barbarians".

"We won't let them finish the job," said Daryl Strang quietly. "But we'll let them almost do it. Then we'll take the rest prisoners. I'll bet, with five emperors to boss them, they'll make roads, and rebuild cities, with superhuman speed. I'm just waiting to see it done! But first, we'll simply watch the progress of the Yellow Girdle quintuple revolt—and see what the Yellow Girdle can do when it really meets opposition worthy of its training and equipment!"

THE END

Ignition Point

A short science feature on atomic reactions and—possible atomic power?

by Arthur McCann

EXCEPT for the rare gases—helium, argon, neon and the like—there isn't an element in the table that has not been induced to form one or more oxygen compounds. Fluroine, last to yield an oxy-compound, has been induced to combine.

But the ease with which these oxides may be formed varies as vastly as the character of the compound formed. White phosphorous takes fire in air spontaneously. Nitrogen oxidizes only at temperatures of the order of 2000°C. Magnesium metal takes fire in air at about 500°. Yet the interesting point of these comparisons is this: magnesium, half way between the other two in ignition point, releases far more energy in burning than do the other two. The degree of stimulus required is no indication of the energy of the ensuing reaction.

Chemists have been writing the equations of their reactions for years. But recently, a new type of equation has arisen, a type that seems, at first glance, a chemical equation. But the reactions indicated are atomic, not molecular. They are the reactions of the atomic physicist, adapted from chemical notation because the element symbols have already been standardized. Modifications of the symbols are, however, necessary, for a given element may frequently have more than one isotopic form. That is, hydrogen occurs in three forms, hydrogen, deuterium and tritium. For convenience, the physicist calls them H^1, H^2, and H^3—that is, hydrogen-atomic-weight-one, hydrogen-atomic-weight-two, and so on.

Some new "elements" are added—such as Nu, the neutron, (—e) and (+e), the electron and positron. With these symbols, atomic reaction equations can be expressed—and with the growth of transmutation in physics, *must* be expressed—conveniently. Thus, one pair of reactions well known now is:

$$P^{31} + Nu = Al^{28} + He^4$$

That is, phosphorous isotope of atomic weight 31, plus a neutron, yields aluminum of atomic weight 28 plus helium of atomic weight 4. But aluminum-28 is unstable, so:

$$Al^{28} = Si^{28} + (-e)$$

The aluminum atom has broken down to silicon and a free electron.

Now these atomic equations display many of the same properties that are found in the chemical—molecular—equations. They have their "ignition points", the initiating energy required to start the reaction. They have their "heats of formation", the amount of energy released in the formation of one unit—say a gram—of the new substance, as do molecular reactions.

And—*there is no necessary connection between those two.* It so happens that the majority of atomic reactions have immensely high ignition points—require enormous energies to activate them. Thus, to activate the reaction $He^4 + N$, one of the first transmutations ever observed (by Rutherford

about 1910), an immense energy must be imparted. Similarly, the reactions between most atoms directly require immense energies.

But neutrons react with atoms at low energies. Neutrons are, in the atomic-reaction field, like oxygen in the chemical field. They combine readily with many atoms. The "ignition point" of beryllium in the presence of neutrons is phenomenally low. Neutrons with energies of 5 or 6 volts can bring about a reaction.

That is, neutrons react at "room temperature". You never find phosphorous free in nature; it reacts too readily. You never find neutrons free in nature for precisely the same reason.

WHEN WORK began on neutrons, it was necessary to bring about some atomic reaction which would free them. (To get free phosphorus, a phosphorous compound must first be broken down.) Deuterium, heavy hydrogen of atomic weight two, consists of atoms made up of one proton plus one neutron. The early method of obtaining neutrons then, consisted of breaking down this "compound". A direct and brutal attack was made. Pounded hard enough, the atom of hydrogen-2 broke to hydrogen-1 and a neutron: $H^2 +$ energy $= H^1 + Nu$.

That energy came by accelerating the H^2 atom in a cyclotron, a Van Der Graff generator, or other arrangement that would produce immense atom-velocities. Huge and unmanageable voltages were required, vast and elaborate apparatus.

For men had picked on atomic reaction with a very high "ignition point". They don't do that any more. They use another atomic reaction, this one:

$$H^2 + H^2 = He^3 + Nu$$

Two atoms of hydrogen-2 react to produce helium of atomic weight 3, plus a neutron There's a side reaction—unwanted—which proceeds simultaneously:

$$H^2 + H^2 = H^3 + H^1$$

Two hydrogen-2's yield a hydrogen-1 and a hydrogen-3.

But the point of interest is this: that that He^3 reaction has a very low ignition point. The two H^2 atoms must collide with a voltage-energy of only about 50,000 to react. The usual method is to project H^2 ions from a tube against H^2 atoms in a compound, such as $(H^2)_2O$ (heavy water) or paraffin made up of H^2 atoms united to carbon.

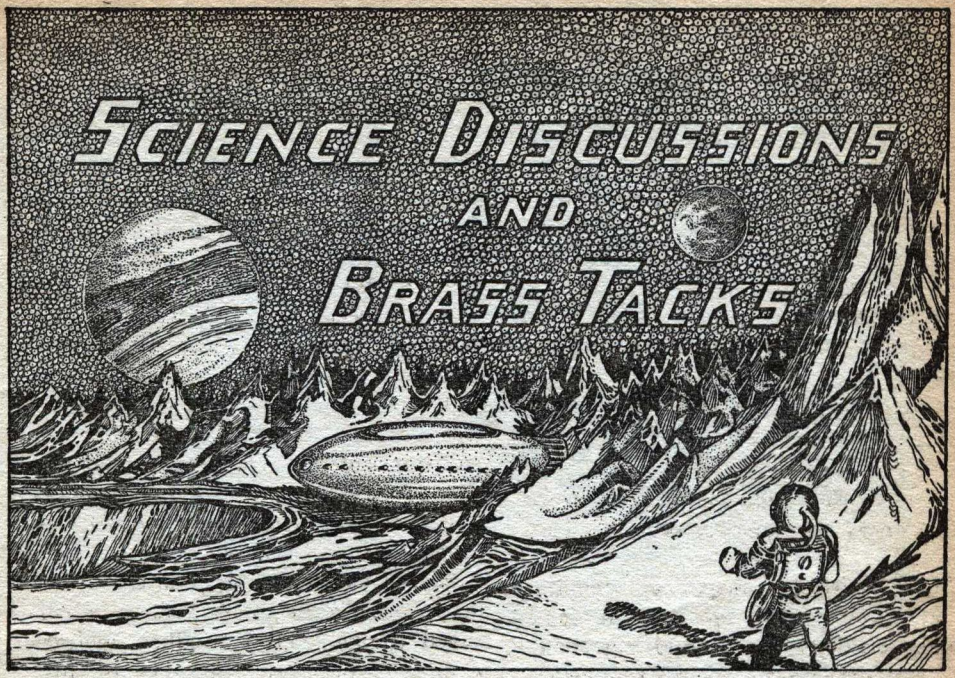
An atomic reaction producing free neutrons with an initiating energy of about 50,000 volts! If 250,000 volts is used, a copious yield of neutrons is obtained.

Now cyclotrons and Van Der Graff generators are ingenious, brilliantly conceived things. They produce energies of millions of volts. But they produce currents—quantities—measured in millionths. A million volts at a millionth of an ampere is less *quantity* than the tiniest drycell made will readily produce. The violence is astounding; the quantity is submicroscopic. They are immensely valuable research tools—but they aren't as powerful as a good No. 6 dry cell. They are, however, the only known methods of initiating reactions that require 5 or 10 million volt energies.

But *Boulder Dam ships power at 250,000 volts!* Power—not sub-drycell trickles! There's quantity there, real mass of power. And now—we know an atomic reaction that produces neutrons with an excitation voltage we can take from a bus-bar!

Remember that the ignition point has nothing to do with the quantity of energy released. And that beryllium reacts practically quantitatively with neutrons—with a violence our modern terms are not designed to picture.

Does there lie, in that fact, the answer to quantity-transmutation and—atomic power?



Machine-Made Evolution?

Dear Mr. Campbell:

Dr. John Clark's letter regarding the future evolution of Man rouses me to answer. I can answer with the perfect knowledge that neither he nor anyone else can disprove absolutely any points on so philosophical a point. Like the late Atlantis argument, anybody can join in, and to an even smaller extent can proof be brought to bear on the question.

However: I suspect your 10,000,000 year-old Pithecanthropus. I had an idea he was so considerably younger than that. But even so, what is the significance of that slow change? That slow development represented the starting of a type. The saurians were slow getting started, but once they were well under way, they branched, changed, called the turns and varied with astonishing rapidity and diversity. The rate of evolution of a type speeds up greatly as the type grows older, I hold.

Further, there is a tendency toward more rapid evolution when the complexity of the species increases. At the present time, the individual develops from a fertilized ovum about 1/50th of an inch in diameter. And about 90% or better of that is inert food-matter, not the active life-stuff.

Yet in that minute bit of protoplasm represented by the remaining 10% is wrapped complete, detailed plans which determine not only that the being to come shall be mammalian, possessed of heart, lungs, liver, endocrine glands and so on, but the detailed structure of cells that are so complex we haven't the foggiest notion of how they work. Millions of cells, and tens of thousands of types of cells, all detailed and planned. In addition, not merely the cells but the interrelationship of those cells which is to determine that subtle thing called character.

With such complexity, the opportunity for some slight change that may cause a new type of Man becomes ever more and more probable.

In this discussion, to get anywhere at all, we have to rule out the idea of controlled evolution. That's not only possible, but probable in actuality, but we can't say anything at all about it here. It is a factor we can't predict. But natural evolution becomes more probable because of greater complexity of germ-plasm.

But the main factor is partly natural and partly synthetic. Man molded the machine, but the machine is going to mold Man. Men once learned the wisdom and agility to escape saber-tooth tigers and cave-bears. Now, by the same evolutionary laws, he's darned well got to learn to escape cruising machines. And, he's got to learn to control machines, or be smashed up. There is a natural aptitude required to learn to fly a plane, and a natural aptitude helps the automobile driver. And the man of slow reactions can't work long around a punch-press.

And in ye goode olde days, there wasn't much nerve-strain. If a man had a mental conflict with another, why the dilemna was readily solved with the aid of a club and the simple removal of one or the other. Doesn't do now. If a man can't adjust, he has a nervous breakdown, and finally gets stored away in safety. He isn't as apt to have quite so large and flourishing a family as his better-adjusted neighbor.

As in prehistoric days, man will adjust. But oh, Lord, what a time he's going to have! The conditions he tries to adjust to are going to change, and change so darned fast that he never will actually adjust to a given set of conditions. He'll have to adjust in a different way: he'll adjust to an environment of *change*.

And that's not going to fit in with an evolution "deadly slow". Now you can call that a natural, or a synthetic evolution. It's a synthetic environment producing natural changes, so to speak.

What sort of evolutionary changes may it produce in Man? For one thing, it's going to demand a more stable nervous system, and a system that reacts more rapidly than ever. It will require even less specialization than now, for specialized tools can do the jobs specialization normally covers in evolution. The warrior-ant and the worker-ant and the food-storage ant are tricks that Nature uses. Man uses machines —battleships, trucks and excavators and cultivators, and grain elevators. Man's only specialization will be toward more flexible control.

Man had prehensile toes once, and he probably had a nice prehensile tail. I've seen a

worker in a steel-mill who worked controls on a special open-hearth furnace loading machine by using both hands, both feet, and by pushing controls with the side of his head. Just think how darned handy a man with prehensile, individually controllable toes, and a really useable monkeylike tail would be!

And eyes! Not a few creatures have eyes capable of individual operation. Give a man eyes that could at will, operate either as two separate units of vision or in stereoscopic cooperation, and you'd have something. A little development of brain tissue already available, and he'd be watching indicating meters, and the operations he was performing at the same time.

That is, if a change does occur in Man so that a slightly variant type arises, he's apt to get his chance pretty quickly. That little thing like the two-way eyes, for instance. A workman who developed that knack would get a pretty good salary, because his efficiency would be higher.

Machines put pressure on men. We live today in an environment which exerts a higher evolutionary pressure than did the ice-age. It has killed off dozens of lower species, just as the ice ages did, and it's a relentless, unceasing squeeze for Man himself. And—he'll never escape it so long as he maintains civilization enough for the machine.

Dr. Clark will agree that there are times of evolutionary stress that have immensely hastened developments. Now I claim that this is, and will continue to be, such a time. It will push man ahead at a pace never before experienced in the world's history, for the pressure driving him will—since it originates with himself—shift and follow however he changes. Since the mind is more flexible than the body, the environment will always lead the body by half a dozen evolutionary changes.

When the swivel-eyed man developes, he will, characteristically, tax his ability to the utmost. To escape that new pressure, he may develop eyes that see as clearly through the full 180° range he now has vaguely, as our eyes do in the narrow center of vision.

And—poor guy—he'll think that thus he will avoid catching his fingers in an unnoticed moving part, or being smashed by an unnoticed ground-car. Poor guy—because he won't. They'll make the moving parts faster, the ground-cars speedier. Man's that way—always making things as hard as he can stand.

But he'll advance, and advance a lot faster than "deadly slow"!——Arthur McCann, 761 Scotland Road, Orange, N. J.

Evolutionary pressure.

Dear Editor:

I enjoyed Dr. Clark's letter in the February issue but am inclined to disagree with his statement that evolution is a "deadly slow process".

Actually, evolution can be a surprisingly fast process. It all depends on the pressure man is subjected to, for evolution is the rise under pressure. It is known that when under pressure of time, man can do uncanny things. The World War did more than any other thing to perfect the airplane.

Therefore, it is not unreasonable to think that if man were subjected to new, difficult conditions man would evolve very fast. It is only when the pressure that man is always striving to overcome is removed that evolution is "deadly slow."

In conclusion, congratulations on your mutation and on E. E. Smith's mighty classic, "Galactic Patrol". It will not be soon forgotten. Sequel!!——Mark Reinsberg, 430 Surf St., Chicago, Illinois.

Would readers want this as the next astronomical cover—or has Earth been shown too frequently?

Dear Editor:

As a subject for an astronomical plate for a *mutant* cover I think you should portray how

the Earth would actually look as seen from the Moon. From some part of the Moon where the Earth would be near the horizon—say from the Moon's north pole where the Earth's north polar cap would be "on top". Picturing the Earth as it would actually look from a distance in space is not so easy as it might seem, for the Earth would not look "like a map" as it would if it had no atmosphere. Probably one would not recognize a single land mass on Earth.

For one thing, there would be the bluish color of the Earth's atmosphere. Astronomers have found that the "Earthshine" reflected by the "old moon in the new moon's arms" is bluish in color. Aviators flying at high altitudes see the Earth's surface below covered with a bluish haze. On hazy days one can see the distant landscape covered with a bluish haze when viewing it from the top of tall buildings. I have seen this once when I was at the top of the Washington Monument. Besides the sky is blue overhead. The reason for this is that the Earth's atmosphere scatters the light at the high frequency end of the spectrum, thus causing the sky to appear blue, while the lower frequency wave lengths are transmitted. This causes red sun-sets and the Moon to appear red during a Lunar total eclipse. The bluish veil of the atmosphere would tend to obscure continental markings.

Not only the obscuring veil of a clear atmosphere, but large cloud masses, storm areas and such would be visible and would obscure continental markings. And at full Earth, there may be a bright reflection of the sun from some place on the ocean near the center of the Earth's disk. Of course the polar caps would be visible—one during the solstices and both during equinoxes. If there were inhabitants on Mars with telescopes like we have, the Earth would be a difficult object to observe. Almost as cloud-wrapped as Venus is to us (and to them). Perhaps the rotation of the Earth would be as much in doubt as that of Venus is to us.

I do not think that you will print this letter but I would like to see a *mutant* cover showing how the Earth would look as seen from the Moon with some Lunar landscape. Do not be in a hurry, but make further studies on the subject besides the contents of this letter. You might consult Prof. Henry Norris Russel, Ph. D., who had an article on the subject in the *Scientific American* in the October issue of 1937 which I have read——Robert K. Holsinger, Route 5, Celina, Ohio.

Escape velocity.

Dear Mr. Campbell:

I have always held the belief that readers should be unseen and unheard, unless they have something of importance to say; something over nine years of reading science-fiction has strengthened this view. However, as I *have* something to say—and to ask—and you seem to invite letters, I have broken a longstanding rule; this is the result.

There is one topic which comes up at intervals in almost all SF magazines—escape velocity; the trouble always seems to be—and your correspondent Stuart Parsons is no exception—that they have made a mistake in the original statement. This latter is that if a projectile is given a certain minimum velocity it will leave the Earth's sphere of attraction; this velocity depends on several factors, and is *not* constant.

But note, this does *not* apply to practicable spaceships of any kind, as they can exert force to maintain their velocity while they are in motion. A projectile, such as we consider in connection with the question of escape velocity, is constantly decellerating, due to the Earth's gravitational pull, etc., and the escape velocity is one such that when the body reaches a point where the Earth's field is balanced by another, the ship will still have some velocity left.

The letter by Arthur McCann in your January number was particularly interesting—it brought out a point which I for one had never seen before——Harold Gottliffe, 13, Bentcliffe Avenue, Leeds, England.

BRASS TACKS

Del Rey, in this issue, was a fan.

Dear Mr. Campbell:

Just a few words to let you know that the first *mutant* issue of Astounding Stories is all X with me. The cover is certainly unusual, and ranks among the best that Brown has painted since entering the science fiction field. I like your idea of placing the printing at the top and bottom of the cover. It makes the cover appear that much better. I notice that you are on the outlook for new authors. It is my prediction that many of your fan readers will soon be submitting acceptable stories. Speaking of new authors, allow me to congratulate you for discovering Polton Cross. His "The Mental Ultimate" was an excellent short story——Robert A. Madle, 333 E. Belgrade St., Philadelphia, Penna.

Schneeman works slowly—can do only a limited amount of the work.

Dear Editor:

Congratulations on getting your best illustrator back in the magazine again. I mean Schneeman, of course. He is *the* artist! I don't see why you or other readers don't seem to appreciate his fine work. Look at those marvelous illustrations for "Mathematica Plus" and "Deserted Universe." Give him more work. He's your best artist. I really mean it.

Binder is improving greatly. His methods of shading are unique. His sense of perspective is super-excellent.

Don't let Dold do too much. He has a habit of incorporating too much symmetry in his characters. For example see *any* of his pictures.

Artists I do *not* want to see in the magazine again: Flatos, Hopper, or Marchioni. They never could draw.

I do not see why Wesso is considered to be so good. His humans all have frowsy looking features and clothes several sizes too large for them. His machinery is very good, though; it looks as if it really was meant to do something. Schneeman's machines are even better. Binder's are good, too. Keep the same line-up in the other issues: Dold, Binder, Wesso, and Schneeman.

Your stories are good. Dr. Smith left out the last two pages of "Galactic Patrol", though. Where is Taine?——Langley Searles, 34 Amherst Street, Milford, N. H.

I'm in touch with Bates; C. L. Moore's promised us a story.

Dear Mr. Campbell:

Your *mutant* idea is a good thing. I think and hope that it will pull the magazine out of the rut it has been in for the past seven or eight months. The February cover was fine, except for the red strip at the top. Keep the authors' names at the bottom. I think this cover shows Brown's superiority to Wesso as a cover artist. Wesso is very good inside, but let Brown do all the covers. He is "tops."

The February issue was disappointing, as every issue has been for almost a year. You haven't published any real top-notch stories since "Forgetfulness," and mighty few that were even good. "Galactic Patrol" was a terrific waste of space. It has just concluded with the invincible hero (of course) routing the deep-dyed villain. A plague on such hash! Of course, in science-fiction character drawing isn't of prime importance, but such stuff that Smith uses is banal. Another vile quality of all Smith's writing is his

"super-science". Super-baloney! The hero learns how to do anything at all with his brain from a super-intellectual race and then conquers the enemy base single-handed in bullet-proof armor. What a thrill! Please waste no more space on such stories as "Galactic Patrol," the most over-ballyhooed, over-rated, gassy flop I have yet come across.

"The Degenerates," quite a good interplanetary, took first place in the February issue. The others were all fairly good, except "Anachronistic Optics", which was neither funny nor weird, in spite of its excellent central idea.

Last year's only three top-notchers were:

1. "Sands of Time"—best of the year—more by Schuyler Miller please, and a sequel if possible.

2. "Forgetfulness"—Stuart's best to date—he is usually only fair.

3. "Infra-Universe"—Schachner has great possibilities, but writes a lot of trash. Accept less from him, and make him write good ones.

Here are some authors I wish you would get hold of. If you do, I think you will get some really great science-fiction in your pages. First of all is Donald Wandrei, who wrote the best science-fiction tales for you I have ever read. Make him write you a nice big novel, or a novelette anyway, and not a little biological short like those he used to play around with and were not worthy of his talents. More please, like "Colossus", "Colossus Eternal", "Farewell to Earth", "Earth Minus" and "Finality Unlimited". I would also like to see Harry Bates, Frank K. Kelly, and C. L. Moore back. What has happened to them? Also more stories by L. Schuyler Miller, Leslie F. Stone, John D. Clark, Ph. D. and Norman L. Knight. I have hopes that some one of your new writers will fill the shoes of Weinbaum—without imitating him, as so many have done. In the meantime, best of luck to you and hoping we get a wal-looping good story soon——Frederick Morgan, 39 West 11th St., New York City.

We can't make an author write, but we do ask them to.

Dear Mr. Campbell:

What more can I say for the February issue, than *perfect!* It was truly a *mutant* issue; the kind I might have thought of but never expected. I will not threaten to quit purchasing Astounding if you don't put out more issues like it, but I *am* asking you to do your very best from now on.

Let me answer briefly a few remarks made in the Brass Tacks column of the magazine this month, by readers.

Robert Sherwood: As far as I know the publishers of Astounding do not make a job of going around and making authors write stories for them.

S. Youd, Jr.: I agree with you as to the need of a new "cut" for the title of the reader's department and still am with you more heartily when you stated that letters merely rating stories should be excluded from the columns.

Paul H. Spencer: The trouble with many readers today is that they will not accept a story with a plot different from the ordinary unless it is written by an author with quite a record of good stories to his credit (E. E. Smith, Nat Schachner, etc.). Since the majority of authors today write stories with far-fetched ideas in them you necessarily have to accept them.

Please do not place Brass Tacks in the center or around a pile of advertisements. I for one don't know sometimes whether I am reading some letter, or the excerpts from some ad.

Again as in my last letter, I make a plea for a long wanted quarterly. I know that many readers agree with me in saying that they will support the idea. If you do, write in and let the publishers know about it—don't keep the notion to yourselves.

It's about time that I fold this letter up and send it along; with hopes that it may enter the columns of Astounding Stories, the best "mag" on the market today——Richard I. Meyer, 3156 Cambridge Ave., Chicago, Illinois.

"Ancient custom" accepted.

Dear Mr. Campbell:

Thanks a million for restoring Brass Tacks. Though I've read many interesting letters in Science Discussions, I always choke on all those X, Y, Z, being used to having my science predigested with fiction.

It's certainly good news to hear that stories of a more mature style and viewpoint are to be given a chance. I would like to see more longer stories and less of the shorts.

Fearn's latest (Red Heritage) is much more plausible and better written, than a lot of his previous work.

"Ormoly of Roonerion," not half as pleasing as some of Warner's earlier work. It occurs to me that he has made an unsuccessful attempt to regain some of the atmosphere of "Strange City."

One of the few original space travel stories I have read is "The Voice Out of Space." It's certainly a pleasure to know that this author can write stories, besides those puerile childish adventure tales we had before.

Thornton Ayre is good, though faintly reminiscent of Weinbaum.

"Pithecanthropus Rejectus" was unusually developed and well written.

"Galactic Patrol," "Dead Knowledge" and "The Mental Ultimate" are in my opinion the best stories in the issue, although I thought Wesso's second illustration was terrible.

And now I'll close with that most ancient custom, I dare ya to print this letter——L. Turner, 45 Maltravers Terrace, Sheffield 2.

We'd need more stories of the quality we demand to start a quarterly. That's one reason I want new authors.

Dear Mr. Campbell:

Congratulations on your first "mutant" issue. I thought it was the best you have put out in a long time, as regards stories; and as for the cover—you really have something there.

I had a time trying to figure out which was the best story, but finally decided in favor of "The Fatal Quadrant," with "Wayward World" an extremely close second. Mr. Giles is getting better and better; don't let him get away. And Binder's story in this issue is better than his last.

Wesso has taken a turn for the better with his illustrations, and Binder is improving. Binder is, perhaps, fundamentally better than Wesso, but his work is a little too sketchy. As for Dold, he has a different style entirely, and I scarcely know how to compare him with the rest. Anyhow, keep all three—not that I know much about it.

"Galactic Patrol" is ended, and what a story! It held my interest to the last, and I wasn't the only one affected that way. I lent it to a couple of fellows—two who don't go in for that type of story—and they stayed up past midnight just to finish the second installment. They acted as if someone had given them a slight dose of "thionite". But I got the impression that this story wasn't so well written as the Skylark stories. I may be wrong—I haven't read them for a long time. Even at that, it tops the average "super" story head and shoulders.

If any of you other science-fiction fans has some back numbers of science-fiction magazine, I wish you'd get in touch with me—that is, if you have the stories I want. They are: "Invaders From the Infinite," by Campbell, and "Solarite" and "The Dark Star Passes". I'm not sure of those last two titles, but they are in the same series. And were they in quarterlies? I think so. In fact, any quarterlies are welcome. I'd also like to get hold of "The Mightiest Machine" and the Skylark stories, but I'm afraid that they, being serials, are strung out over too much space and time. I am willing to pay well for all these.

By the way, speaking of quarterlies, I notice that Mr. Sherwood was a bit put out because the stories are too short. Don't you think, Mr. Sherwood, that if we all got together, and sent in enough letters, we could get a quarterly? There you would have your long stories plus improved quality. And I believe, Mr. Campbell,

that if enough readers asked for one, they would get it. Isn't that so? Of course, that's probably beyond your control.

Mr. Youd asked you to get, among other authors, Keller and Vaughan. I say, by all means do, and see if you can persuade the latter, at least, to write a story. The two stories of his that I have read I rank among the best; they compared with Smith's yarns, I thought.

And here's to your continuous improvement! Keep up the present high standard, and raise it if you can——Ralph C. Hamilton, 920 College Avenue, Wooster, Ohio.

Criticism—complete.

Dear Mr. Campbell:

My self-imposed task of the most ruthless criticism possible awaits me, and I now have three full issues to dissect.

The illusion of reality which was the one essential feature of all Dr. Smith's previous stories, and which was present in the first three installments of "Galactic Patrol" flickered out in the final three. This is a terrible crime I find it hard to believe, and even harder to forgive. I have read the story twice, to trace the weaknesses and I have found two. Dr. Smith has introduced an utterly useless and innocuous heroine in a very late stage of the story, and he has destroyed one of his most capable villains in a very unconvincing manner. Heaven knows Naida of "Spacehounds" and Clio of "Triplanetary" were not much more than the conventional love interest, but they were principal characters from the beginning and played integral parts in well-told yarns. And Dorothy of the "Skylark" series is the only woman I can remember in any science-fiction story (written around a male character) who did more than act as an ornament to the story. As a master violin player, I respect Dorothy more than any other heroine Dr. Smith has concocted. With this background, then, is it any wonder I am disappointed in the "red-headed nurse" thrust so rudely down our throats out of all proportion to the logical development of the "Patrol"?

Kinnison's great scheme of taking Helmuth's base is also a sore point with me. Here is why. Dr. Smith tells us that Helmuth has the most capable brain of any member of his galaxy wide organization. Accordingly, he is able to deduce from Blakeslee's strange revolt that the Lensman must be able to control minds, and that thought screens are needed for the Grand Base. Now, Helmuth had thrown an impregnable net around Boyssia II when he received Blakeslee's defiance, yet he knew the Lensman had escaped. Dosn't it follow that he would, on analogy with his first deduction, come to the conclusion that somehow the Lensman must have developed a detector-nullifier, and wouldn't he have formed a screen of ships with interlocking electromagnetic detectors around the Grand Base? That certainly seems a fair inference to me.

Ah, well, perhaps I am growing immune to the lure of the interplanetary yarn deluxe. But I do think that that indefinable touch which

made Dr. Smith's stories great is missing from the conclusion of "Galactic Patrol". The ending comes too pat, too smug, too satisfying. But enough! Let us leave Dr. Smith with kindly thoughts of his past masterpieces, and study some of the shorter stories, issue by issue.

We will begin with November. "Marinorro" easily ranks the lot, due to the originality of the approach and the feeling put into the theme. As a typical adventure yarn, "The Golden Horseshoe", with two and a half, takes second. "A Surgical Error" is good, standard two-rating stuff. "Lost in the Dimensions" is funny. It just made me laugh—not with, but at the preposterous concoction. As for "Queen of the Skies," Eando Binder deserves more pity than censure.

Next, December, I read "Dark Eternity" and then I said "Huh?" and read it again. It still added up plus or minus zero or infinity, and I just couldn't stand the strain. I swore off Fearn for 1938 as one of my New Years Resolutions, and if he never returns to the style of "Before Earth Came", I reckon I might as well stay off. Please, please, just what *is* the meaning or significance of "Dark Eternity" anyway?

I soothed myself to sleep upon "City of the Rocket Horde". "Angel in the Dust Bowl" for its ingenious handling of a current problem, and "From the Vacuum of Space", for its fairly interesting handling of a theme only once or twice touched before. Both rated two stars, which was also the rating I gave "The Secret of the Rocks"—more because I am planning to be a geologist myself and would like that gift than for any particular merit in the story! "Mana" and "The Mind Master" represent the hardy permonthly school of science-fiction which crops up eternally in spite of the readers' wearied protests. Or maybe I'm wrong and the readers like to read those sort of stories over and over and over again. What a discouraging thought! I finished the issue by reading "The Time Contractor" and immediately wished I had not. Conversations from a madhouse, replete with unintelligible pseudo-scientific jargon, do not make a science-fiction story, and don't you dare quote Gertrude Stein in rebuttal!

So on to January. I pounced with great eagerness upon Don A. Stuart's "Dead Knowledge," nor was I at all disappointed. Better than "Out of Night," if a shade below "Forgetfulness," it rated 3½ and stood way out above the rest of the issue. Average two-stars were "Ormoly of Roonerion" and "Red Heritage," neither of which deserves extended comment. The short stories were all not so good, with Manly Wellman's yarn perhaps not quite as bad as the others.

An interesting and praiseworthy department is "In Times to Come", for which I now rise to cheer. I only wish that you would also let the readers know how the stories that have appeared were received—say in a "Merits and Demerits" department analogous to "In Times to Come". I'm sure the readers would be very interested—but reasons of policy may make my suggestion impracticable.

Came the February number. Rah the *mutant* cover. I at once cut out and framed the color plate sans lettering and bought another copy for my files. As long as you publish covers like that *without lettering* I will do the same. The most striking cover I have ever seen on any magazine was the marvelous view of Jupiter on the November, 1928 Amazing Stories, but due to the lettering the picture is useless for framing. Your astronomical accuracy is an equally important step forward. Sir, I salute you!

It is very sad, after going into such ecstacies over the cover, to have to admit that the actual contents of the magazine were rather punk. I enjoyed "Wayward World" and, stretching a point, gave it 2½. "Mercutian Adventure" was more acceptable than many of Gallun's earlier tales, but rated no more than 2. "The Anti-Weapon" executes a hero with the same lack of plan with which the average story brings about the happy ending. I don't object to the form of the ending as such but to its appropriateness considering the tale as a whole. Similar consideration apply to "Galactic Patrol", as I mentioned before. "The Fatal Quadrant" is an unsatisfactory story because it asks for a calm acceptance of point after unexplained point, going on its placid way without the slightest at-

tempt to clarify the reader's foggy state. In Karel Copak's play "R. U. R." we are asked to accept robots, but the play proceeds normally, granted this one abnormal stipulation. In this story, however, we are asked to absorb any quantity of mysterious rays—shades of "Awlo of Ulm"!—an incomprehensible race of some kind of people who have permitted themselves to be frozen under miles of ice, although scientifically superior to the present human race, to say nothing of the very mysterious matter of controlling the robots. Burks writes in the worst manner of 1928—an improbable event followed by more improbable events in a totally improbable sequence, in contrast to the ideal story of an improbable event giving rise to a logical series of normal actions—e. g., Dr. Keller's "The Metal Doom"—or the more adventurous story in which improbable events are followed by similar improbabilities in an easily credible sequence—as with Dr. Smith's "Skylark" stories.

"Thunder Voice" amounts to little, while "Anachronistic Optics" is a very poor time-travel story. I personally regard Nat Schachner's "The Time Express" as the most fascinating of these wildly improbable tales, but many other authors have played pleasant tunes upon this intriguing theme. M. Schere does not.

Worse than either of the above two, however, was Polton Cross's "The Degenerates". I am about fed up on absent minded scientists who have a villain for a lab assistant or associate, with the inevitable beautiful daughter (why are all science-fiction scientists' daughters beautiful?) trailing the usual suitor who turns out to be the mighty hero. Mr. Campbell, I know you want to be kind to the authors, but can't you spare the readers from this sort of thing? Of course, there is always the depressing possibility that they may actually *like* stories written on such lines, but if such is the case—as I hope and believe it is not—my faith in the future of science-fiction as intelligent literature would be somewhat shaken.

I am going to be very much interested in your next mutation.

In any case, I am still in the ranks of your most devoted followers——Louis Russell Chauvenet, Matthews 59, Cambridge, Mass.

Holding the bag?

Dear Editor:

I write this to compliment you on your latest creation, the February issue of the Astounding. It's one of the best productions I've laid my glimmers on, approaching but not exceeding the immortal issues wherein were contained parts of both "The Mightiest Machine" and "The Skylark of Valeron". No one story stands out in this last issue but all were up above standard—muchly so. The "Galactic Patrol" ended with the feeling that somebody was left holding the bag. Who, I dunno. Probably us. Smith must have felt that he was writing too much to put an ending such as he did onto one of his "epics".

The mutant business strikes me favorably, as does the trend of the whole magazine from fictitious science to true science-fiction. It is, in addition, a relief to not have an "unable-to-figure-out" cover on the magazine. Brown seems to specialize in such. Take him under your wing, Mr. Campbell, and get him to leave out entirely the fictitious part of his works. Personally, I still think you could stand a whole new bunch of—well, I dunno whether to call them illustrators or not. Do they ever read the story real carefully before they start in? You're getting new authors, why not illustrators?

Speaking of authors. G. A. Giles seems to have copped the green cake with yaller icing this round. His "Wayward World" was hunky dory and I'm sure taking interest in his future works, the same which I'm hoping are many and short between. Was somewhat surprised and muchly pleased to see Don A. Stuart was still in the roll call. I had the impression he left us. His story in the January issue helped considerably to keep the mag from dragging its feet in the mud during that month. "Galactic Patrol" hit new highs in this issue only, as I have said before, to end abruptly the next month——Carroll Anvil, Box 166, Mineral, Wash.

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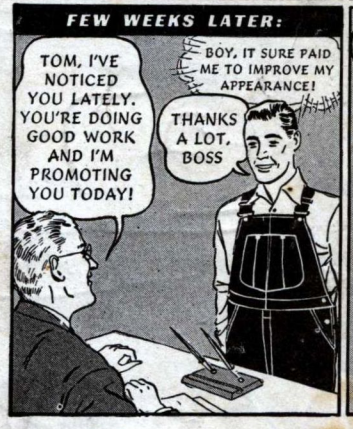


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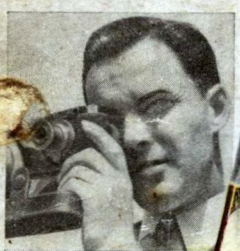

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