Astounding
SCIENCE FICTION
REG. U. S. PAT. OFF.
NOVEMBER 1946
25 CENTS

MEWHU'S JET

BY THEODORE STURGEON

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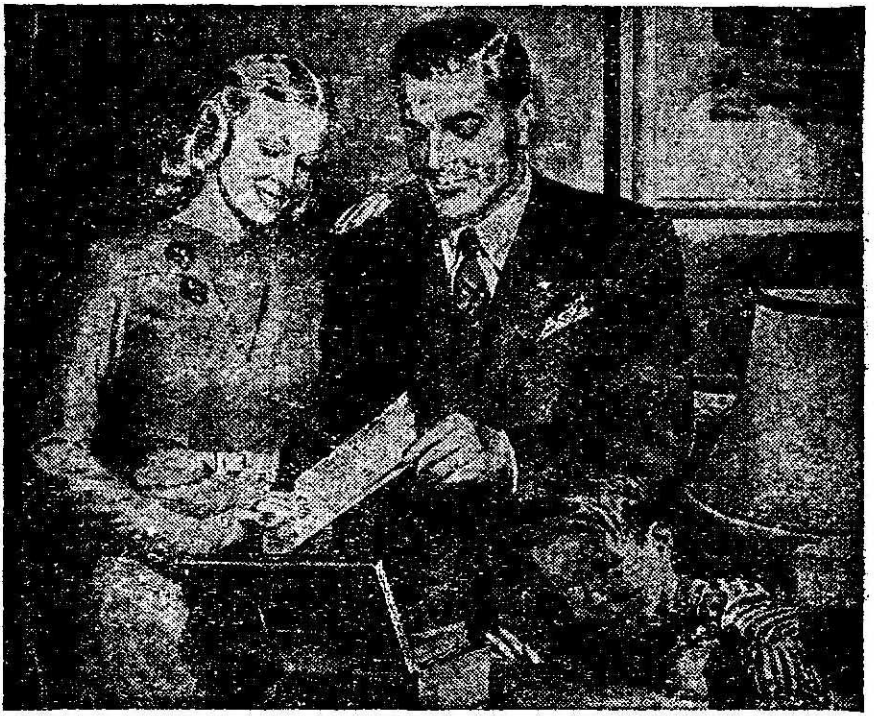

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ASTOUNDING
SCIENCE FICTION

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CONTENTS

NOVEMBER, 1946 VOL. XXXVIII, NO. 3

NOVELETTES

SHORT STORIES

ARTICLES

SERIAL

READERS' DEPARTMENTS

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ATOMIC ENGINES

As heat accompanies fire, so certainly will gamma radiation accompany atomic fire—and gamma rays are deadly to any living thing. Time and again the nuclear physicists have said engines using atomic power cannot be used in automobiles, airplanes, or the like, because either the atomic power source must be wrapped in nearly one hundred tons of shielding, or it will kill every living thing near it. For steamships, railroad locomotives, power plants, and similar massive devices, the atomic engine is possible and practicable; for light-weight devices such as cars and planes—no.

But Fairchild Engineering has taken a contract to develop atomic engines for aircraft use—a contract that means they think they know how to do the job!

Actually, there's an easily overlooked joker in that statement that aircraft engines using atomic power aren't possible. It's perfectly correct as it stands; it's the truth, the whole truth, and nothing but the truth—but the implication is wrong; the engine can be built, and while no living thing can come within a quarter of a mile of it and survive, robots can. A drone plane can take off, fly two hundred and fifty miles, investigate the atomic hell of the atomic bomb cloud, report back to base and mother planes by telemetering devices exactly what is going on within that death cloud, and then return to base and land. Robots can readily be designed to function in an atomic spray; they aren't living things.

Building the atomic engine isn't hard, and making a light engine isn't difficult—if your pilot can operate in a flood of gamma rays. The high-speed electrons and alpha particles, protons, positrons and heavier nuclei exploded out by an atomic pile can all be stopped very readily by light gauge sheet metal. It's the gamma rays and neutrons that are hard to stop. But neither gamma rays nor neutrons are serious menaces to electronic devices, so long as the electronic tubes used are all hard-vacuum types. (Gas discharge type tubes sometimes used in equipment —thyratrons, voltage regulators, rectifiers—might misbehave due to ionization caused by the gamma rays.) Neutrons and gamma rays are not charged particles, and would interfere to only a very limited—and correctible—degree with ordinary circuits.

A "raw" or unshielded atomic engine could be small, light, and inordinately powerful. A plane so equipped would have an indefinite cruising range. Drone planes of that type could be built and operated—from a long way off. Such planes can carry neither passengers nor commercial freight; passengers would be killed almost instantly, and freight would be rendered highly radioactive and unapproachable itself.

Such drone atomic-engined planes would have to operate from special

airports; once a drone atomic plane had taken off, it would be weeks before the field would have lost the induced radioactivity sufficiently to permit human approach. Once such a plane had been operated, it could never again be approached by human beings, either for repair, maintenance, or removal of wreckage in case of a crack-up. The development of the drone atomic plane will be an extremely complex job, since it requires the preliminary development of robot servicing mechanisms —or, more accurately, remote-control servicing devices. Normally, a research engineer tries a hookup, determines its performance, modifies it and tries again until he gets what he wants. Once the robot atomic plane has been tested, it can never be modified by human beings. The plane, radioactivated by the operation of the pile, cannot be approached more closely than one hundred yards, even with the heaviest armor a man could handle. The plane in operation would be deadly at a half mile or more.

As a military plaything, this new type robot atomic plane will really be the last and ultimate word, beside which the atomic bomb becomes a secondary weapon. Its military advantages are really wonderful. Here is an interceptor craft that can really raise hell with an attacking fleet of human-manned bombers — without firing a shot. By simply cruising a half mile or so above the bombers, every man on board the ships can be killed. It needs—and could have —no more deadly weapon than its own operating engine.

As an attack plane, it becomes the ultimate ideal of the military designer—a strafing attack at five hundred feet altitude with this plane would kill every man below, whether in a tank, an air-raid shelter of ordinary depth, or exposed on the ground.

The Navy, at Bikini, was impressed by the poisonous properties of atomic weapons, and discovered that ninety per cent of the gamma rays from the bomb penetrated eighteen inches of steel armor. This new robot atomic type plane could make a clean sweep of any Navy.

Such a device would certainly be something to make anyone genuinely interested in the perfection of mass murder enthusiastic. Far better than the bomb, this device leaves cities intact, but conveniently depopulated for conquest. Further, unlike the bomb, it can be reused an indefinite number of times. The combination of bomb and the robot death-spray, rather than death-ray, will make a practically unbeatable team. A few survivors hiding in remote and very deep mountain caves might remain, but that's about all. The death spray can kill those who flee the cities.

Dr. Urey said recently that if no effective international control of atomic weapons was worked out, either the United States must impose international control by conquering the world before someone else develops the atomic weapons, or our civilization will be destroyed.

Dr. Urey's statement is conservative. I'd change "civilization" to "race".

THE EDITOR.

MEWHU'S JET

BY THEODORE STURGEON

***Mewhu** came from—somewhere. He wrecked his spaceship on landing, but the "parachute" he had was something decidedly super—an atomic jet job! The problem was to get into communication—they thought.*

"We interrupt this program to announce—"

"Jack! Don't jump like that! And you've dropped ashes all over your—"

"Aw, Iris, honey, let me listen to—"

"—at first identified as a comet, the object is pursuing an erratic course through the stratosphere, occasionally dipping as low as—"

"You make me nervous, Jack! You're an absolute slave to the radio. I wish you paid that much attention to me."

"Darling, I'll argue the point, or pay attention to you, or anything in the wide world you like when I've heard this announcement; but please, *please* LET ME LISTEN!"

"—dents of the East Coast are warned to watch for the approach of this ob—"

"Iris, don't—"

Click!

"Well, of all the selfish, inconsiderate, discourteous—"

"That will do, Jack Garry! It's my radio as much as yours, and I have a right to turn it off when I want to!"

"Might I ask why you find it necessary to turn it off at this moment?"

"Because I know the announcement will be repeated any number of times if it's important, and you'll shush me every time. Because I'm not interested in that kind of thing and don't see why I should have it rammed down my throat. Because the only thing you ever want to listen to is something which couldn't possibly affect us. But mostly because you YELLED at me!"

"I did NOT yell at you!"

"You *did!* And you're yelling NOW!"

"MOM! DADDY!"

"Oh, Molly, darling, we woke you up!"

"Poor bratlet. Hey—what about your slippers?"

"It isn't cold tonight, Daddy. What was that on the radio?"

"Something buzzing around in the sky, darling, I didn't hear it all."

"A spaceship, I betcha."

"You see? You and your so-called science-fiction!"

"Call us a science-faction. The kid's got more judgment than you have."

"You have as little judgment as a seven-year-old child, you mean. And b-besides, you're turning her a-against me!"

"Aw, for Pete's sake, Mom, don't cry!"

At which point, something like a giant's fist clouted off the two-room top story of the seaside cottage and scattered it down the beach. The lights winked out, and outside, the whole waterfront lit up with a brief, shattering blue glare.

"Jacky darling, are you hurt?"

"Mom, he's bleedin'!"

"Jack, honey, say something. *Please* say something."

"Urrrrgh," said Jack Garry obediently, sitting up with a soft clatter of pieces of falling lath and plaster. He put his hands gently on the sides of his head and whistled. "Something hit the house."

His red-headed wife laughed half-hysterically. "Not really, darling." She put her arms around him, whisked some dust out of his hair, and began stroking his neck. "I'm . . . frightened, Jack."

"You're frightened!" He looked around, shakily, in the dim moonlight that filtered in. Radiance from an unfamiliar place caught his bleary gaze, and he clutched Iris' arm. "Upstairs . . . it's gone!" he said hoarsely, struggling to his feet. "Molly's room . . . Molly—"

"I'm here, Daddy. Hey! You're squeezin'!"

"Happy little family," said Iris, her voice trembling. "Vacationing in a quiet little cottage by the sea, so Daddy can write technical articles while Mummy regains her good disposition—without a phone, without movies within miles, and living

in a place where the roof flies away. Jack—what hit us?"

"One of those things you were talking about," said Jack sardonically. "One of the things you refuse to be interested in, that couldn't possibly affect us. Remember?"

"The thing the radio was talking about?"

"I wouldn't be surprised. We'd better get out of here. This place may fall in on us, or burn, or something."

"An' we'll all be kilt," crooned Molly.

"Shut up, Molly! Iris, I'm going to poke around. Better go on out and pick us a place to pitch the tent—if I can find the tent."

"Tent?" Iris gasped.

"Boy oh boy," said Molly.

"Jack Garry, I'm not going to go to bed in a tent. Do you realize that this place will be swarming with people in no time flat?"

"O.K.—O.K. Only get out from under what's left of the house. Go for a swim. Take a walk. Or g'wan to bed in Molly's room, if you can find it. Iris, you can pick the oddest times to argue!"

"I'm not going out there by myself!"

Jack sighed. "I should've asked you to stay in here," he muttered. "If you're not the contrariest woman ever to— Be quiet, Molly!"

"I didn't say anything."

Meeew-w-w!

"Aren't you doing that caterwauling?"

"No, Daddy, truly."

Iris said, "I'd say a cat was caught in the wreckage except that cats are smart and no cat would ever come near this place."

Wuh-wuh-muh-meeee-ew-w-w!

"What a dismal sound!"

"Jack, that isn't a cat."

"Well, stop shaking like the well-known aspen leaf."

Molly said, "Not without aspen Daddy's leaf to do it."

"Molly! You're too young to make bad puns!"

"Sorry, Daddy. I fergot."

Mmmmmew. Mmm—m-m-m. .

"Whatever it is," Jack said, "it can't be big enough to be afraid of and make a funny little noise like that." He squeezed Iris' arm and, stepping carefully over the rubble, began peering in and around it. Molly scrambled beside him. He was about to caution her against making so much noise, and then thought better of it. What difference would a little racket make?

The noise was not repeated, and five minutes' searching elicited nothing. Garry went back to his wife, who was fumbling around the shambles of a living room, pointlessly setting chairs and coffee tables back on their legs.

"I didn't find anyth—"

"YIPE!"

"Molly! What is it?"

Molly was just outside, in the shrubbery. "Oh . . . oh— Daddy, you better come quick!"

Spurred by the urgency of her tone, he went crashing outside. He found Molly standing rigid, trying to cram both her fists in her mouth at the same time. And at her feet

was a man with silver-gray skin and a broken arm, who mewed at him.

"—Guard and Navy Department have withdrawn their warnings. The pilot of a Pan American transport has reported that the object disappeared into the zenith. It was last seen eighteen miles east of Normandy Beach, New Jersey. Reports from the vicinity describe it as traveling very slowly, with a hissing noise. Although it reached within a few feet of the ground several times, no damage has been reported. Inves—"

"Think of that," said Iris, switching off the little three-way portable. "No damage."

"Yeah. And if no one saw the thing hit, no one will be out here to investigate. So you can retire to your downy couch in the tent without fear of being interviewed."

"Go to sleep? Are you mad? Sleep in that flimsy tent with that mewing monster lying there?"

"Oh heck, Mom, he's sick! He wouldn't hurt anybody."

They sat around a cheerful fire, fed by roof shingles. Jack had set up the tent without much trouble. The silver-gray man was stretched out in the shadows, sleeping lightly and emitting an occasional moan.

Jack smiled at Iris. "Y'know, I love your silly chatter, darling. The way you turned to and set his arm was a pleasure to watch. You didn't think of him as a monster while you were tending to him."

"Didn't I, though? Maybe 'monster' was the wrong word to use. Jack, he has only one bone in his forearm!"

"He has what? Oh, nonsense, honey! 'Tain't scientific. He'd have to have a ball-and-socket joint in his wrist."

"He *has* a ball and socket joint in his wrist."

"This I have to see," Jack muttered. He picked up a flash lantern and went over to the long prone figure.

Silver eyes blinked up at the light. There was something queer about them. He turned the beam closer. The pupils were not black in that light, but dark-green. They all but closed—from the sides, like a cat's. Jack's breath wheezed out. He ran the light over the man's body. It was clad in a bright-blue roomy bathroom effect, with a yellow sash. The sash had a buckle which apparently consisted of two pieces of yellow metal placed together; there seemed to be nothing to keep them together. They just stayed. When the man had fainted, just as they found him, it had taken almost all Jack's strength to pull them apart.

"Iris."

She got up and came over to him. "Let the poor devil sleep."

"Iris—what color was his robe?"

"Red, with a . . . but it's *blue!*"

"Is now. Iris, what on earth have we got here?"

"I don't know. I don't know. Some poor thing that escaped from an institution for . . . for—"

"For what?"

"How should I know?" she snapped. "There must be some

place where they send creatures that get born like that."

"Creatures don't get born like that. Iris, he isn't deformed. He's just different."

"I see what you mean. I don't know why I see what you mean, but I'll tell you something." She stopped, and was quiet for so long that he turned to her, surprised. She said slowly, "I ought to be afraid of him, because he's strange, and ugly, but—I'm not."

"Me, too."

"Molly, go back to bed!"

"He's a leprechaun."

"Maybe you're right. Go on to bed, chicken, and in the morning you can ask him where he keeps his crock of gold."

"Gee." She went off a little way then stood on one foot, drawing a small circle in the sand with the other. "Daddy."

"Yes, Molly-m'love."

"Can I sleep in the tent tomorrow, too?"

"If you're good."

"Daddy obviously means," said Iris acidly, "that if you're *not* good he'll have a roof on the house by tomorrow night."

"I'll be good." She disappeared into the tent.

"For kids," Jack said admiringly, "it never rains tomorrow."

The gray man mewed.

"Well, old guy, what is it?"

The man reached over and fumbled at his splinted arm.

"It hurts him," said Iris. She knelt beside him and, taking the wrist of his good arm, lifted it away from the splint, where he was clawing. The man did not resist, but lay and looked at her with pain-filled, slitted eyes.

"He has six fingers," Jack said. "See?" He knelt beside his wife and gently took the man's wrist. He whistled. "It *is* a ball and socket."

"Give him some aspirin."

"That's a good . . . wait." Jack stood pulling his lip in puzzlement. "Do you think we should?"

"Why not?"

"We don't know where he comes from. We know nothing of his body chemistry, or what any of our medicines might do to him."

"He . . . what do you mean, where he comes from?"

"Iris, will you open up your mind just a little? In the face of evidence like this, are you going to even attempt to cling to the idea that this man comes from anywhere on this earth?" Jack said with annoyance. "You know your anatomy. Don't tell me you ever saw a human freak with skin and bones like that! That belt buckle—that material in his clothes . . . come on, now. Drop your prejudices and give your brains a chance, will you?"

"You're suggesting things that simply don't *happen!*"

"That's what the man in the street said—in Hiroshima. That's what the old-time aeronaut said from the basket of his balloon when they told him about heavier-than-air craft. That's what—"

"All right, all right, Jack! I know the rest of the speech. If you want dialectics instead of what's

left of a night's sleep, I might point out that the things you have mentioned have all concerned human endeavors. Show me any new plastic, a new metal, a new kind of engine, and though I may not begin to understand it, I can accept it because it is of human origin. But this . . . this man, or whatever he is—"

"I know," said Jack, more gently. "It's frightening because it's strange, and away down underneath we feel that anything strange is necessarily dangerous. That's why we wear our best manners for strangers and not for our friends —but I still don't think we should give this character any aspirin."

"He seems to breathe the same air we do. He perspires, he talks . . . I think he talks—"

"You have a point. Well, if it'll ease his pain at all, it may be worth trying. Give him just one."

Iris went to the pump with a collapsible cup from her first-aid kit, and filled it. Kneeling by the silver-skinned man, she propped up his head, gently put the aspirin between his lips, and brought the cup to his mouth. He sucked the water in greedily, and then went completely limp.

"Oh, oh. I was afraid of that."

Iris put her hand over the man's heart. *"Jack!"*

"Is he . . . what is it, Iris?"

"Not dead, if that's what you mean. Will you feel this?"

Jack put his hand beside Iris'. The heart was beating with massive, slow blows, about eight to the minute. Under it, out of phase completely with the main beat, was another, an extremely fast, sharp beat, which felt as if it were going about three hundred.

"He's having some sort of palpitation," Jack said.

"And in two hearts at once!"

Suddenly the man raised his head and uttered a series of ululating shrieks and howls. His eyes opened wide, and across them fluttered a translucent nicitating membrane. He lay perfectly still with his mouth open, shrieking and gargling. Then, with a lightning movement, he snatched Jack's hand to his mouth. A pointed tongue, light-orange and four inches longer than it had any right to be, flicked out and licked Jack's hand. Then the strange eyes closed, the shrieks died to a whimper and faded out, and the man relaxed.

"Sleeping now," said Iris. "Oh, I hope we haven't done anything to him!"

"We've done something. I just hope it isn't serious. Anyhow, his arm isn't bothering him any. That's all we were worried about in the first place."

Iris put a cushion under the man's oddly planed head, touched the beach mattress he was lying on to see that he would be comfortable. "He has a beautiful mustache," she said. "Like silver. He looks very old and wise, doesn't he?"

"So does an owl. Let's go to bed."

Jack woke early, from a dream in which he had bailed out of a flying motorcycle with an umbrella that turned into a candy cane as he fell. He landed in the middle of some sharp-toothed crags which gave like sponge rubber. He was immediately surrounded by mermaids who looked like Iris and who had hands shaped like spur gears. But nothing frightened him. He awoke smiling, inordinately happy.

Iris was still asleep. Outside, somewhere, he heard the tinkle of Molly's laugh. He sat up, looked at Molly's camp cot. It was empty.

Moving quietly, so as not to disturb his wife, he slid his feet into moccasins and went out.

Molly was on her knees beside their strange visitor, who was squatting on his haunches and—

They were playing patty-cake.

"Molly!"

"Yes, Daddy."

"What are you trying to do? Don't you realize that that man has a broken arm?"

"Oh gosh, I'm sorry. Do you s'pose I hurt him?"

"I don't know. It's very possible," said Jack Garry testily. He went to the alien, took his good hand.

The man looked up at him and smiled. His smile was peculiarly engaging. All of his teeth were pointed, and they were very widely spaced. "Eeee-yu mow madibu Mewhu," he said.

"That's his name," Molly said excitedly. She leaned forward and tugged at the man's sleeve. "Mewhu. Hey, Mewhu!" And she pointed at her chest.

"Mooly," said Mewhu. "Mooly—Geery."

"See, Daddy?" Molly said ecstatically. "See?" She pointed at her father. "Daddy. Dah—dee."

"Deedy," said Mewhu.

"No, silly! Daddy."

"Dewdy."

"Dah-dy!"

Jack, quite entranced, pointed at himself and said, "Jack."

"Jeek."

"Good enough. Molly, the man can't say 'ah.' He can say 'oo' or 'ee' but not 'ah.' That's good enough."

Jack examined the splints. Iris had done a very competent job. When she realized that instead of the radius-ulna development of a true human, Mewhu had only one bone in his forearm, she had set the arm and laid on two splints instead of one. Jack grinned. Intellectually, Iris would not accept Mewhu's existence even as a possibility; but as a nurse, she not only accepted his body structure but skillfully compensated for its differences.

"I guess he wants to be polite," said Jack to his repentant daughter, "and if you want to play patty-cake, he'll go along with you, even if it hurts. Don't take advantage of him, chicken."

"I won't, Daddy."

Jack started up the fire and had a green-stick crane built and hot water bubbling by the time Iris

emerged. "Takes a cataclysm to get you to start breakfast," she grumbled through a pleased smile. "When were you a boy scout?"

"Matter of fact," said Garry, "I was once. Will modom now take over?"

"Modom will. How's the patient?"

"Thriving. He and Molly had a patty-cake tournament this morning. His clothes, by the way, are red again."

"Jack—where does he come from?"

"I haven't asked him yet. When I learn to caterwaul, or he learns to talk, perhaps we'll find out. Molly has already elicited the information that his name's Mewhu." Garry grinned. "And he calls me 'Jeek.'"

"Can't pronounce an 'r,' hm?"

"That'll do, woman. Get on with the breakfast."

While Iris busied herself over breakfast, Jack went to look at the house. It wasn't as bad as he had thought—a credit to poor construction. Apparently the upper two rooms were a late addition and had just been perched onto the older, comparatively flat-topped lower section. The frame of Molly's bed was bent beyond repair, but the box spring and mattress were intact. The old roof seemed fairly sound, where the removal of the jerry-built little top story had exposed it. The living room would be big enough for him and Iris, and Molly's bed could be set up in the study. There were tools and lumber in the garage, the weather was warm and clear, and like any other writer, Jack Garry was very much attracted by the prospect of hard work for which he would not get paid, as long as it wasn't writing. By the time Iris called him for breakfast, he had most of the debris cleared from the roof and a plan of action mapped out. It would only be necessary to cover the hole where the stairway landing had been, and go over the roof for potential leaks. A good rain, he reflected, would search those out for him quickly enough.

"What about Mewhu?" Iris asked as she handed him an aromatic plate of eggs and bacon. "If we feed him any of this, do you think he'll throw another fit?"

Jack looked at their visitor, who sat on the other side of the fire, very close to Molly, gazing big-eyed at their breakfasts.

"I don't know. We could give him a little, I suppose."

Mewhu inhaled his sample, and wailed for more. He ate a second helping, and when Iris refused to fry more eggs, he gobbled toast and jam. Each new thing he tasted he would nibble at, blink twice, and then bolt down. The only exception was the coffee. One taste was sufficient. He put it down on the ground and very carefully, very delicately overturned it.

"Can you talk to him?" Iris asked suddenly.

"He can talk to me," declared Molly.

"I've heard him," Jack said.

"Oh, no. I don't mean *that,*" Molly denied vehemently. "I can't make any sense out of that stuff."

"What do you mean, then?"

"I . . . I dunno, Mommy. He just—talks to me, that's all."

Jack and Iris looked at each other. "Must be a game," said Iris. Jack shook his head, looking at his daughter carefully as if he had not really seen her before. He could think of nothing to say, and rose.

"Think the house can be patched up?"

"Oh sure." He laughed. "You never did like the color of the upstairs rooms, anyway."

"I don't know what's gotten into me," said Iris thoughtfully. "I'd have kicked like a mule at any part of this. I'd have packed up and gone home if, say, just a wall was gone upstairs, or if there were just a hole in the roof, or if this . . . this android phenomenon arrived suddenly. But when it all happens at once—I can take it all!"

"Question of perspective. Show me a nagging woman and I'll show you one who hasn't enough to worry about."

"You'll get out of my sight or you'll have this frying pan bounced off your yammering skull," said Iris steadily. Jack got.

Molly and Mewhu trailed after him as he returned to the house,

stood side by side goggling at him as he mounted the ladder.

"Whatsha doing, Daddy?"

"Marking off the edges of this hole where the stairway hits the place where the roof isn't, so I can clean up the edges with a saw."

"Oh."

Jack roughed out the area with a piece of charcoal, lopped off the more manageable rough edges with a hatchet, cast about for his saw. It was still in the garage. He climbed down, got it, climbed up again, and began to saw. Twenty minutes of this, and sweat was streaming down his face. He knocked off, climbed down, doused his head at the pump, lit a cigarette, climbed back up on the roof.

"Why don't you jump off and back?"

The roofing job was looking larger and the day seemed warmer than it had. Jack's enthusiasm was in inverse proportion to these factors. "Don't be funny, Molly."

"Yes, but Mewhu wants to know."

"Oh, he does. Ask him to try it."

He went back to work. A few minutes later, when he paused for a breath, Mewhu and Molly were nowhere to be seen. Probably over by the tent, in Iris' hair, he thought, and went on sawing.

"Daddy!"

Daddy's unaccustomed arm and shoulder were, by this time, yelling for help. The dry soft-wood alternately cheesed the saw out of line and bound it. He answered impatiently, "Well, what?"

"Mewhu says to come. He wants to show you something."

"Show me what? I haven't time to play now, Molly. I'll attend to Mewhu when we get a roof over our heads again."

"But it's for you!"

"What is?"

"The thing in the tree."

"Oh, all right." Prompted more by laziness than by curiosity, Jack climbed back down the ladder. Molly was waiting. Mewhu was not in sight.

"Where is he?"

"By the tree," she said with exaggerated patience, taking his hand. "Come on. It's not far."

She led him around the house and across the bumpy track that was euphemistically known as a road. There was a tree down on the other side. He looked from it to the house, saw that in line with the felled tree and his damaged roof were more broken trees, where something had come down out of the sky, skimmed the tops of the trees, angling closer to the ground until it wiped the top off his house and had then risen up and up—to where?

They went deeper into the woods for ten minutes, skirting an occasional branch or fallen treetop, until they came to Mewhu, who was leaning against a young maple. He smiled, pointed up into the tree, pointed to his arm, to the ground. Jack looked at him in puzzlement.

"He fell out of the tree and broke his arm," said Molly.

"How do you know?"

"Well, he just did, Daddy."

"Nice to know. Now can I get back to work?"

"He wants you to get the thing in the tree!"

Jack looked upward. Hung on a fork two-thirds of the way up the tree was a gleaming object, a stick about five feet long with a streamlined shape on each end, rather like the wingtip tanks of a P-80. "What on earth is that?"

"I dunno. I can't— He tol' me, but I dunno. Anyway, it's for you, so you don't . . . so you don't—" She looked at Mewhu for a moment. The alien's silver mustache seemed to swell a little. "—so you don't have to climb the ladder so much."

"Molly—how did you know that?"

"He *told* me, that's all. Gosh, Daddy, don't be mad. I don't know how, honest; he just did, that's all."

"I don't get it," muttered Jack. "Anyhow—what's this about that thing in the tree? I'm supposed to break my arm too?"

"It isn't dark."

"What do you mean by that?"

Molly shrugged. "Ask him."

"Oh. I think I catch that. He fell out of the tree because it was dark. He thinks I can get up there and get the whatzit without hurting myself because I can see what I am doing. He also flatters me. Or is it flattery? How close to the apes does he think we are?"

"What are you talking about, Daddy?"

"Never mind . . . why am I supposed to get that thing, anyway?"

"Uh—so's you can jump off the roof."

"That is just silly. However, I do want a look at that thing. Since his ship is gone, that object up there seems to be the only artifact he brought with him except his clothes."

"What's an artifact?"

"Second cousin to an artichoke. Here goes nothin'," and he swung up into the tree. He had not climbed a tree for years, and as he carefully chose his way, it occurred to him that there were probably more efficient ways of gaining altitude. An escalator, for example. Why didn't escalators grow on trees?

The tree began to shiver and sway with his weight. He looked down once and decided instantly not to do it again. He looked up and was gratified to see how close he was to the object he was after. He pulled himself up another three feet and was horrified at how far away it was, for the branches were very small up here. He squirmed upward, reached, and his fingers just brushed against the shank of the thing. It had two rings fastened to it, he noticed, one each side of the center, large enough to get an arm through. It was one of these which was hung up on a branch. He chinned himself, then, with his unpracticed muscles crack-

ing, took one hand off and reached.

The one-hand chinning didn't come off so well. His arm began to sag. The ring broke off its branch as his weight came on it. He was immediately surrounded by the enthusiastic crackling of breaking shrubbery. He folded his tongue over and got his teeth on it. Since he had a grip on Mewhu's artifact, he held on . . . even when it came free. He began to fall, tensed himself for the bone-breaking jolt he would get at the bottom.

He didn't get it.

He fell quite fast at first, and then the stick he was holding began to bear him up. He thought that it must have caught on a branch, by some miracle—but it hadn't! He was drifting down like a thistle seed, hanging from the rod, which in some impossible fashion was supporting itself in midair. There was a shrill, faint *whooshing* sound from the two streamlined fixtures at the ends of the rod. He looked down, blinked sweat out of his eyes, looked again. Mewhu was grinning a broad and happy grin, and Molly was slack-jawed with astonishment.

The closer he came to the ground the slower he went. When, after what seemed an eternity, he felt the blessed pressure of earth under his feet, he had to stand and *pull* the rod down. It yielded slowly, like an eddy current brake. Dry leaves danced and whirled under the end pieces.

"Gee, Daddy, that was wonderful!"

He swallowed twice to wet down his dry esophagus, and pulled his eyes back in. "Yeah. Fun," he said weakly.

Mewhu came and took the rod out of his hand, and dropped it. It stayed perfectly horizontal, and sank slowly down to the ground, where it lay. Mewhu pointed at it, at the tree, and grinned.

"Just like a parachute. Oh, *gee*, Daddy!"

"You keep away from it," said Jack, familiar with youthful intonation. "Heaven knows what it is. It might go off, or something."

He looked fearfully at the object. It lay quietly, the hissing of the end pieces stilled. Mewhu bent suddenly and picked it up, held it over his head with one hand. Then he calmly lifted his feet and hung from it. It lowered him gently, butt first, until he sat on the ground, in a welter of dead leaves; for as soon as he picked it up, the streamlined end pieces had begun to blast again.

"That's the silliest thing I ever saw. Here—let me see it." It was hovering about waist-high. He leaned over one of the ends. It had a fine round grille over it. He put out a hand. Mewhu reached out and caught his wrist, shaking his head. Apparently it was dangerous to go too near those ends. Garry suddenly saw why. They were tiny, powerful jet motors of some kind. If the jet was powerful enough to support a man's weight, the intake must be draw-

ing like mad—probably enough to snap a hole through a man's hand like a giant ticket-puncher.

But what controlled it? How was the jet strength adjusted to the weight borne by the device, and to the altitude? He remembered without pleasure that when he had fallen with it from the treetop, he had dropped quite fast, and that he went slower and slower as he approached the ground. And yet when Mewhu had held it over his head, it had borne his weight instantly and lowered him very slowly. And besides—how was it so stable? Why didn't it turn upside down and blast itself and passenger down to earth?

He looked at Mewhu with some increase of awe. Obviously he came from a place where the science was really advanced. He wondered if he would ever be able to get any technical information from his visitor—and if he would be able to understand it. Of course, Molly seemed to be able to—

"He wants you to take it back and try it on the roof," said Molly.

"How can that refugee from a Kuttner opus help me?"

Immediately Mewhu took the rod, lifted it, ducked under it, and slipped his arms through the two rings, so that it crossed his back like a water-bucket yoke. Peering around, he turned to face a clearing in the trees, and before their startled eyes, he leaped thirty feet in the air, drifted away in a great arc, and came gently to rest twenty yards away.

Molly jumped up and down and clapped her hands, speechless with delight. The only words Garry could find were a reiterated, "Ah, no!"

Mewhu stood where he was, smiling his engaging smile, waiting for them. They walked toward him, and when they were close, he leaped again and soared out toward the road.

"What do you do with a thing like this?" breathed Jack. "Who do you go to, and what do you say to him?"

"Le's just keep him for a pet, Daddy."

Jack took her hand, and they followed the bounding, soaring silver man. A pet! A member of some alien race, from some unthinkable civilization—and obviously a highly trained individual, too, for no "man in the street" would have made such a trip. What was his story? Was he an advance guard? Or—was he the sole survivor of his people? How far had he come? Mars? Venus?

They caught up with him at the house. He was standing by the ladder. His strange rod was lying quiet on the ground. He was fascinatedly operating Molly's yo-yo. When he saw them, he threw down the yo-yo, picked up his device, and slipping it across his shoulders, sprang high in the air and drifted down to the roof. "Eee-yu!" he said, with emphasis, and jumped off backward. So stable was the rod that, as he sank

through the air, his long body swung to and fro.

"Very nice," said Jack. "Also spectacular. And I have to go back to work." He went to the ladder.

Mewhu bounded over to him, caught his arm, whimpering and whistling in his peculiar speech. He took the rod and extended it toward Jack.

"He wants you to use it," said Molly.

"No, thanks," said Jack, a trace of his tree-climbing vertigo returning to him. "I'd just as soon use the ladder." And he put his hand out to it.

Mewhu, hopping with frustration, reached past him and toppled the ladder. It levered over a box as it fell and struck Jack painfully on the shin.

"I guess you better use the flyin' belt, Daddy."

Jack looked at Mewhu. The silver man was looking as pleasant as he could with that kind of a face; on the other hand, it might just possibly be wise to humor him a little. Being safely on the ground to begin with, Jack felt that it might not matter if the fantastic thing wouldn't work for him. And if it failed him over the roof—well, the house wasn't *very* tall.

He shrugged his arms through the two rings. Mewhu pointed to the roof, to Jack, made a jumping motion. Jack took a deep breath, aimed carefully, and, hoping the gadget wouldn't work—jumped.

He shot up close to the house—too close. The eave caught him a resounding thwack on precisely the spot where the ladder had just hit him. The impact barely checked him. He went sailing up over the roof, hovered for a breathless second, and then began to come down. For a moment he thought his flailing legs would find purchase on the far edge of the roof. He just missed it. All he managed to do was to crack the same shin, in the same place, mightily on the other eave. Trailing clouds of profanity, he landed standing—in Iris' wash basket. Iris, just turning from the clothes line, confronted him.

"Jack! What on earth are you . . . get out of that! You're standing right on my wash with your dirty . . . *oh!*"

"Oh oh!" said Jack, and stepped backward out of the wash basket. His foot went into Molly's express wagon, which Iris used to carry the heavy basket. To get his balance, he leaped—and immediately rose high in the air. This time his luck was better. He soared completely over the kitchen wing of the house and came to earth near Molly and Mewhu.

"Daddy, you were just like a bird!"

"I'm going to be just like a corpse if your mother's expression means what I think it does." He shucked off the "flyin' belt" and dove into the house just as Iris rounded the corner. He heard Molly's delighted "He went *that* way" as he plowed through the shambles of the living room and out the front door. As the kitchen door slammed he was rounding the

house. He charged up to Mewhu, snatched the gadget from him, slipped it on and jumped. This time his judgment was faultless. He cleared the house easily although he came very near landing astride the clothesline. When Iris, panting and furious, stormed out of the house, he was busily hanging sheets.

"Just what," said Iris, her voice crackling at the seams, "do you think you're doing?"

"Just giving you a hand with the laundry, m'love," said Jack.

"What is that . . . that object on your back?"

"Another evidence of the ubiquity of the devices of science-fiction," said Jack blandly. "This is a multilateral, three-dimensional mass adjuster, or pogo-chute. With it I can fly like a gull, evading the cares of the world and the advances of beautiful redheads, at such times as their passions are distasteful to me."

"Sometime in the very near future, you gangling hatrack, I am going to pull the tongue out of your juke box of a head and tie a bowknot in it." Then she laughed.

He heaved a sigh of relief, went and kissed her. "Darling, I am sorry. I was scared silly, dangling from this thing. I didn't see your clothes basket, and if I had I don't know how I'd have steered clear."

"What is it, Jack? How does it work?"

"I dunno. Jets on the ends. They blast hard when there's a lot of weight pushing them toward the earth. They blast harder near the earth then up high. When the weight on them slacks off a bit, they throttle down. What makes them do it, what they are using for power—I just wouldn't know. As far as I can see, they suck in air at the top and blow it out through the jets. And, oh yes—they point directly downward no matter which way the rod is turned."

"Where did you get it?"

"Off a tree. It's Mewhu's. Apparently he used it for a parachute. On the way down, a tree branch speared through one of these rings and he slipped out of it and fell and broke his arm."

"What are we going to do with him, Jack?"

"I've been worrying about that myself. We can't sell him to a sideshow." He paused, thoughtfully. "There's no doubt that he has a lot that would be of value to humanity. Why—this thing alone would change the face of the earth! Listen—I weigh a hundred and seventy. I *fell* on this thing, suddenly, when I lost my grip on a tree, and it bore my weight immediately. Mewhu weighs more than I do, judging from his build. It took his weight when he lifted his feet off the ground while holding it over his head. If it can do that, it or a larger version should be able, not only to drive, but to support an aircraft. If for some reason that isn't possible, the power of those little jets certainly could turn a turbine."

"Will it wash clothes?" Iris was glum.

"That's exactly what I mean! Light, portable, and more power than it has any right to have—of *course* it'll wash clothes. And drive generators, and cars, and . . . Iris, what do you *do* when you have something as big as this?"

"Call a newspaper, I guess."

"And have a hundred thousand people peeking and prying all over the place, and Congressional investigations, and what all? Uh . . . *uh!*"

"Why not ask Harry Zinsser?"

"Harry? I thought you didn't like him."

"I never said that. It's just that you and he go off in the corner and chatter about mulpitude amputation and debilities of reactance and things like that, and I have to sit, knit—and spit when I want someone's attention. Harry's all right."

"Gosh, honey, you've got it! Harry'll know what to do. I'll go right away."

"You'll do nothing of the kind! With that hole in the roof? I thought you said you could have it patched up for the night at least. By the time you get back here it'll be dark."

The prospect of sawing out the ragged hole in the roof was suddenly the least appealing thing in the world. But there was logic and an "or else" tone to what she said. He sighed and went off, mumbling something about the greatest single advance in history awaiting the whim of a woman. He forgot he was wearing Mewhu's armpit altitudinizer, and only his first two paces were on the ground. Iris hooted with laughter at his clumsy walking on air. When he reached the ground, he set his jaw and leaped lightly up to the roof. "Catch me now, you and your piano legs," he taunted cheerfully, ducked the lancelike clothes prop she hurled at him, and went back to work.

As he sawed, he was conscious of a hubbub down below.

"Dah—dee! "Mr-r-roo ellue—"

He sighed and put down the saw. "What is it?"

"Mewhu wants his flyin' belt!"

Jack looked at the roof, at the lower shed, and decided that his old bones could stand it if he had to get down without a ladder. He took the jet-tipped rod and dropped it. It stayed perfectly horizontal, falling no slower and no faster than it had when he had ridden it down. Mewhu caught it, deftly slipped his splinted arm through it—it was astonishing how careful he was of the arm, and yet how little it inconvenienced him—then the other arm, and sprang up to join Jack on the roof.

"What do you say, fella?"

"Woopen yew weep."

"I know how you feel." He knew that the silver man wanted to tell him something, but couldn't help him out. He grinned and picked up the saw. Mewhu took it out of his hand and tossed it off the roof, being careful to miss Molly, who was dancing back to get a point of vantage.

"What's the big idea?"

"Dellihew hidden," said Mewhu. Pento deh numinew heh," and he pointed at the flyin' belt and at the hole in the roof.

"You mean I'd rather fly off in that thing than work? Brother, you got it. But I'm afraid I have to—"

Mewhu circled his arm, pointing all around the hole in the roof, and pointed again to the pogo-chute, indicating one of the jet motors.

"I don't get it," said Jack.

Mewhu apparently understood, and an expression of amazement crossed his mobile face. Kneeling, he placed his good hand around one of the little jet motors, pressed two tiny studs, and the casing popped open. Inside was a compact, sealed, and simple-looking device, the core of the motor itself, apparently. There seemed to be no other fastening. Mewhu lifted it out and handed it to Jack. It was about the size and shape of an electric razor. There was a button on the side. Mewhu pointed at it, pressed the back; and then moved Jack's hand so that the device was pointed away from them both. Jack, expecting anything, from nothing at all to the "blinding bolt of searing, raw energy" so dear to the science-fiction world, pressed the button.

The gadget hissed, and snuggled back into his palm in an easy recoil.

"That's fine," said Jack, "but what do I do with it?"

Mewhu pointed at Jack's saw cut, then at the device.

"Oh," said Jack. He bent close, aimed the thing at the end of the saw cut, and pressed the button. Again the hiss, and the slight, steady recoil; and a fine line appeared in the wood. It was a cut, about half as thick as the saw cut, clean and even and, as long as he kept his hand steady, very straight. A fine cloud of pulverized wood rose out of the hole in the roof, carried on a swirl of air.

Jack experimented, holding the jet close to the wood and away from it. He found that it cut finer the closer he got to it. As he drew it away from the wood, the slot got wider and the device cut slower until at about eighteen inches it would not cut at all. Delighted, Jack quickly cut and trimmed the hole. Mewhu watched grinning. Jack grinned back, knowing how he would feel if he introduced a saw to some primitive who was trying to work wood with a machete.

When he was finished, he handed the jet back to the silver man, and slapped his shoulder. "Thanks a million, Mewhu."

"Jeek," said Mewhu, and reached for Jack's neck. One of his thumbs lay on Jack's collarbone, the other on his back, over the scapula. Mewhu squeezed twice, firmly.

"That the way you shake hands back home?" smiled Jack. He thought it likely. Any civilized race was likely to have a manual greeting. The handshake evolved from a raised palm, indicating that the saluter was unarmed. It was

quite possible that this was an extension, in a slightly different direction, of the same sign. It would indeed be an indication of friendliness to have two individuals present their throats, each to the other.

Mewhu, with three deft motions, slipped the tiny jet back into its casing, and holding the rod with one hand, stepped off the roof, letting himself be lowered in that amazing thistle-down fashion to the ground. Once there, he tossed the rod back. Jack was startled to see it hurtle upward like any earthly object. He grabbed it and missed. It reached the top of its arc, and as soon as it started down again the jets cut in, and it sank easily to him. He put it on and floated down to join Mewhu.

The silver man followed him to the garage, where he kept a few pieces of milled lumber. He selected some one-inch pine boards and dragged them out, to measure them and mark them off to the size he wanted to knock together a simple trapdoor covering for the useless stair well; a process which Mewhu watched with great interest.

Jack took up the flying belt and tried to open the streamlined shell to remove the cutter. It absolutely defied him. He pressed, twisted, wrenched, and pulled. All it did was to hiss gently when he moved it toward the floor.

"Eek, Jeek," said Mewhu. He took the jet from Jack, pressed it. Jack watched closely. Then he grinned and took the cutter.

He swiftly cut the lumber up

with it, sneering gayly at the ripsaw which hung on the wall. Then he put the whole trap together with a Z-brace, trimmed off the few rough corners, and stood back to admire it. He realized instantly that it was too heavy to carry by himself, let alone lift to the roof. If Mewhu had two good hands, now, or if— He scratched his head.

"Carry it on the flyin' belt, Daddy."

"Molly! What made you think of that?"

"Mewhu tol' . . . I mean, I sort of—"

"Let's get this straight once and for all. How does Mewhu talk to you?"

"I dunno, Daddy. It's sort of like I remembered something he said, but not the . . . the words he said. I jus' . . . jus'—" she faltered, and then said vehemently, "I don' *know,* Daddy. Truly I don't!"

"What'd he say this time?"

She looked at Mewhu. Again Jack noticed the peculiar swelling of Mewhu's silver mustache. She said, "Put the door you jus' made on the flyin' belt and lift it. The flyin' belt'll make it fall slow, and you can push it along while . . . it's . . . fallin'."

Jack looked at the door, at the jet device, and got the idea. When he had slipped the jet-rod under the door, Mewhu gave him a lift. Up it came; and then Mewhu, steadying it, towed it well outside the garage before it finally sank to the ground. Another lift, another easy tow, and they covered thirty more feet. In this manner they covered the distance to the house, with Molly skipping and laughing behind, pleading for a ride and handing the grinning Mewhu a terrific brag.

At the house, Jack said, "Well, Einstein Junior, how do we get it up on the roof?"

Mewhu picked up Molly's yo-yo and began to operate it deftly. Doing so, he walked around the corner of the house.

"Hey!"

"He don't know, Daddy. You'll have to figger it out."

"You mean he could dream up that slick trick for carrying it out here and now his brains give out?"

"I guess so, Daddy."

Jack Garry looked after the retreating form of the silver man, and shook his head. He was already prepared to expect better than human reasoning from Mewhu, even if it was a little different. He couldn't quite phase this with Mewhu's shrugging off a problem in basic logic. Certainly a man with his capabilities would not have reasoned out such an ingenious method of bringing the door out here without realizing that that was only half the problem.

Shrugging, he went back to the garage and got a small block and tackle. He had to put up a big screw hook on the eave, and another on the new trapdoor; and once he had laboriously hauled the

door up until the tackle was two-blocked, it was a little more than arduous to work it over the edge and drag it into position. Mewhu had apparently quite lost interest. It was two hours later, just as he put the last screw in the tower bolt on the trapdoor and was calling the job finished, that he heard Mewhu begin to shriek again. He dropped his tools, shrugged into the jet stick, and sailed off the roof.

"Iris! Iris! What's the matter?"

"I don't know, Jack. He's . . . he's—"

Jack pounded around the house to the front. Mewhu was lying on the ground in the midst of some violent kind of convulsion. He lay on his back, arching it high, digging his heels into the turf; and his head was bent back at an impossible angle, so that his weight was on his heels and his forehead. His good arm pounded the ground, though the splinted one lay limp. His lips writhed and he uttered an edgy, gasping series of ululations quite horrible to listen to. He seemed to be able to scream as loudly when inhaling as when exhaling.

Molly stood beside him, watching him hypnotically. She was smiling. Jack knelt beside the writhing form and tried to steady it. "Molly, stop grinning at the poor fellow!"

"But—he's happy, Daddy."

"He's what?"

"Can't you see, silly? He feels —good, that's all. He's laughing!"

"Iris, what's the matter with him? Do you know?"

"He's been into the aspirin again, that's all I can tell you."

"He ate four," said Molly. "He loves 'em."

"What can we do, Jack?"

"I don't know, honey," said Jack worriedly. "Better just let him work it out. Any emetic or sedative we give him might be harmful."

The attack slackened and ceased suddenly, and Mewhu went quite limp. Again, with his hand over the man's chest, Jack felt the strange double pulsing.

"Out cold," he said.

Molly said in a strange, quiet voice, "No, Daddy. He's lookin' at dreams."

"Dreams?"

"A place with a or'nge sky," said Molly. He looked up sharply. Her eyes were closed. "Lots of Mewhus. Hunderds an' hunderds —big ones. As big as Mr. Thorndyke." (Thorndyke was an editor whom they knew in the city. He was six feet seven.) "Round houses, an' big airplanes with . . . sticks fer wings."

"Molly, you're talking nonsense!" said her mother worriedly. Jack shushed her. "Go on, baby."

"A place, a room. It's a . . . Mewhu is there and a bunch more. They're in . . . in lines. Rows. There's a big one with a yella hat. He—keeps them in rows. Here's Mewhu. He's outa the line. He's jumpin' out th' windy with a flyin'

belt." There was a long silence. Mewhu moaned.

"Well?"

"Nothin', Daddy—wait! It's . . . all . . . fuzzy. Now there's a thing, a kinda summerine. Only on the ground, not in the water. The door's open. Mewhu is . . . is inside. Knobs, and clocks. Pull on the knobs. Push a— Oh. *Oh!* It hurts!" She put her fists to her temples.

"Molly!"

Molly opened her eyes and said, quite calmly, "Oh, *I'm* all right, Mommy. It was a thing in the dream that hurt, but it didn't hurt *me*. It was all a bunch of fire an' . . . an' a sleepy feeling, only bigger. An' it hurt."

"Jack, he'll harm the child!"

"I doubt it," said Jack.

"So do I," said Iris, wonderingly, and then, almost inaudibly, "Now, why did I say that?"

"Mewhu's asleep," said Molly suddenly.

"No more dreams?"

"No more dreams. Gee. That was—funny."

"Come and have some lunch," said Iris. Her voice shook a little. They went into the house. Jack looked down at Mewhu, who was smiling peacefully in his sleep. He thought of putting the strange creature to bed, but the day was warm and the grass was thick and soft where he lay. He shook his head and went into the house.

"Sit down and feed," Iris said.

He looked around. "You've done wonders in here," he said. The litter of lath and plaster was gone, and Iris' triumphant antimacassars blossomed from the upholstery. She curtsied. "Thank you, m'lord."

They sat around the card table and began to do damage to tongue sandwiches. "Jack."

"Mm-m?"

"What was that—telepathy?"

"Think so. Something like that. Oh, wait'll I tell Zinsser! He'll never believe it."

"Are you going down to the airfield this afternoon?"

"You bet. Maybe I'll take Mewhu with me."

"That would be a little rough on the populace, wouldn't it? Mewhu isn't the kind of fellow you can pass off as your cousin Julius."

"Heck, he'd be all right. He could sit in the back seat with Molly while I talked Zinsser into coming out to have a look at him."

"Why not get Zinsser out here?"

"You know that's silly. When we see him in town, he's got time off. Out here he's tied to that airport almost every minute."

"Jack—do you think Molly's quite safe with that creature?"

"Of course! Are you worried?"

"I . . . I am, Jack. But not about Mewhu. About me. I'm worried because I think I should worry more, if you see what I mean."

Jack leaned over and kissed her. "The good old maternal instinct at work," he chuckled. "Mewhu's new and strange and might be

dangerous. At the same time Mewhu's helpless and inoffensive, and something in you wants to mother him, too."

"There you really have something," said Iris, thoughtfully. "He's as big and ugly as you are, and unquestionably more intelligent. Yet I don't mother you."

Jack grinned. "You're not kiddin'." He gulped his coffee and stood up. "Eat it up, Molly, and go wash your hands and face. I'm going to have a look at Mewhu."

"You're going in to the airport, then?" asked Iris.

"If Mewhu's up to it. There's too much I want to know, too much I haven't the brains to figure out. I don't think I'll get all the answers from Zinsser, by any means; but between us we'll figure out what to do about this thing. Iris, it's *big!*"

Full of wild, induced speculation, he stepped out on the lawn. Mewhu was sitting up, happily contemplating a caterpillar.

"Mewhu."

"Dew?"

"How'd you like to take a ride?"

"Hubilly grees. Jeek?"

"I guess you don't get the idea. C'mon," said Jack, motioning toward the garage. Mewhu very, very carefully set the caterpillar down on a blade of grass and rose to follow; and just then the most unearthly crash issued from the garage. For a frozen moment no one moved, and then Molly's voice set up a hair-raising reiterated screech. Jack was pounding toward the garage before he knew he had moved.

"Molly! what is it?"

At the sound of his voice the child shut up as if she were switch-operated.

"Molly!"

"Here I am, Daddy," she said in an extremely small voice. She was standing by the car, her entire being concentrated in her protruding, faintly quivering lower lip. The car was nose-foremost through the back wall of the garage.

"Daddy, I didn't mean to do it: I just wanted to help you get the car out. Are you going to spank me? Please, Daddy, I didn't—"

"Quiet!"

She was quiet, but immediately. "Molly, what on earth possessed you to do a thing like that? You know you're not supposed to touch the starter!"

"I was pretending, Daddy, like it was a summerine that could fly, the way Mewhu did."

Jack threaded his way through this extraordinary shambles of syntax. "Come here," he said sternly. She came, her paces half-size, her feet dragging, her hands behind her where her imagination told her they would do the most good. "I ought to whack you, you know."

"Yeah," she answered tremulously. "I guess you oughta. Not more'n a couple of times, huh, Daddy?"

Jack bit the insides of his cheeks for control, but couldn't make it.

He grinned. *You little minx,* he thought. "Tell you what," he said gruffly, looking at the car. The garage was fortunately flimsy, and the few new dents on hood and fenders would blend well with the old ones. "You've got three good whacks coming to you. I'm going to add those on to your next spanking."

"Yes, Daddy," said Molly, her eyes big and chastened. She climbed into the back seat and sat, very straight and small, away back out of sight. Jack cleared away what wreckage he could, and then climbed in, started the old puddle-vaulter and carefully backed out of the damaged shed.

Mewhu was standing well clear, watching the groaning automobile with startled silver eyes. "Come on in," said Jack, beckoning. Mewhu backed off.

"Mewhu!" cried Molly, putting her head out the rear door. Mewhu said "Yowk," and came instantly. Molly opened the door and he climbed in, and Molly shouted with laughter when he crouched down on the floor, and made him get up on the seat. Jack pulled around the house, stopped, picked up Mewhu's jet rod, blew a kiss through the window to Iris, and they were off.

Forty minutes later they wheeled up to the airport after an ecstatic ride during which Molly had kept up a running fire of descriptive commentary on the wonders of a terrestrial countryside. Mewhu had goggled and ogled in a most satisfactory fashion, listening spellbound to the child—sometimes Jack would have sworn that the silver man understood everything she said—and uttering little shrieks, exclamatory mewings, and interrogative peeps.

"Now," said Jack, when he had parked at the field boundary, "you two stay in the car for a while. I'm going to speak to Mr. Zinsser and see if he'll come out and meet Mewhu. Molly, do you think that you can make Mewhu understand that he's to stay in the car, and out of sight? You see, if other people see him, they'll want to ask a lot of silly questions, and we don't want to embarrass him, do we?"

"No, Daddy. Mewhu'll be good. Mewhu," she said, turning to the silver man. She held his eyes with hers. His mustache swelled, rippled. "You'll be good, won't you, and stay out of sight?"

"Jeek," said Mewhu. "Jeek mereedy."

"He says you're the boss."

Jack laughed, climbing out. "He does, eh?" Did the child really know or was it mostly a game? "Be good, then. See you soon." Carrying the jet rod, he walked into the building.

Zinsser, as usual, was busy. The field was not large, but did a great deal of private-plane business, and as traffic manager, Zinsser had his hands full. He wrapped one of his pudgy, flexible hands around the phone he was using. "Hi, Garry! What's new out of this world?" he grated cheerfully. "Siddown. With you in a min-

ute." He bumbled cheerfully into the telephone, grinning at Jack as he talked. Jack made himself as comfortable as patience permitted and waited until Zinsser hung up.

"Well now," said Zinsser, and the phone rang again.

Jack closed his open mouth in annoyance. Zinsser hung up and another bell rang. He picked up a field telephone from its hook on the side of his desk. "Zinsser. "Yes—"

"Now that's enough," said Jack to himself. He rose, went to the door, closed it softly so that he was alone with the manager. He took the jet rod, and to Zinsser's vast astonishment, stood up on his desk, raised the rod high over his head, and stepped off. A hurricane screamed out of the jets. Jack, hanging by his hands from the rod as it lowered him gently through the air, looked over his shoulder. Zinsser's face looked like a red moon in a snow flurry, surrounded as it was by every interoffice memo for the past two weeks.

Anyway, the first thing he did when he could draw a breath was to hang up the phone.

"Thought that would do it," said Jack, grinning.

"You . . . you . . . what *is* that thing?"

"It's a dialectical polarizer," said Jack, alighting. "That is, it makes conversations possible with airport managers who won't get off the phone."

Zinsser was out of his chair and around the desk, remarkably light on his feet for a man his size. "Let me see that."

Jack handed it over.

"Look, Mewhu! Here comes a plane!"

Together they watched the Cub slide in for a landing, and squeaked at the little puffs of dust that were thrown up by the tires and flicked away by the slipstream.

"And there goes another one. It's gonna take off!" The little blue low-wing coupé taxied across the field, braked one wheel, swung in its own length and roared down toward them, lifting to howl away into the sky far over their heads.

"Eeeeeyow," droned Molly, imitating the sound of the motor as it passed overhead.

"S-s-s-s-sweeeeee!" hissed Mewhu, exactly duplicating the whine of control surfaces in the prop blast.

Molly clapped her hands and shrieked with delight. Another plane began to circle the field. They watched it avidly.

"Come on out and have a look at him," said Jack.

Zinsser looked at his watch. "I can't. All kidding aside, I got to stick by the phone for another half hour at the very least. Will he be all right out there? There's hardly anyone around."

"I think so. Molly's with him, and as I told you, they get along beautifully together. That's one of the things I want to have investigated—that telepathy angle."

He laughed suddenly. "That Molly . . . know what she did this afternoon?" He told Zinsser about Molly's driving the car through the wrong end of the garage.

"The little hellion," chuckled Zinsser. "They'll all do it, bless 'em. At some time or other in his life, I think every kid climbs aboard something he doesn't know anything about and runs it wrong. My brother's kid went to work on the front lawn with his mother's vacuum cleaner the other day." He laughed. "To get back to what's-his-name—Mewhu, and this gadget of his. Jack, we've got to hang on to it. Do you realize that he and his clothes and this thing are the only clues we have as to what he is and where he came from?"

"I sure do. But listen—he's very intelligent. I'm sure he'll be able to tell us plenty."

"You can bet he's intelligent," said Zinsser. "He's probably above average on his planet. They wouldn't send just anyone on a trip like that. Jack, what a pity we don't have his ship!"

"Maybe it'll be back. What's your guess as to where he comes from?"

"Mars, maybe."

"Now, you know better than that. We know Mars has an atmosphere, but it's mighty tenuous. An organism the size of Mewhu would have to have enormous lungs to keep him going. No; Mewhu's used to an atmosphere pretty much like ours."

"That would rule Venus out."

"He wears clothes quite comfortably here. His planet must have not only pretty much the same atmosphere, but the same climate. He seems to be able to take most of our foods, though he is revolted by some of them—and aspirin sends him high as a kite. He gets what looks like a laughing drunk on when he takes it."

"You don't say. Let's see; it wouldn't be Jupiter, because he isn't built to take a gravity like that. And the outer planets are too cold,

and Mercury is too hot." Zinsser leaned back in his chair and absently mopped his bald head. "Jack, this guy doesn't even come from this solar system!"

"Gosh. I guess you're right. Harry, what do you make of this jet gadget?"

"From the way you say it cuts wood . . . can I see that, by the way?" Zinsser asked.

"Sure." Garry went to work on the jet. He found the right studs to press simultaneously. The casing opened smoothly. He lifted out the active core of the device, and, handling it gingerly, sliced a small corner off Zinsser's desk top.

"That is the strangest thing I have ever seen," said Zinsser. "May I see it?"

He took it and turned it over in his hands. "There doesn't seem to be any fuel for it," he said, musingly.

"I think it uses air," said Jack.

"But what pushes the air?"

"Air," said Jack. "No—I'm not kidding. I think that in some way it disintegrates part of the air, and uses the energy released to activate a small jet. If you had a shell around this jet, with an intake at one end and a blast tube at the other, it would operate like a high-vacuum pump, dragging more air through."

"Or like an athodyd," said Zinsser. Garry's blood went cold as the manager sighted down into the jet orifice. "For heaven's sake don't push that button."

"I won't. Say—you're right. The tube's concentric. Now, how on earth could a disruption unit be as small and light as that?"

Jack Garry said, "I've been chewing on that all day. I have one answer. Can you take something that sounds really fantastic, so long as it's logical?"

"You know me," grinned Zinsser, waving at a long shelf of back number science-fiction magazines. "Go ahead."

"Well," said Jack carefully. "You know what binding energy is. The stuff that holds the nucleus of an atom together. If I understand my smattering of nuclear theory properly, it seems possible to me that a sphere of binding energy could be produced that would be stable."

"A sphere? With what inside it?"

"Binding energy—or maybe just nothing . . . space. Anyhow, if you surround that sphere with another, this one a force-field which is capable of penetrating the inner one, or of allowing matter to penetrate it, it seems to me that anything entering that balance of forces would be disrupted. An explosive pressure would be bottled up inside the inner sphere. Now if you bring your penetrating field in contact with the binding-energy sphere, the pressures inside will come blasting out. Incase the whole rig in a device which controls the amount of matter going in one side of the sphere and the amount of orifice allowed for the escape of energy, and incase that further in an outside shell which will give you a stream of air induced violently

through it—like the vacuum pump you mentioned—and you have this," and he rapped on the little jet motor.

"Most ingenious," said Zinsser, wagging his head. "Even if you're wrong, it's an ingenious theory. What you're saying, you know, is that all we have to do to duplicate this device is to discover the nature of binding energy and then find a way to make it stay stably in spherical form. After which we figure out the nature of a field which can penetrate binding energy and allow any matter to do likewise—one way." He spread his hands. "That's all. Just learn to actually use the stuff that the long-hair boys haven't thought of theorizing about yet, and we're all set."

"Shucks," said Garry, "Mewhu will give us all the dope."

"I hope so, Jack, this can revolutionize the entire industrial world!"

"You're understating," grinned Jack.

The phone rang. Zinsser looked at his watch again. "There's my call." He sat down, answered the phone, and while he went on at great length to some high-powered character at the other end of the line, about bills of lading and charter service and interstate commerce restrictions, Jack lounged against the cut-off corner of the desk and dreamed. Mewhu—a superior member of a superior race, come to earth to lead struggling humanity out of its struggling, wasteful ways. He wondered what Mewhu was like at home among his strange people. Young, but very mature, he decided, and gifted in many ways—the pick of the crop, fit to be ambassador to a new and dynamic civilization like Earth's. And what about the ship? Having dropped Mewhu, had it and its pilot returned to the mysterious corner of the universe from which they had come? Or was it circling about somewhere in space, anxiously awaiting word from the adventurous ambassador?

Zinsser cradled his instrument and stood up with a sigh. "A credit to my will power," he said. "The greatest thing that has ever happened to me, and I stuck by the day's work in spite of it. I feel like a kid on Christmas Eve. Let's go have a look at him."

"Wheeeeyouwow!" screamed Mewhu as another rising plane passed over their heads. Molly bounced joyfully up and down on the cushions, for Mewhu was an excellent mimic.

The silver man slipped over the back of the driver's seat in a lithe movement, to see a little better around the corner of a nearby hangar. One of the Cubs had been wheeled into it, and was standing not far away, its prop ticking over.

Molly leaned her elbows on the edge of the seat and stretched her little neck so she could see, too. Mewhu brushed against her head and her hat fell off. He bent to pick it up and bumped his own head on the dashboard, and the glove compartment flew open. His strange pupils narrowed, and the nictitating membranes flickered over his eyes as he reached inside. The

next thing Molly knew, he was out of the car and running over the parking area, leaping high in the air, mouthing strange noises, and stopping every few jumps to roll and beat with his good hand on the ground.

Horrified, Molly Garry left the car and ran after him. "Mewhu!" she cried. "Mewhu, come *back!*"

He cavorted toward her, his arms outspread. "W-r-r-row-w!" he shouted, rushing past her. Lowering one arm a little and raising the other like an airplane banking, he ran in a wide arc, leaped the little tarmac retaining wall and bounded out onto the hangar area.

Molly, panting and sobbing, stopped and stamped her foot. "Mewhu!" she croaked helplessly. "Daddy said—"

Two mechanics standing near the idling Cub looked around at a sound like a civet-cat imitating an Onondaga war whoop. What they saw was a long-legged, silver-gray apparition with a silver-white mustache, and slotted eyes, dressed in a scarlet robe that turned to indigo. Without a sound, moving as one man, they cut and ran. And Mewhu with one last terrible shriek of joy, leaped to the plane and disappeared inside.

Molly put her hands to her mouth and her eyes bugged. "Oh, Mewhu," she breathed. "Now you've done it." She heard pounding feet, turned. Her father was racing toward her, with Mr. Zinsser waddling behind. "Molly! Where's Mewhu?"

Wordlessly, she pointed at the Cub; and as if it were a signal, the little ship throttled up and began to crawl away from the hangars.

"Hey! Wait! Wait!" screamed Jack Garry uselessly, sprinting after the plane. He leaped the wall but misjudged it because of his speed. His toe hooked it and he sprawled slitheringly, jarringly on the tarmac. Zinsser and Molly ran to him, helped him up. Jack's nose was bleeding. He whipped out a handkerchief, looked out at the dwindling plane. "Mewhu!"

The little plane waddled across the field, bellowed suddenly with power. The tail came up, and it scooted away from them—cross wind, cross the runway. Jack turned to speak to Zinsser and saw the fat man's face absolutely stricken. He followed Zinsser's eyes and saw the other plane, the big six-place cabin job, coming in.

He had never felt so helpless in all his life. Those planes were going to collide. There was nothing anyone could do about it. He watched them, unblinking, almost detachedly. They were hurtling but they seemed to creep; the moment lasted forever. Then, with twenty feet altitude, Mewhu cut his gun and dropped a wing. The Cub slowed, leaned into the wind, and *side-slipped* so close under the cabin ship that another coat of paint on either craft would have meant disaster.

Jack didn't know how long he had been holding that breath, but it was agony when he let it out.

"Anyway, he can fly," breathed Zinsser.

"Of course he can fly," snapped Jack. "A prehistoric thing like an airplane would be child's play for him. Child's play."

"Oh, Daddy, I'm scared."

"I'm not," said Jack hollowly.

"Me, too," said Zinsser with an unconvincing laugh. "The plane's insured."

The Cub arrowed upward. At a hundred feet it went into a skidding turn, harrowing to watch, suddenly winged over and came shouting down at them. Mewhu buzzed them so close that Zinsser went flat on his face. Jack and Molly simply stood there, wall-eyed. An enormous cloud of dust obscured every thing for ninety interminable seconds. When they next saw the plane it was wobbling crazily at a hundred and fifty.

Suddenly Molly screamed piercingly and put her hands over her face.

"Molly! Kiddo, what is it?"

She flung her arms around his neck and sobbed so violently that he knew it was hurting her throat. "Stop it!" he yelled; and then, very gently, he asked, "What's the matter, darling?"

"He's scared. Mewhu's terrible, terrible scared," she said brokenly.

Jack looked up at the plane. It yawed, fell away on one wing.

Zinsser shouted, his voice cracking, "Gun her! Gun her! Throttle up, you idiot!"

Mewhu cut the gun.

Dead stick, the plane winged over and plunged to the ground. The impact was crushing.

Molly said, quite calmly, "All Mewhu's pictures have gone out now," and slumped unconscious to the ground.

They got him to the hospital. It was messy—all of it; picking him up, carrying him to the ambulance—

Jack wished fervently that Molly had not seen; but she had sat up and cried as they carried him past. He thought worriedly as he and Zinsser crossed and recrossed in their pacing of the waiting room, that he would have his hands full with the child when this thing was all over.

The resident physician came in, wiping his hands. He was a small man with a nose like a walnut meat. "Who brought that plane-crash case in here—you?"

"Both of us," said Zinsser.

"What . . . who is he?"

"A friend of mine. Is he . . . will he live?"

"How should I know?" snapped the doctor impatiently. "I have never in my experience—" He exhaled through his nostrils. "The man has two circulatory systems. Two *closed* circulatory systems, and a heart for each. All his arterial blood looks veinous—it's purple. How'd he happen to get hurt?"

"He ate half a box of aspirin out of my car," said Jack. "Aspirin makes him drunk. He swiped a plane and piled it up."

"Aspirin makes him—" The doctor looked at each of them in turn. "I won't ask if you're kidding me. Just to see that . . . that thing in there is enough to kid any

doctor. How long has that splint been on his arm?"

Zinsser looked at Jack and Jack said "About eighteen hours."

"Eighteen *hours?*" The doctor shook his head. "It's so well knitted that I'd say eighteen days." Before Jack could say anything he added. "He needs a transfusion."

"But you can't! I mean . . . his blood—"

"I know. Took a sample to type it. I have two technicians trying to blend chemicals into plasma so we can approximate it. Both of 'em called me a liar. But he's got to have the transfusion. I'll let you know." He strode out of the room.

"There goes one bewildered medico."

"He's O.K.," said Zinsser. "I know him well. Can you blame him?"

"For feeling that way? Gosh no. Harry, I don't know what I'll do if Mewhu checks out."

"That fond of him?"

"Oh, it isn't only that. But to come so close to meeting a new culture, and then have it slip from our fingers like this—it's too much."

"That jet . . . Jack, without Mewhu to explain it, I don't think any scientist will be able to build another. It would be like . . . like giving a Damascus sword-smith some tungsten and asking him to draw it into filaments. There the jet would be, hissing when you shove it toward the ground, sneering at you."

"And that telepathy—what J. B. Rhine wouldn't give to be able to study it!"

"Yeah, and what about his origin?" Zinsser asked excitedly. "He isn't from this system. It means that he used an interstellar drive of some kind, or even that space-time warp the boys write about."

"He's got to live," said Jack. "He's got to, or there ain't no justice. There are too many things we've got to know, Harry! Look—he's here. That must mean that some more of his people will come some day."

"Yeah. Why haven't they come before now?"

"Maybe they have. Charles Forte—"

"Aw, look," said Zinsser, "don't let's get this thing out of hand."

The doctor came back. "I think he'll make it."

"Really?"

"Not really. Nothing real about that character. But from all indications, he'll be O.K. Responded very strongly. What does he eat?"

"Pretty much the same as we do, I think."

"You think. You don't seem to know much about him."

"I don't. He only just got here. No—don't ask me where from," said Jack. "You'll have to ask him."

The doctor scratched his head. "He's out of this world. I can tell you that. Obviously adult, but every fracture but one is a green-stick break; kind of thing you see on a three-year old. Transparent membranes over his . . . what are you laughing at?" he asked suddenly.

Jack had started easily, with a chuckle, but it got out of control. He roared.

Zinsser said, "Jack! Cut it out. This is a hosp—"

Jack shoved his hand away. "I . . . I got to," he said helplessly and went off on another peal.

"You've got to what?"

"Laugh," said Jack, gasping. He sobered—he more than sobered. "It has to be funny, Harry. I won't let it be anything else."

"What the devil do you—"

"Look, Harry. We assumed a lot about Mewhu, his culture, his technology, his origin . . . we'll never know anything about it!"

"Why? You mean he won't tell us—"

"He won't tell us. I'm wrong. He'll tell us plenty. But it won't do any good. Here's what I mean. Because he's our size, because he obviously arrived in a spaceship, because he brought a gadget or two that's obviously the product of a highly advanced civilization, we believe that *he* produced the civilization; that he's a superior individual in his own place."

"Well, he must be."

"He must be? Harry, did Molly invent the automobile?"

"No, but—"

"But she drove one through the back of the garage."

Light began to dawn on Zinsser's moon face. "You mean—"

"It all fits! Remember when Mewhu figured out how to carry that heavy trapdoor of mine on the jet stick, and then left the problem half-finished? Remember his fascination with Molly's yo-yo? What about that peculiar rapport he has with Molly that he has with no one else? Doesn't that begin to look reasonable? Look at Iris' reaction to him—almost maternal, though she didn't know why."

"The poor little fellow," breathed Zinsser. "I wonder if he thought he was home when he landed?"

"Poor little fellow—sure," said Jack, and began to laugh again. "Can Molly tell you how an internal combustion engine works? Can she explain laminar flow on an airfoil?" He shook his head. "You wait and see. Mewhu will be able to tell us the equivalent of Molly's 'I rode in the car with Daddy and we went sixty miles an hour.'"

"But how did he get here?"

"How did Molly get through the back of my garage?"

The doctor shrugged his shoulders helplessly. "About that I don't know. But his biological reactions do look like those of a child—and if he is a child, then his rate of tissue restoration will be high, and I'll guarantee he'll live."

Zinsser groaned. "Much good will it do us—and him, poor kid. With a kid's inherent faith in any intelligent adult anywhere, he's probably been feeling happily sure we'd get him home somehow. Well—we haven't got what it takes, and won't have for a long, long time. We don't know enough to start duplicating that jet of his—and that was just a little kid's toy on his world."

THE END.

THE UNFORESEEN

BY MARK CHAMPION

***A prison** break is successful only when it employs some factor which neither foresight nor past experience has called to the attention of the guards. The key to freedom is—the unforeseen.*

Randall squirmed clear of the aperture of the servicing cubicle, lunged free, shoved his hanging body out with his left hand. He hung a moment like a fly on the face of that immense wall of the

Block, the fingers of his right hand hooked. Then he opened them, dropped.

It was sixty feet from the air intake of the hospital to the roof of the wareshed below. But in the light gravity Randall took the shock without spilling.

He came up instantly from his flexed knees. The pale sheen of Phobus, climbing fast to top the penal institution's high towers, limned him starkly. He felt exposed and moved, swiftly as a hunting leopard, vaulting a low wall to the top of the Interward Ramp, sprinting along the Ramp toward the Exec Wing.

Over him glittered the myriad stars in the Martian sky, diamond hard and burning.

There was no sound in this world of cold thin air, crystallized in its ages-old deathlike immobility, except the slap of his sandaled feet, and the low, sullen hum of the Block.

Phobus climbed.

On the lips of the nocturnal prowler there traced a tight, hard smile. So far, his elemental strategy had worked against the complex rationalized technologic system that made the Block revolt-proof and escape-proof.

The sirens were still silent.

Once the sirens let go, an involved mechanical reflex, the Actualities Arc, housed in the Exec Wing, would be fed data by the so-called Periscope, an aggregate of scanner and robot-eye relay videos. The Arc would immediately produce the spot reaction which nipped prison breaks in the attempt.

If the radrifle towers, in activation, did not get the prisoner on the walls, the quarry shells outside would.

The shells had noses like bloodhounds. They hunted by radar and killed by bolt. Convicts spoke of them with a helpless and weary hate.

Randall reached the first of the radrifle towers.

Flattened against the curved stelene, he let his gaze range. The Valley of the Titans, southward, ran like a steep walled river of pale ochre sand, stippled here and there with spatulated *chorl* shrub, the ubiquitous growth of wasteland Mars.

Gigantic figures, rough hewn out of the tufa cliffs that made the walls of the valley, flanked the pale lit sand and dim in the moonlight were visible broken shards of the Canaler civilization whose builders had been dead for a thousand centuries.

If the ghosts of the Canalers moved here, the wraiths were pale. The Block dominated the Valley. Out over the sere cold deserts to the south, lonely plains split by an immense maw, the Rift, crimson streaks marked the jets of a passing transport inbound from the Syrtis minelands to New Midland.

This was Terran domain. Midleague domain.

Randall, waiting, flicked his gaze up to one star in the panoply of the

constellations overhead. The home world of his breed. He was Texan by birth, and a citizen of Marsport on the equator, in the Trustland of the American Region. Sympathy had joined him to the Brotherhood of Space, an underground organization fighting the policies of the Midleague in every city established by the World Union. A dragnet of the dread Midleague Bureaucracy had seized him a year before.

It seemed a century. For an instant cold bitterness showed and passed in Alan Randall's eyes, as he shifted his wide shoulders, feeling the twinge in his sinews, the residues of many stun-gun lashings. It was war between him and the Bureaucracy, war without quarter. If he could make this break, much more than his own life depended on the feat.

"Well, here goes."

The words came from Randall in a swift, low whisper. All his muscles pulled together for the ordeal. His gaze focused on a swift scudding blob of shadow that suddenly detached itself from the gloom east of the Block, and flitted over lawns and walls toward the moat and the Exec Wing.

It was the inner grounds Ro-Eye.

The Ro-Eye itself was traveling as silently as its moon-cast shadow, some eighty feet over the Interward Ramp. It was a microjetted cylinder with an infrared projector and a cluster of photocells in its nose. As it swept around and around the Block, it relayed the shifting view to the Periscope and its infrared eyes probed into the deepest gloom, missing nothing.

Randall slid around the radrifle tower, intently watching that flitting shadow but careful to keep the opaque steel of the tower between him and the robot watchdog.

When the Ro-Eye's shadow was close to the moat, he jumped for it.

Randall put everything he had into that fateful rush. Teeth gritted, eyes glazed, he covered twenty, thirty, forty feet at a bound.

There were only split instants of leeway.

At this angle of his progress three of the radrifle towers were echeloned toward the east. The Ro-Eye, scudding past, did not register that tigerishly leaping figure.

There was no alarm.

Coming down from his last straightaway spring, across the moat, Randall threw himself forward and over the Ramp Wall into the grounds of the Exec Wing.

He landed squarely on a man's shoulders.

Through the thin cold air sounded a muffled, surprised curse.

It was a stark choice. Defeat and death for Randall. Or a quick kill.

The shock of the fall had spilled both men. Randall, rolling over, came up first. He made out in the moonlight, the uniform of a Block guard. His hands shot out, seized

the tufts on the guard's parkalike helmet, wrenched.

The short scream died.

The sirens snarled and wailed into full cry. That high fierce keening cut the unearthly silence, filled the Valley.

Inside his ornate quarters, done in damaskine and plastex, in the Exec Wing, Goaler Lodner woke, cursing peevishly.

The fools would never learn.

Three attempted breaks in a week. Death to the idiots venturing against mathematical certainty. Irritation for Lodner and the chief guard, even though the Arc always took care of the situations, expeditiously, in a matter of moments.

Lodner knew the "Emergency Met" signal would sound long before he got down to the Periscope. Bureaucracy regulations, however, had it that he had to sign off every incident himself in a spot report to the video center in New Midland.

Growling something highly uncomplimentary about the arrogance of the big shots in the capital, Lodner got out of bed. He silenced his wife's questions with a peevish snap. By the time he had donned his tunic his irritation was growing and when he stepped out into the circular hall that curved down toward the Tech and Transit floor he was definitely in one of his ugly moods.

What fool was responsible for the sirens shorting?

It was plainly a mechanical failure, for the Arc would have disposed of a genuine eventuality by now. Still the sirens wailed and wailed.

Fluro light lay in a pale-orange wash over the little foyer between Transit and the Periscope. A burly individual detached himself from a knot of arguing uniformed men to salute Lodner.

"I'm sure, sir," said Chief Guard Horovic, "the Corrective, or the General Action of the Arc, will have the situation under control in a few minutes."

"What are you talking about?" snapped Lodner. Little spots of red showed on his cheekbones.

"The prisoner, sir. Y424. Block ward 8. Alan Randall."

"Well?"

"He made a break and killed a guard. What's more"—Horovic touched dry lips with his tongue —"the first scanners didn't register him. He passed the A1 Ro-Eye circuit—"

"He *passed* the circuit—?" For a moment it seemed Lodner would explode. Then his will gripped his hyper-irascible temper.

Horovic was a heavy jowled man with blank fish eyes. Lodner shoved him unceremoniously aside and strode out of the foyer to the Periscope, kicking the door open. That persistent wailing of the sirens was an infuriating and humiliating thing. Perhaps that pig of a prisoner, that—who was it—Y424, was laughing at him.

"You!" barked Lodner, standing in the doorway. "What are you gaping at?"

He was looking into a long, severely utilitarian room, lit only by flickering glows reflecting from the grouped scanner videos and the moving center strip of the Ro-Eye relay.

Standing back a few feet from the disks and frames and the fluxing panels was a lean man in Tech overalls, a knob micro adjuster in his hand. He was curiously rigid. His eyes were wide with a peculiar excitation.

Lodner clawed at his belt, failed to find his disciplinary stun gun, turned to Horovic, who was entering behind him, and yanked the cruel stub nosed electronic clubber from the chief guard's waist clip.

The Tech man said. "Sir. I've done nothing."

Lodner threw the gun on him. The Tech man tried to dodge. But the bolts sledged the quick turning shoulder and head. The Tech man was slapped over. He lay huddled on the floor.

Lodner tossed the stun gun on a flange between the stills and the fluxing panels. "I'll teach you to stand and gawk at me, you swine," said Lodner coldly and turned his attention to the disks.

Five minutes later the sadistic gaoler was sweating. A thread of unease and surprise, of fear, ran through his rage.

The fleeing man was dwarfed by the gigantic figures carved in tufa, looming over the Valley.

A dark mote in the pale Phobus sheen, the man ran tirelessly south, to grow dim in a tracery of shadow cast by the ruins of the ancient Canaler city that walled the Valley floor.

"The shells—where are the quarry shells?" raged Lodner, his hands gripping the video frame, his gaze focused on that incredible scene relayed into the disk of G3 Ro-Eye. G3. It was five miles from the Block.

"He's got a trick bolter. He must have had a trick bolter!" muttered Horovic, over and over.

"Shut up!" snapped Lodner in his heedless and characteristic rage. He spun around. "You, there—Micail—get me a re-view. I want the scanner stills around the Ramp and the AI Ro-Eye at 1435 to 1440."

Micail, the lean Tech man, had picked himself up from the floor. "Yes, sir," he said very quickly. His eyes were absolutely blank.

There was a continuous scurrying of feet in the foyer outside as guards boiled toward Transit. For the first time in the Block's history aside from its routine drills, the telautographs were clicking in every department. Iron shutters were sealing off all the Block wards. Mobile guard cycles were roaring in the main yard. The robots that made escape from the Block impossible had—failed.

"How? *How?*" raged Lodner.

"There's the blanking!" Horovic was excited. His heavy jaw hung loose. He pointed at the re-views. "There! AI went *out!* At 1437!"

"Why don't the scanner stills show him bolting the Ro-Eye?"

Horovic shrugged. "That I don't know."

Lodner's thin lips were like a gash in his face. "Yes, and you don't know of any bolt that can blank a Ro-Eye. Nor does the Midleague Foundation or even the Terran Institute."

"He must have had it," muttered Horovic.

Lodner yelled orders. A small balding man came from the foyer. It was Eston, chief Tech man.

"What kind of a gun will blank a Ro-Eye, Eston?" asked Lodner sardonically.

"No kind, sir, as you know."

"I know no more than you blasted sniveling scientific swine tell me!" roared Lodner. He pointed. "Look at this!"

The disks were gray.

A captain of cycle guards came in and departed hastily at Lodner's snarled: "Start? Of course you're to start? Hunt the vermin down!"

Beads of sweat were gathering on the gaoler's forehead. The Bureaucracy would make an inquiry. The Bureaucracy always made inquiries. And it didn't matter where the blame really lay. For an official, a summons to New Midland meant—oblivion.

Horovic was saying: "He gained the outside without technical aids. He was hospitalized. He took a running jump hitting a cot mattress for catapult and leaped clear to the air vent. No ordinary man could have done it. And no ordinary man could so have dislocated his own shoulder by muscular action as to trick the medics into hospitalizing him."

"Muscular action?" Lodner's face contorted. "Get me this man's dossier!"

Waiting, he went back to the videos.

G4 was relaying.

The scene was the southern opening of the Valley. A spreading plain of red sand, the last looming shadows of the tufa Titans, and a vague figure, itself a shadow among the shadows, that ran toward the open desert and the stupendous gorge of the Rift.

Lodner, watching, suddenly blew his breath out in one harsh, triumphant word.

Scudding down valley, rapidly overtaking its prey, its metal casing glinting in the moonglow, was a quarry shell.

The man fought a losing running fight against inevitable doom.

H2 was relaying.

It was far to the south and west of the Valley of the Titans. The Ro-Eye, cruising the open desert on the north side of the Rift, showed the fugitive, still running, hounded by several shells.

Twice the hunted man turned. Twice he threw up his right arm. From a knobbing in his right hand there winked a bright small eye of intense blue.

One of the shells dipped and crashed. It scored the desert, raising a thin plume of dust in the moonlight.

"I told you he had a trick

bolter," said Horovic, astonishment thick in his voice.

Lodner was cursing monotonously. The New Midland signal was on the tele. The Bureaucracy was already impatient about this unusual and protracted confusion, relayed by the Arc in facsimile.

"A new bolt!" raged Lodner. It should be such a sensation that the Bureaucracy might not concentrate on the slipup which had allowed a gun to be smuggled into the Block.

"Even with that, *how* can he hit a shell on the wing?" muttered Horovic. Lodner had ceased trying to think it out. He wiped sweat from his brow. That fugitive figure, dim in the distance, was his nemesis.

The Brotherhood of Space would propagandize this break. The story would spread, through New Midland, to Marsport and the mining towns, of how one man had thrown the entire Block into confusion—how a man had made his way through ring after ring of Arc action, to the open desert. Even in dying that man was striking a heavy blow at the Bureaucracy.

Lodner fumed, his eyes glued to the screens.

The amazing fugitive brought down two more shells. H2 was now registering very faintly. The disk was dim. But Lodner could make out the details of the deadly little drama. A shell arced wide, came in from the west—and scored with its lance beam.

Smoke puffed from the fugitive's body. He staggered along the rim of the monster canyon, tried to turn. He stumbled. And went over the edge.

Lodner's stiffened frame relaxed. Breath blew through his distended nostrils. "Done!" he said. "It's *done!*"

With a great effort, then, he controlled himself, barked orders. Horovic departed. Lodner said. "Micail, co-ordinate me with Central. An Arc signoff."

Micail moved efficiently, his eyes curiously lidded.

The signoff was ready. Lodner ruffled the dossier on Alan Randall and spoke into the tele.

"The attempted escape of Convict Y424, Alan Randall, had some unusual features. The Arc was circumvented, first of all, by this convict's unusual physical capacities, as displayed in a dislocation of his own arm and a spectacular leap, a fantastic, unobserved feat which enabled him to gain the outside without scanner detection. Our records show that this same Randall is an American Regional by birth and the winner of the Interplanetary Meet in 947 in Marsport. He became active in the Brotherhood of Space shortly thereafter and was caught in a New Midland stakeout in 49. He was in the Block for two hundred twenty-seven transits of Deimos."

Lodner's voice hoarsened.

"Alarm went off at 1445, due to a filament break at base of the Ramp. An Exec Wing guard was found there, his neck broken.

"Randall was . . . in some

way"— Lodner sweated—"in possession of a secret or new needle beam gun. With it he must have stunned the Exec guard, toppling him from the Ramp. With it he blanked, in succession, at least nine Ro-Eyes, for the Arc was first activated visually by G3, beyond the outer grounds. G3's reaction consists of eight quarry shells. For some as yet unascertained reason, these shells failed to hunt him down in mid-Valley."

Lodner wet his dry lips. He knew now that he was reading his own sentence of demotion and exile and possibly worse.

"Randall was finally disposed of by Ro-Eye H2's reaction well beyond the Valley. His body will be found in the Rift."

Lodner spoke defiantly. "I recommend a thorough investigation of Penology Liaison, which is responsible for the Block not being advised of this revolutionary weapon developed by the Brotherhood, a handgun beam capable of piercing an Imperm field.

"Signed—Lodner, Gaoler."

He slid his gaze to the tele. The "Check" did not come. He had not really expected it. The hard bright words traced on the band. "Gaoler Lodner will report to Bureaucracy Center. In person. At once."

Lodner turned, cursing the man who had died far from the Valley. His rage had to find vent. As he spun on his heel he saw the Tech man, Micail, watching him and could have sworn he saw a mocking glint in Micail's eyes. Lodner's spleen erupted. He lunged for the stun gun on the flange beside him. Again he threw the gun on Micail, advancing the charge high, clubbing the technician savagely.

Micail went down but this time he did not writhe. As Lodner strode over him and out the Tech man's eyes still held their look of mockery.

Randall waited.

The interior of Transit was white lit. The skytrucks in the main hangar, the personnel ferries, the little turbojet flier warming up on the Exec apron all were clear in the cold cathode glow. But up near the ceiling there was shadow. Randall was barely discernible. straddling the big coaxal cable that came from the Periscope and led to the powerhouse.

There was no one on the apron after Micail left. Servicers talked in the main hangar hidden from Randall's view. The flier's jets hummed softly. Lodner came to the door of Transit, pulling on his gauntlets, signaling Micail who was over by the switchboard.

The excitement in the Block had died. Only one guard was at Transit's outer lift door. At Lodner's signal Micail tripped the switch which threw in a compensating circuit in the nose of every Ro-Eye, allowing the passage of the flier which would be registered on the videos but with the quarry reaction cut out.

Lodner reached the little ship. circled it.

Randall swung down. He hit the floor hidden from the guard and reached the flier in two long swift leaps.

Some instinct warned Lodner. He lunged around. Randall hit him in a solid plunge, jamming both their bodies hard against the flier's stub wing.

Lodner's hand clawed for his stun gun. The move was frenzied. But it was comparatively slow. For the weapon was already out of its clip. Randall's fist gripped the stock. The muzzle jammed hard into the gaoler's stomach.

Close up they were, straining. Complete incredulity was in Lodner's eyes. "Y424," he whispered. *"Randall!"* And he thought he screamed.

His mouth opened for the yell. Randall hit him with the stun bolt at full force. The sledge stroke caught Lodner in the solar plexus. His jaw gaped. His eyes glazed. He was limp in Randall's grip.

Randall slid the little cockpit of the flier open and unceremoniously jammed Lodner inside. As he worked his own body in he saw that the guard had stepped a little way from the door and was looking toward the flier. Randall shoved Lodner past the control. He let the gaoler's profile show at the cockpit window, briefly.

A moment later the flier's keybeam hit the selenium plate over Transit's door, lifting it. The jets coughed softly. The flier kicked itself away from the apron. Its stub wings took hold of cold air.

Randall waved down to a motionless Micail. The Tech man nodded almost imperceptibly.

The apron lip, the round roof of the Periscope, the Exec buildings were dropping away. The monoliths of the Block retreated. The grounds seemed to revolve, tilt. Little glints showed the reflections of the Phobus sheen on the ceaselessly cruising Ro-Eyes.

Lodner groaned.

Randall's face was devoid of emotion. He watched the Valley slide backward, like a flowing river of ochre sand, over which brooded the great figures hewn in tufa and the remnants of the Canaler city.

The Rift crossed the flat desert to the south. Phobus was at zenith, moving eastward almost visibly among the constellations. A wild chaos of rock, in that eastern distance, rimmed the deserts, separating the wastelands from the Cyrtis mineheads and the Midleague's capital.

In a crotch of those far hills, Deimos was rising.

Lodner's left hand made a small scraping sound, fumbling for the panel trip.

The gaoler was trying to squeeze away from Randall. The stream of his incoherent mutterings finally made sense.

"—in the devil are you? A necromancer? I saw you hit. I saw you fall. Besides, how could you get *back?*"

"I was never there."

Lodner gagged.

"G3 picked you up in mid-

Valley. All the down Valley Ro-Eyes—"

"It was staged."

"Staged?"

"The Brotherhood filmed it. Fortunately for us there are many Canaler ruins and rows of their great idols located in sheer walled valleys that debouch on the Equatorial Rift. The location was similar—the scenes were shot when Phobus was in transit—drone shells were used—"

Lodner whispered insanely. "You mean—the *Periscope* was fixed!"

"Exactly." A hard contempt was in Randall's eyes. "How else? How could the Brotherhood with its limited resources, develop a bolt which could blank Imperm fields, a feat the Union's Space Navy hasn't achieved? That which was smuggled in to me wasn't a gun. It was a microreel the size of a thimble, its first sequences blank to give the impression I had shot out the Ro-Eyes. It was syonchronized to give the first view on the G3 panel, well down where the Block was no longer visible—"

His words cut off. Lodner made a maniacal lunge. Randall fended the gaoler off with one thrust of a hard-muscled shoulder.

Below, the Rift yawned.

"I've got the reel with me now," said Randall coldly. "I slipped it out after you slugged Micail and left. A primitive strategy, wasn't it, to set up against the Arc? But it was your own howling primitiveness, Lodner, which assured its success."

"How?"

"Micail caught me just after I had reached the Periscope. I was unarmed. He just looked at me and motioned me up toward the coaxal cable conduits. No, he wasn't our man. There's the cream of the jest. I understood why he acted that way, later. What you overlooked, Lodner, were the elemental things. Among them, the kickback from your own pretty habit of bolt whipping your subordinates—"

Something was snapping in Lodner's mind. He lunged for Randall again. Shoved off once more by a contemptuous strength he could

not match, he swung around, clawed the fuselage door open. He would score the only triumph he could over this man who had destroyed him. He threw himself out.

Randall banked the flier, circling down briefly after the falling body. The Rift yawned nearer. Lodner plummeted into gloom.

Randall climbed back toward the glittering constellations.

The Bureaucracy had been embarrassed and more. Its police would find nothing amiss with the Periscope and it would take time to sift out the truth from the evidence of men who would swear they saw the Ro-Eyes blanked. The Brotherhood might even send a plane to drop a shell casing in the desert, to further confuse the grim ferrets of the Midleague.

They would even find a body in the Rift. As Lodner had advised.

A tight, hard and mocking smile touched Randall's lips. The war between the great Midleague, rebel to the ideals of the World Union, and the Brotherhood of Space, was still uneven. But the myth of Midleague invincibility was being broken and a counter tradition was in process of being created.

The stub wings of the little flier sang as it bulleted toward the southlands and Phobus, like a yellow, judging eye, began to slide down the arc of the eastern sky.

THE END.

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THE EDITOR.

HOBBIES

BY CLIFFORD D. SIMAK

The cities were deserted, save for one. The men and women of that city had hobbies—but no accomplishments. The robots they had left behind were doing better . . .

The rabbit ducked around a bush and the little black dog zipped after him, then dug in his heels and skidded. In the pathway stood a wolf, the rabbit's twitching, bloody body hanging from his jaws.

Ebenezer stood very still and panted, red rag of a tongue lolling out, a little faint and sick at the sight before him.

It had been such a nice rabbit!

Feet pattered on the trail behind him and Shadow whizzed around the bush, slid to a stop alongside Ebenezer.

The wolf flicked his glare from the dog to the pint-size robot, then back to the dog again. The yellow light of wildness slowly faded from his eyes.

"You shouldn't have done that, Wolf," said Ebenezer, softly. "The rabbit knew I wouldn't hurt him and it was all in fun. But he ran straight into you and you snapped him up."

"There's no use talking to him," Shadow hissed out of the corner of his mouth. "He doesn't know a word you're saying. Next thing you know, he'll be gulping you."

"Not with you around, he won't," said Ebenezer. "And, anyhow, he knows me. He remembers

last winter. He was one of the pack we fed."

The wolf paced forward slowly, step by cautious step, until less than two feet separated him from the little dog. Then, very slowly, very carefully, he laid the rabbit on the ground, nudged it forward with his nose.

Shadow made a tiny sound that was almost a gasp. "He's giving it to you!"

"I know," said Ebenezer calmly. "I told you he remembered. He's the one that had a frozen ear and Jenkins fixed it up."

The dog advanced a step, tail wagging, nose outstretched. The wolf stiffened momentarily, then lowered his ugly head and sniffed. For a second the two noses almost rubbed together, then the wolf stepped back.

"Let's get out of here," urged Shadow. "You high-tail it down the trail and I'll bring up the rear. If he tries anything—"

"He won't try anything," snapped Ebenezer. "He's a friend of ours. It's not his fault about the rabbit. He doesn't understand. It's the way he lives. To him a rabbit is just a piece of meat."

Even, he thought, *as it once was for us. As it was for us before the first dog came to sit with a man before a cave-mouth fire—and for a long time after that. Even now a rabbit sometimes—*

Moving slowly, almost apologetically, the wolf reached forward, gathered up the rabbit in his gaping jaws. His tail moved—not quite a wag, but almost.

"You see!" cried Ebenezer and the wolf was gone. His feet moved and there was a blur of gray fading through the trees—a shadow drifting in the forest.

"He took it back," fumed Shadow. "Why, the dirty—".

"But he gave it to me," said Ebenezer, triumphantly. "Only he was so hungry he couldn't make it stick. He did something a wolf has never done before. For a moment he was more than an animal."

"Indian giver," snapped Shadow.

Ebenezer shook his head. "He was ashamed when he took it back. You saw him wag his tail. That was explaining to me—explaining he was hungry and he needed it. Worse than I needed it."

The dog stared down the green aisles of the fairy forest, smelled the scent of decaying leaves, the heady perfume of hepaticas and bloodroot and spidery windflower, the quick, sharp odor of the new leaf, of the woods in early spring.

"Maybe some day—" he said.

"Yeah, I know," said Shadow. "Maybe some day the wolves will be civilized, too. And the rabbits and squirrels and all the other wild things. The way you dogs go mooning around—"

"It isn't mooning," Ebenezer told him. "Dreaming, maybe. Men used to dream. They used to sit around and think up things. That's how we happened. A man named Webster thought us up. He messed around with us. He fixed up our throats so we could talk. He

rigged up contact lenses so that we could read. He—"

"A lot of good it did men for all their dreaming," said Shadow, peevishly.

And that, thought Ebenezer, *is the solemn truth. Not many men left now. Just the mutants squatting in their towers and doing God knows what and the little colony of real men still living in Geneva. The others, long ago, had gone to Jupiter. Had gone to Jupiter and changed themselves into things that were not human.*

Slowly, tail drooping, Ebenezer swung around, clumped slowly up the path.

Too bad about the rabbit, he thought. *It had been such a nice rabbit. It had run so well. And it really wasn't scared. He had chased it lots of times and it knew he wouldn't catch it.*

But even at that, Ebenezer couldn't bring himself to blame the wolf. To a wolf a rabbit wasn't just something that was fun to chase. For the wolf had no herds for meat and milk, no fields of grain for meal to make dog biscuits.

"What I ought to do," grumbled the remorseless Shadow, treading at his heels, "is tell Jenkins that you ran out. You know that you should be listening."

Ebenezer did not answer, kept on trudging up the trail. For what Shadow said was true. Instead of rabbit-chasing, he should have been sitting up at Webster House listening—listening for the things that came to one—sounds and scents and *awareness* of something that was near. Like listening on one side of a wall to the things that were happening on the other, only they were faint and sometimes far away and hard to catch. Even harder, most times, to understand.

It's the animal in me, thought Ebenezer. *The old flea-scratching, bone-chewing, gopher-digging dog that will not let me be—that sends me sneaking out to chase a rabbit when I should be listening, out prowling the forest when I should be reading the old books from the shelves that line the study wall.*

Too fast, he told himself. *We came up too fast. Had to come up too fast.*

It took Man thousands of years to turn his grunts into the rudiments of speech. Thousands of years to discover fire and thousands more of years to invent the bow and arrow—thousands of years to learn to till the soil and harvest food, thousands of years to forsake the cave for a house he built himself.

But in a little more than a thousand years from the day we learned to talk we were on our own—our own, that is, except for Jenkins.

The forest thinned out into gnarled, scattered oaks that straggled up the hill, like hobbling old men who had wandered off the path.

The house stood on the hilltop, a huddled structure that had taken root and crouched close against the earth. So old that it was the

color of the things around it, of grass and flowers and trees, of sky and wind and weather. A house built by men who loved it and the surrounding acres even as the dogs now loved them. Built and lived in and died in by a legendary family that had left a meteoric trail across centuries of time. Men who lent their shadows to the stories that were told around the blazing fireplace of stormy nights when the wind sucked along the eaves. Stories of Bruce Webster and the first dog, Nathaniel; of a man named Grant who had given Nathaniel a word to pass along; of another man who had tried to reach the stars and of the old man who had sat waiting for him in the wheelchair on the lawn. And other stories of the ogre mutants the dogs had watched for years.

And now the men had gone and the family was a name and the dogs carried on as Grant had told Nathaniel that fargone day they must.

As if you were men, as if the dog were man. Those were the words that had been handed down for ten full centuries—and at last the time had come.

The dogs had come home when the men had gone, come from the far corners of the earth back to the place where the first dog had spoken the first word, where the first dog had read the first line of print—back to Webster House where a man, long ago, had dreamed of a dual civilization, of man and dog going down the ages, hand in paw.

"We've done the best we could," said Ebenezer, almost as if he were speaking to someone. "We still are doing it."

From the other side of the hill came the tinkle of a cow bell, a burst of frantic barking. The pups were bringing in the cows for the evening milking.

The dust of centuries lay within the vault, a gray, powdery dust that was not an alien thing, but a part of the place itself—the part that had died in the passing of the years.

Jon Webster smelled the acrid scent of the dust cutting through the mustiness of the room, heard the silence humming like a song within his head. One dim radium bulb glowed above the panel with its switch and wheel and half a dozen dials.

Fearful of disturbing the sleeping silence, Webster moved forward quietly, half awed by the weight of time that seemed to press down from the ceiling. He reached out a finger and touched the open switch, as if he had expected it might not be there, as if he must feel the pressure of it against his fingertip to know that it was there.

And it was there. It and the wheel and dials, with the single light above them. And that was all. There was nothing else. In all that small, bare vault there was nothing else.

Exactly as the old map had said that it would be.

Jon Webster shook his head,

thinking: I might have known that it would have been. The map was right. The map remembered. We were the ones that had forgotten —forgotten or never known or never cared. And he knew that more than likely it was the last that would be right. Never cared.

Although it was probable that very few had ever known about this vault. Had never known because it was best that only few should know. That it never had been used was no factor in its secrecy. There might have been a day—

He stared at the panel, wondering. Slowly his hand reached out again and then he jerked it back. Better not, he told himself, better not. For the map had given no clue to the purpose of the vault, to the mechanics of the switch.

"Defense," the map had said, and that was all.

Defense! Of course, there would have been defense back in that day of a thousand years ago. A defense that never had been needed, but a defense that had to be there, a defense against the emergency of uncertainty. For the brotherhood of peoples even then was a shaky thing that a single word or act might have thrown out of kilter. Even after ten centuries of peace, the memory of war would have been a living thing—an ever-present possibility in the mind of the world committee, something to be circumvented, something to be ready for.

Webster stood stiff and straight, listening to the pulse of history beating in the room. History that had run its course and ended. History that had come to a dead end—a stream that suddenly had flowed into the backwater of a few hundred futile human lives and now was a stagnant pool unrelieved by the eddying of human struggle and achievement.

He reached out a hand, put it flat against the masonry, felt the slimy cold, the rough crawl of dust beneath his palm.

The foundation of empire, he thought. The subcellar of empire. The nethermost stone of the towering structure that soared in proud strength on the surface far above —a great building that in olden times had hummed with the business of a solar system, an empire not in the sense of conquest but an empire of orderly human relations based on mutual respect and tolerant understanding.

A seat of human government lent an easy confidence by the psychological fact of an adequate and foolproof defense. For it would have been both adequate and foolproof, it would have had to be. The men of that day took no chances, overlooked no bets. They had come up through the hard school and they knew their way around.

Slowly, Webster swung about, stared at the trail his feet had left across the dust. Silently, stepping carefully, following the trail he'd made, he left the vault, closed the massive door behind him and spun the lock that held its secret fast.

Climbing the tunneled stairs, he

thought: *Now I can write my history. My notes are almost complete and I know how it should go. It will be brilliant and exhaustive and it might be interesting if anyone should read it.*

But he knew that no one would. No one would take the time or care.

For a long moment, Webster stood on the broad marble steps before his house, looking down the street. A pretty street, he told himself, the prettiest street in all Geneva, with its boulevard of trees, its carefully tended flower beds, the walks that glistened with the scrub and polish of ever-working robots.

No one moved along the street and it wasn't strange. The robots had finished their work early in the day and there were few people.

From some high treetop a bird sang and the song was one with the sun and flowers, a gladsome song that strained at the bursting throat, a song that tripped and skipped with boundless joy.

A neat street drowsing in the sun and a great, proud city that had lost its purpose. A street that should be filled with laughing children and strolling lovers and old men resting in the sun. And a city, the last city on Earth, the only city on Earth, that should be filled with noise and business.

A bird sang and a man stood on the steps and looked and the tulips nodded blissfully in the tiny fragrant breeze that wafted down the street.

Webster turned to the door, fumbled it open, walked across the threshold.

The room was hushed and solemn, cathedrallike with its stained glass windows and soft carpeting. Old wood glowed with the patina of age and silver and brass winked briefly in the light that fell from the slender windows. Over the fireplace hung a massive canvas, done in subdued coloring—a house upon a hill, a house that had grown roots and clung against the land with a jealous grip. Smoke came from the chimney, a wind-whipped, tenuous smoke that smudged across a storm-gray sky.

Webster walked across the room and there was no sound of walking. *The rugs,* he thought, *the rugs protect the quietness of the place. Randall wanted to do this one over, too, but I wouldn't let him touch it and I'm glad I didn't. A man must keep something that is old, something he can cling to, something that is a heritage and a legacy and promise.*

He reached his desk, thumbed a tumbler and the light came on above it. Slowly, he let himself into a chair, reached out for the portfolio of notes. He flipped the cover open and stared at the title page: *"A Study of the Functional Development of the City of Geneva."*

A brave title. Dignified and erudite. And a lot of work. Twenty years of work. Twenty years of digging among old dusty records, twenty years of reading and comparing, of evaluating the weight and words of those who had gone before, sifting and rejecting and

working out the facts, tracing the trend not only of the city but of men. No hero worship, no legends, but facts. And facts are hard to come by.

Something rustled. No footstep, but a rustle, a sense that someone was near. Webster twisted in his chair. A robot stood just outside the circle of the desk light.

"Beg pardon, sir," the robot said, "but I was supposed to tell you. Miss Sara is waiting in the Seashore."

Webster started slightly. "Miss Sara, eh? It's been a long time since she's been here."

"Yes, sir," said the robot. "It seemed almost like old times, sir, when she walked in the door."

"Thank you, Roscoe, for telling me," said Webster. "I'll go right out. You will bring some drinks."

"She brought her own drinks, sir," said Roscoe. "Something that Mr. Ballentree fixed up."

"Ballentree!" exclaimed Webster. "I hope it isn't poison."

"I've been observing her," Roscoe told him, "and she's been drinking it and she's still all right."

Webster rose from his chair, crossed the room and went down the hall. He pushed open the door and the sound of the surf came to him. He blinked in the light that shone on the hot sand beach, stretching like a straight white line to either horizon. Before him the ocean was a sun-washed blue tipped with the white of foaming waves.

Sand gritted underneath his feet as he walked forward, eyes adjusting themselves to the blaze of sunlight.

Sara, he saw, was sitting in one of the bright canvas chairs underneath the palm trees and beside the chair was a pastel, very ladylike jug.

The air had a tang of salt and the wind off the water was cool in the sun-warm air.

The woman heard him and stood up and waited for him, with her hands outstretched. He hurried forward, clasped the outstretched hands and looked at her.

"Not a minute older," he said. "As pretty as the day I saw you first."

She smiled at him, eyes very bright. "And you, Jon. A little gray around the temples. A little handsomer. That is all."

He laughed. "I'm almost sixty, Sara. Middle age is creeping up."

"I brought something," said Sara. "One of Ballentree's latest masterpieces. It will cut your age in half."

He grunted. "Wonder Ballentree hasn't killed off half Geneva, the drinks that he cooks up."

"This one is really good."

It was. It went down smooth and it had a strange, half metallic, half ecstatic taste.

Webster pulled another chair close to Sara's, sat down and looked at her.

"You have such a nice place here," said Sara. "Randall did it, didn't he?"

Webster nodded. "He had more fun than a circus. I had to beat

him off with a club. And those robots of his! They're creazier than he is."

"But he does wonderful things. He did a Martian room for Quentin and it's simply unwordly."

"I know," said Webster. "Was set on a deep-space one for here. Said it would be just the place to sit and think. Got sore at me when I wouldn't let him do it."

He rubbed the back of his left hand with his right thumb, staring off at the blue haze above the ocean. Sara leaned forward, pulled his thumb away.

"You still have the warts," she said.

He grinned. "Yes. Could have had them taken off, but never got around to it. Too busy, I guess. Part of me by now."

She released the thumb and he went back to rubbing the warts absent-mindedly.

"You've been busy," she said.

"Haven't seen you around much. How is the book coming?"

"Ready to write," said Webster. "Outlining it by chapters now. Checked on the last thing today. Have to make sure, you know. Place way down under the old Solar Administration Building. Some sort of a defense set-up. Control room. You push a lever and—"

"And what?"

"I don't know," said Webster. "Something effective, I suppose. Should try to find out, but can't find the heart to do it. Been digging around in too much dust these last twenty years to face any more."

"You sound discouraged, Jon. Tired. You shouldn't get tired. There's no reason for it. You should get around. Have another drink?"

He shook his head. "No, Sara, thanks. Not in the mood, I guess. I'm afraid, Sara—afraid."

"Afraid?"

"This room," said Webster. "Illusion. Mirrors that give an allusion of distance. Fans that blow the air through a salt spray, pumps that stir up the waves. A snythetic sun. And if I don't like the sun, all I have to do is snap a switch and I have a moon."

"Illusion," said Sara.

"That's it," said Webster. "That is all we have. No real work, no real job. Nothing that we're working for, no place we're going. I've worked for twenty years and I'll write a book and not a soul will read it. All they'd have to do would be spend the time to read it, but they won't take the time. They won't care. All they'd have to do would be come and ask me for a copy—and if they didn't want to do that I'd be so glad someone was going to read it that I'd take it to them. But no one will. It will go on the shelves with all the other books that have been written. And what do I get out of it? Wait . . . I'll tell you. Twenty years of work, twenty years of fooling myself, twenty years of sanity."

"I know," said Sara, softly. "I know, Jon. The last three paintings—"

He looked up quickly. "But, Sara—"

She shook her head. "No, Jon. No one wanted them. They're out of style. Naturalistic stuff is passé. Impressionalism now. Daubs—"

"We are too rich," said Webster. "We have too much. Everything was left for us—everything and nothing. When Mankind went out to Jupiter the few that were left behind inherited the Earth and it was too big for them. They couldn't handle it. They couldn't manage it. They thought they owned it, but they were the ones that were owned. Owned and dominated and awed by the things that had gone before."

She reached out a hand and touched his arm.

"Poor Jon," she said.

"We can't flinch away from it," he said. "Some day some of us must face the truth, must start over again—from scratch."

"I—"

"Yes, what is it, Sara?"

"I came here to say good-by."

"Good-by?"

"I'm going to take the Sleep."

He came to his feet, swiftly, horrified. "No, Sara!"

She laughed and the laugh was strained. "Why don't you come with me, Jon. A few hundred years. Maybe it will all be different when we awake."

"Just because no one wants your canvases. Just because—"

"Because of what you said just a while ago. Illusion, Jon. I knew it, felt it, but I couldn't think it out."

"But the Sleep is illusion, too."

"I know. But you don't know it's illusion. You think it's real. You have no inhibitions and you have no fears except the fears that are planned deliberately. It's natural, Jon—more natural than life. I went up to the Temple and it was all explained to me."

"And when you awake?"

"You're adjusted. Adjusted to whatever life is like in whatever era you awake. Almost as if you belonged, even from the first. And it might be better. Who knows? It might be better."

"It won't be," Jon told her, grimly. "Until, or unless, someone does something about it. And a people that run to the Sleep to hide are not going to bestir themselves."

She shrank back in the chair and suddenly he felt ashamed.

"I'm sorry, Sara. I didn't mean you. Nor any one person. Just the lot of us."

The palms whispered harshly, fronds rasping. Little pools of water, left by the surging tide, sparkled in the sun.

"I won't try to dissuade you," Webster said. "You've thought it out, you know what it is you want."

It hadn't always been like that with the human race, he thought. *There would have been a day, a thousand years ago, when a man would have argued about a thing like this. But Juwainism had ended all the petty quarrels. Juwainism had ended a lot of things.*

"I've always thought," Sara told him, softly, "if we could have stayed together—"

He made a gesture of impatience. "It's just another thing we've lost, another thing that the human race let loose. Come to think it over, we lost a lot of things. Family ties and business, work and purpose."

He turned to face her squarely. "If you want to come back, Sara—"

She shook her head. "It wouldn't work, Jon. It's been too many years."

He nodded. There was no use denying it.

She rose and held out her hand. "If you ever decide to take the Sleep, find out my date. I'll have them reserve a place right next to me."

"I don't think I ever shall," he told her.

"All right, then. Good-by, Jon."

"Wait a second, Sara. You haven't said a word about our son. I use to see him often, but—"

She laughed brightly. "Tom's almost a grown man now, Jon. And it's the strangest thing. He—"

"I haven't seen him for so long," Webster said again.

"No wonder. He's scarcely in the city. It's his hobby. Something he inherited from you, I guess. Pioneering in a way. I don't know what else you'd call it."

"You mean some new research. Something unusual."

"Unusual, yes, but not research. Just goes out in the woods and lives by himself. He and a few of his friends. A bag of salt, a bow and arrows— Yes, it's queer," Sara admitted, "but he has a lot of fun. Claims he's learning something. And he does look healthy. Like a wolf. Strong and lean and a look about his eyes."

She swung around and moved away.

"I'll see you to the door," said Webster.

She shook her head. "No. I'd rather that you wouldn't."

"You're forgetting the jug."

"You keep it, Jon. I won't need it where I'm going."

Webster put on the plastic "thinking cap," snapped the button of the writer on his desk.

Chapter Twenty-six, he thought and the writer clicked and chuckled and wrote "Chapter XXVI."

For a moment Webster held his mind clear, assembling his data, arranging his outline, then he began again. The writer clicked and gurgled, hummed into steady work:

The machines ran on, tended by the robots as they had been before, producing all the things they had produced before.

And the robots worked as they knew it was their right to work, their right and duty, doing the things they had been made to do.

The machines went on and the robots went on, producing wealth as if there were men to use it, just as if there were millions of men instead of a bare five thousand.

And the five thousand who had stayed behind or who had been left behind suddenly found themselves the masters of a world that had been geared to the millions, found themselves possessed of the wealth and services that only months before had been the wealth and services that had been due the millions.

There was no government, but there was no need of government, for all the crimes and abuses that government had held in check were as effectively held in check by the sudden wealth the five thousand had inherited. No man will steal when he can pick up what he wants without the bother of thievery. No man will contest with his neighbor over real estate when the entire world is real estate for the simple taking. Property rights almost overnight became a phrase that had no meaning in a world where there was more than enough for all.

Crimes of violence long before had been virtually eliminated from human society and with the economic pressure eased to a point where property rights ceased to be a point of friction, there was no need of government. No need, in fact, of many of the encumbrances of custom and convenience which man had carried forward from the beginnings of commerce. There was no need of currency, for exchange had no meaning in a world where to get a thing one need but ask for it or take it.

Relieved of economic pressure, the social pressures lessened, too. A man no longer found it necessary to conform to the standards and the acts of custom which had played so large a part in the post-Jovian world as an indication of commercial character.

Religion, which had been losing ground for centuries, entirely disappeared. The family unit, held together by tradition and by the economic necessity of a provider and protector, fell apart. Men and women lived together as they wished, parted when

they wished. For there was no economic reason, no social reason why they shouldn't.

Webster cleared his mind and the machine purred softly at him. He put up his hands, took off the cap, reread the last paragraph of the outline.

There, he thought, *there is the root of it. If the families had stayed together. If Sara and I had stayed together.*

He rubbed the warts on the back of his hand, wondering: *Wonder if Tom goes by my name or hers. Usually they take their mother's name. I know I did at first until my mother asked me to change it. Said it would please my father and she didn't mind. Said he was proud of the name he bore and I was his only child. And she had others.*

If only we had stayed together. Then there'd be something worth living for. If we'd stayed together, Sara wouldn't be taking the Sleep, wouldn't be lying in a tank of fluid in suspended animation with the "dream cap" on her head.

Wonder what kind of dream she chose—what kind of synthetic life she picked out to live. I wanted to ask her, but I didn't dare. It's not the kind of thing, after all, that one can ask.

He reached out and picked up the cap again, put it on his head, marshaled his thoughts anew. The writer clicked into sudden life:

Man was bewildered. But not for long. Man tried. But not for long.

For the five thousand could not carry on the work of the millions who had gone to Jupiter to enter upon a better life in alien bodies. The five thousand did not have the skill, nor the dreams, nor the incentive.

And there were the psychological factors. The psychological factor of tradition which bore like a weight upon the minds of the men who had been left behind. The psychological factor of Juwainism which forced men to be honest with themselves and others, which forced men to perceive at last the hopelessness of the things they sought to do. Juwainism left no room for false courage. And false, foolhardy courage that didn't know what it was going up against was the one thing the five thousand needed most.

What they did suffered by comparison with what had been done before and at last they came to know that the human dream of millions was too vast a thing for five thousand to attempt.

Life was good. Why worry? There was food and clothes and shelter, human companionship and luxury and entertainment—there was everything that one could ever wish.

Man gave up trying. Man enjoyed himself. Human achievement became a zero factor and human life a senseless paradise.

Webster took off the cap again, reached out and clicked off the writer.

If someone would only read it once I get it done, he thought. *If someone would read and understand. If someone could realize where human life is going.*

I could tell them, of course. I could go out and buttonhole them one by one and hold them fast until I told them what I thought. And they would understand, for Juwainism would make them understand. But they wouldn't pay attention. They'd tuck it all away in the backs of their brains somewhere for future reference and they'd never have the time or take the trouble to

drag it out again.

They'd go on doing the foolish things they're doing, following the footless hobbies they have taken up in lieu of work. Randall with his crew of zany robots going around begging to be allowed to re-design his neighbors' homes. Ballentree spending hours on end figuring out new alcoholic mixtures. Yes, and Jon Webster wasting twenty years digging into the history of a single city.

A door creaked faintly and Webster swung around. A robot catfooted into the room.

"Yes, what is it, Oscar?"

The robot halted, a dim figure in the half-light of the dusk-filled room.

"It's time for dinner, sir. I came to see—"

"Whatever you can think up," said Webster. "And, Oscar, you can lay the fire."

"The fire is laid, sir."

Oscar stalked across the room, bent above the fireplace. Flame flickered in his hand and the kindling caught.

Webster slouched in his chair, staring at the flames crawling up the wood, heard the first, faint hiss and crackle of the wood, the suction mumble at the fireplace throat.

"It's pretty, sir," said Oscar.

"You like it, too?"

"Indeed I do."

"Ancestral memories," said Webster, soberly. "Remembrance of the forge that made you."

"You think so, sir?" asked Oscar.

"No, Oscar, I was joking. Anachronisms, that's what you and I are. Not many people have fires these days. No need for them. But there's something about them, something that is clean and comforting."

He stared at the canvas above the mantelpiece, lighted now by the flare of burning wood. Oscar saw his stare.

"Too bad about Miss Sara, sir."

Webster shook his head. "No, Oscar, it was something that she wanted. Like turning off one life and starting on another. She will lie up there in the Temple, asleep for years, and she will live another life. And this one, Oscar, will be a happy life. For she would have it planned that way."

His mind went back to other days in this very room.

"She painted that picture, Oscar," he said. "Spent a long time at it, being very careful to catch the thing she wanted to express. She used to laugh at me and tell me I was in the painting, too."

"I don't see you, sir," said Oscar.

"No. I'm not. And yet, perhaps, I am. Or part of me. Part of what and where I came from. That house in the painting, Oscar, is the Webster House in North America. And I am a Webster. But a long ways from the house—a long ways from the men who built that house."

"North America's not so far, sir."

"No," Webster told him. "Not so far in distance. But far in other ways."

He felt the warmth of the fire

steal across the room and touch him.

Far. Too far—and in the wrong direction.

The robot moved softly, feet padding on the rug, leaving the room.

She worked a long time, being very careful to catch the thing she wanted to express.

And what was that thing? He had never asked her and she had never told him. He had always thought, he remembered, that it probably had been the way the smoke streamed, wind-whipped across the sky, the way the house crouched against the ground, blending in with the trees and grass, huddled against the storm that walked above the land.

But it may have been something else. Some symbolism. Something that made the house synonymous with the kind of men who built it.

He got up and walked closer, stood before the fire with head tilted back. The brush strokes were there and the painting looked less a painting than when viewed from the proper distance. A thing of technique, now. The basic strokes and shadings the brushes had achieved to create illusion.

Security. Security by the way the house stood foursquare and solid. Tenacity by the way it was a part of the land itself. Sternness, stubbornness and a certain bleakness of the spirit.

She had sat for days on end with the visor beamed on the house, sketching carefully, painting slowly, often sitting and watching and doing nothing at all. There had been dogs, she said, and robots, but she had not put them in, because all she wanted was the house. One of the few houses left standing in the open country. Through centuries of neglect, the others had fallen in, had given the land back to the wilderness.

But there were dogs and robots in this one. One big robot, she had said, and a lot of little ones.

Webster had paid no attention—he had been too busy.

He swung around, went back to the desk again.

Queer thing, once you came to think of it. Robots and dogs living together. A Webster once had messed around with dogs, trying to put them on the road to a culture of their own, trying to develop a dual civilization of man and dog.

Bits of remembrance came to him—tiny frangments, half recalled, of the legends that had come down the years about the Webster House. There had been a robot named Jenkins who had served the family from the very first. There had been an old man sitting in a wheel chair on the front lawn, staring at the stars and waiting for a son who never came. And a curse had hung above the house, the curse of having lost to the world the philosophy of Juwain.

The visor was in one corner of the room, an almost forgotten piece of furniture, something that was scarcely used. There was no need to use it. All the world was here in the city of Geneva.

Webster rose, moved toward it,

stopped and thought. The dial settings were listed in the log book, but where was the log book? More than likely somewhere in his desk.

He went back to the desk, started going through the drawers.

Excited now, he pawed furiously, like a terrier digging for a bone.

Jenkins, the ancient robot, scrubbed his metallic chin with metallic fingers. It was a thing he did when he was deep in thought, a meaningless, irritating gesture he had picked up from long association with the human race.

His eyes went back to the little dog sitting on the floor beside him.

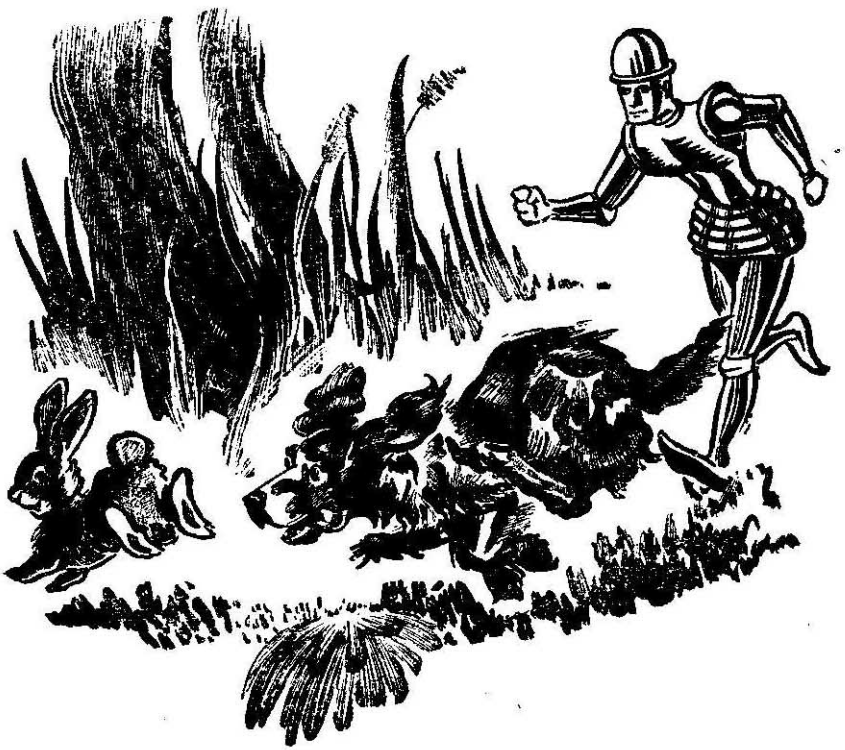
"So the wolf was friendly," said Jenkins. "Offered you the rabbit."

Ebenezer jigged excitedly upon his bottom. "He was one of them we fed last winter. The pack that came up to the house and we tried to tame them."

"Would you know the wolf again?"

Ebenezer nodded. "I got his scent," he said. "I'd remember him."

Shadow shuffled his feet against the floor. "Look, Jenkins, ain't you going to smack him one? He should have been listening and he



ran away. He had no business chasing rabbits—"

Jenkins spoke sternly. "You're the one that should get the smacking, Shadow. For your attitude. You are assigned to Ebenezer, you should be part of him. You aren't an individual. You're just Ebenezer's hands. If he had hands, he'd have no need of you. You aren't his mentor nor his conscience. Just his hands. Remember that."

Shadow shuffled his feet rebelliously. "I'll run away," he said.

"Join the wild robots, I suppose," said Jenkins.

Shadow nodded. "They'd be glad to have me. They're doing things. They need all the help that they can get."

"They'd bust you up for scrap," Jenkins told him sourly. "You have no training, no abilities that would make you one of them."

He turned to Ebenezer. "We have other robots."

Ebenezer shook his head. "Shadow is all right. I can handle him. We know one another. He keeps me from getting lazy, keeps me on my toes."

"That's fine," said Jenkins. "You two run along. And if you ever happen to be out chasing rabbits, Ebenezer, and run onto this wolf again, try to cultivate him."

The rays of the westering sun were streaming through the windows, touching the age-old room with the warmth of a late spring evening.

Jenkins sat quietly in the chair, listening to the sounds that came from outside—the tinkle of cowbells, the yapping of the puppies, the ringing thud of an ax splitting fireplace logs.

Poor little fellow, thought Jenkins. *Sneaking out to chase a rabbit when he should have been listening. Too far—too fast. Have to watch that. Have to keep them from breaking down. Come fall and we'll knock off work for a week or two and have some coon hunts. Do them a world of good.*

Although there'd come a day when there'd be no coon hunts, no rabbit chasing—the day when the dogs finally had tamed everything, when all the wild things would be thinking, talking, working beings. A wild dream and a far one—but, thought Jenkins, *no wilder and no farther than some of the dreams of man.*

Maybe even better than the dreams of man, for they held none of the ruthlessness that the human race had planned, aimed at none of the mechanistic brutality the human race spawned.

A new civilization, a new culture, a new way of thought. Mystic, perhaps, and visionary, but so had man been visionary. Probing into mysteries that man had brushed by as unworthy of his time, as mere superstition that could have no scientific basis.

Things that go bump in the night. Things that prowl around a house and the dogs get up and growl and there are no tracks in the snow. Dogs howling when someone dies.

The dogs knew. The dogs had known long before they had been given tongues to talk, contact lenses

to read. They had not come along the road as far as men—they were not cynical and skeptic. They believed the things they heard and sensed. They did not invent superstition as a form of wishful thinking, as a shield against the things unseen.

Jenkins turned back to the desk again, picked up the pen, bent above the notebook in front of him. The pen screeched as he pushed it along.

Ebenezer reports friendliness in wolf. Recommend council detach Ebenezer from listening and assign him to contact the wolf.

Wolves, mused Jenkins, *would be good friends to have. They'd make splendid scouts. Better than the dogs. Tougher, faster, sneaky. They could watch the wild robots across the river and relieve the dogs. Could keep an eye on the mutant castles.*

Jenkins shook his head. *Couldn't trust anyone these days. The robots seemed to be all right. Were friendly, dropped in at times, helped out now and then. Real neighborly, in fact. But you never knew. And they were building machines.*

The mutants never bothered anyone, were scarcely seen, in fact. But they had to be watched, too. Never knew what devilment they might be up to. Remember what they'd done to man. That dirty trick with Juwainism, handing it over at a time when it would doom the race.

Men. They were gods to us and now they're gone. Left us on our own. A few in Geneva, of course, but they can't be bothered, have no interest in us.

He sat in the twilight, thinking of the whiskies he had carried, of the errands he had run, of the days when Websters had lived and died within these walls.

And now—father confessor to the dogs. Cute little devils and bright and smart—and trying hard.

A bell buzzed softly and Jenkins jerked upright in his seat. It buzzed again and a green light winked on the televisor. Jenkins came to his feet, stood unbelieving, staring at the winking light.

Someone calling!

Someone calling after almost a thousand years!

He staggered forward, dropped into the chair, reached out with fumbling fingers to the toggle, tripped it over.

The wall before him melted away and he sat facing a man across a desk. Behind the man the flames of a fireplace lighted up a room with high, stained-glass windows.

"You're Jenkins," said the man and there was something in his face that jerked a cry from Jenkins.

"You . . . you—"

"I'm Jon Webster," said the man.

Jenkins pressed his hands flat against the top of the televisor, sat straight and stiff, afraid of the unrobotlike emotions that welled within his metal being.

"I would have known you anywhere," said Jenkins. "You have the look of them. I should recognize one of you. I worked for you

long enough. Carried drinks and . . . and—"

"Yes, I know," said Webster. "Your name has come down with us. We remembered you."

"You are in Geneva, Jon?" And then Jenkins remembered. "I meant, sir."

"No need of it," said Webster. "I'd rather have it Jon. And, yes, I'm in Geneva. But I'd like to see you. I wonder if I might."

"You mean come out here?"

Webster nodded.

"But the place is overrun with dogs, sir."

Webster grinned. "The talking dogs?" he asked.

"Yes," said Jenkins, "and they'll be glad to see you. They know all about the family. They sit around at night and talk themselves to sleep with stories from the old days and . . . and—"

"What is it, Jenkins?"

"I'll be glad to see you, too. It has been so lonesome!"

God had come.

Ebenezer shivered at the thought, crouching in the dark. *If Jenkins knew I was here,* he thought, *he'd whale my hide for fair. Jenkins said we were to leave him alone, for a while, at least.*

Ebenezer crept forward on fur-soft pads, sniffed at the study door. And the door was open—open by the barest crack!

He crouched on his belly, listening, and there was not a thing to hear. Just a scent, an unfamiliar, tangy scent that made the hair crawl along his back in swift, almost unbearable ecstasy.

He glanced quickly over his shoulder, but there was no movement. Jenkins was out in the dining room, telling the dogs how they must behave, and Shadow was off somewhere tending to some robot business.

Softly, carefully, Ebenezer pushed at the door with his nose and the door swung wider. Another push and it was half open.

The man sat in front of the fireplace, in the easy-chair, long legs crossed, hands clasped across his stomach.

Ebenezer crouched tighter against the floor, a low involuntary whimper in his throat.

At the sound Jon Webster jerked erect.

"Who's there?" he asked.

Ebenezer froze against the floor, felt the pumping of his heart jerking at his body.

"Who's there?" Webster asked once more and then he saw the dog.

His voice was softer when he spoke again. "Come in, feller. Come on in."

Ebenezer did not stir.

Webster snapped his fingers at him. "I won't hurt you. Come on in. Where are all the others?"

Ebenezer tried to rise, tried to crawl along the floor, but his bones were rubber and his blood was water. And the man was striding toward him, coming in long strides across the floor.

He saw the man bending over him, felt strong hands beneath his body, knew that he was being lifted

up. And the scent that he had smelled at the open door—the overpowering god-scent—was strong within his nostrils.

The hands held him tight against the strange fabric the man wore instead of fur and a voice crooned at him—not words, but comforting.

"So you came to see me," said Jon Webster. "You sneaked away and you came to see me."

Ebenezer nodded weakly. "You aren't angry, are you? You aren't going to tell Jenkins?"

Webster shook his head. "No, I won't tell Jenkins."

He sat down and Ebenezer sat in his lap, staring at his face—a strong, lined face with the lines deepened by the flare of the flames within the fireplace.

Webster's hand came up and stroked Ebenezer's head and Ebenezer whimpered with doggish happiness.

"It's like coming home," said Webster and he wasn't talking to the dog. "It's like you've been away for a long, long time and then you come home again. And it's so long you don't recognize the place. Don't know the furniture, don't recognize the floor plan. But you know by the feel of it that it's an old familiar place and you are glad you came."

"I like it here," said Ebenezer and he meant Webster's lap, but the man misunderstood.

"Of course, you do," he said. "It's your home as well as mine. More your home, in fact, for you stayed here and took care of it while I forgot about it."

He patted Ebenezer's head and pulled Ebenezer's ears.

"What's your name?" he asked.

"Ebenezer."

"And what do you do, Ebenezer?"

"I listen."

"You listen?"

"Sure, that's my job. I listen for the cobblies."

"And you hear the cobblies?"

"Sometimes. I'm not very good at it. I think about chasing rabbits and I don't pay attention."

"What do cobblies sound like?"

"Different things. Sometimes they walk and other times they just go bump. And once in a while they talk. Although oftener, they think."

"Look here, Ebenezer, I don't seem to place these cobblies."

"They aren't any place," said Ebenezer. "Not on this earth, at least."

"I don't understand."

"Like there was a big house," said Ebenezer. "A big house with lots of rooms. And doors between the rooms. And if you're in one room, you can hear whoever's in the other rooms, but you can't get to them."

"Sure you can," said Webster. "All you have to do is go out the door."

"But you can't open the door," said Ebenezer. "You don't even know about the door. You think this one room you're in is the only room in all the house. Even if you did know about the door you couldn't open it."

"You're talking about dimensions."

Ebenezer wrinkled his forehead

in worried thought. "I don't know that word you said. Dimensions. What I told you was the way Jenkins told it to us. He said it wasn't really a house and it wasn't really rooms and the things we heard probably weren't like us."

Webster nodded to himself. That was the way one would have to do. Have to take it easy. Take it slow. Don't confuse them with big names. Let them get the idea first and then bring in the more exact and scientific terminology. And more than likely it would be a manufactured terminology. Already there was a coined word. Cobblies—the things behind the wall, the things that one hears and cannot identify—the dwellers in the next room.

Cobblies.

The cobblies will get you if you don't watch out.

That would be the human way. Can't understand a thing. Can't see it. Can't test it. Can't analyze it. O.K., it isn't there. It doesn't exist. It's a ghost, a goblin, a cobbly.

The cobblies will get you—

It's simpler that way, more comfortable. Scared? Sure, but you forget it in the light. And it doesn't plague you, haunt you. Think hard enough and you wish it away. Make it a ghost or goblin and you can laugh at it—in the daylight.

A hot, wet tongue rasped across his chin and Ebenezer wriggled with delight.

"I like you," said Ebenezer. "Jenkins never held me this way. No one's ever held me this way."

"Jenkins is busy," said Webster.

"He sure is," agreed Ebenezer. "He writes things down in a book. Things that us dogs hear when we are listening and things that we should do."

"You've heard about the Websters?" asked the man.

"Sure. We know all about them. You're a Webster. We didn't think there were any more of them."

"Yes there is," said Webster. "There's been one here all the time. Jenkins is a Webster."

"He never told us that."

"He wouldn't."

The fire had died down and the room had darkened. The sputtering flames chased feeble flickers across the walls and floor.

And something else. Faint rustlings, faint whisperings, as if the very walls were talking. An old house with long memories and a lot of living tucked within its structure. Two thousand years of living. Built to last and it had lasted. Built to be a home and it still was a home—a solid place that put its arms around one and held one close and warm, claimed one for its own.

Footsteps walked across his brain—footsteps from the long ago, footsteps that had been silenced to the final echo centuries before. The walking of the Websters. Of the ones that went before me, the ones that Jenkins waited on from their day of birth to the hour of death.

History. Here is history. History stirring in the drapes and creeping on the floor, sitting in the corners, watching from the wall. Living history that a man can feel in the bones of him and against his shoulder blades—the impact of the long dead eyes that come back from the night.

Another Webster, eh! Doesn't look like much. Worthless. The breed's played out. Not like we were in our day. Just about the last of them.

Jon Webster stirred. "No, not the last of them," he said. "I have a son."

Well, it doesn't make much difference. He says he has a son. But he can't amount to much—

Webster started from the chair, Ebenezer slipping from his lap.

"That's not true," cried Webster. "My son—"

And then sat down again.

His son out in the woods with bow and arrows, playing a game, having fun.

A hobby, Sara had said before she climbed the hill to take a hundred years or so of dreams.

A hobby. Not a business. Not a way of life. Not necessity.

A hobby.

An artificial thing. A thing that had no beginning and no end. A thing a man could drop at any minute and no one would ever notice.

Like cooking up recipes for different kinds of drinks.

Like painting pictures no one wanted.

Like going around with a crew of crazy robots begging people to let you redecorate their homes.

Like writing history no one cares about.

Like playing Indian or caveman or pioneer with bow and arrows.

Like thinking up centuries-long dreams for men and women who are tired of life and yearn for fantasy.

The man sat in the chair, staring at the nothingness that spread before his eyes, the dread and awful nothingness that became tomorrow and tomorrow.

Absent-mindedly his hands came together and the right thumb stroked the back of the left hand.

Ebenezer crept forward through the fire-flared darkness, put his front paws on the man's knee and looked into his face.

"Hurt your hand?" he asked.

"Eh?"

"Hurt your hand? You're rubbing it."

Webster laughed shortly. "No, just warts." He showed them to the dog.

"Gee, warts!" said Ebenezer. "You don't want them, do you?"

"No," Webster hesitated. "No, I guess I don't. Never got around to having them taken off."

Ebenezer dropped his nose and nuzzled the back of Webster's hand.

"There you are," he announced triumphantly.

"There I'm what?"

"Look at the warts," invited Ebenezer.

A log fell in the fire and Web-

ster lifted his hand, looked at it in the flare of light.

And the warts were gone. The skin was smooth and clean.

Jenkins stood in the darkness and listened to the silence, the soft sleeping silence that left the house to shadows, to the half-forgotten footsteps, the phrase spoken long ago, the tongues that murmured in the walls and rustled in the drapes.

By a single thought the night could have been as day, a simple adjustment in his lenses would have done the trick, but the ancient robot left his sight unchanged. For this was the way he liked it, this was the hour of meditation, the treasured time when the present sloughed away and the past came back and lived.

The others slept, but Jenkins did not sleep. For robots never sleep. Two thousand years of consciousness, twenty centuries of full time unbroken by a single moment of unawareness.

A long time, thought Jenkins. *A long time, even for a robot. For even before man had gone to Jupiter most of the older robots had been deactivated, had been sent to their death in favor of the newer models. The newer models that looked more like men, that were smoother and more sightly, with better speech and quicker responses within their metal brains.*

But Jenkins had stayed on because he was an old and faithful servant, because Webster House would not have been home without him.

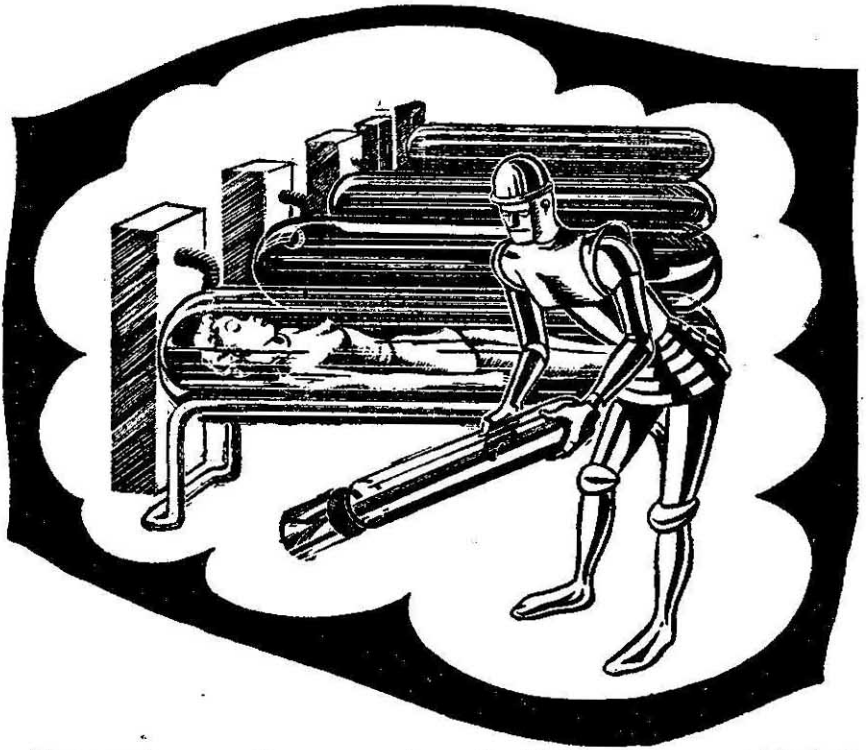
"They loved me," said Jenkins to himself. And the three words held deep comfort—comfort in a world where there was little comfort, a world where a servant had become a leader and longed to be a servant once again.

He stood at the window and stared out across the patio to the night-dark clumps of oaks that staggered down the hill. Darkness. No light anywhere. There had been a time when there had been lights. Windows that shone like friendly beams in the vast land that lay across the river.

But man had gone and there were no lights. The robots needed no lights, for they could see in darkness, even as Jenkins could have seen, had he but chose to do so. And the castles of the mutants were as dark by night as they were fearsome by day.

Now man had come again, one man. Had come, but he probably wouldn't stay. He'd sleep for a few nights in the great master bedroom on the second floor, then go back to Geneva. He'd walk the old forgotten acres and stare across the river and rummage through the books that lined the study wall, then he would up and leave.

Jenkins swung around. *Ought to see how he is,* he thought. *Ought to find if he needs anything. Maybe take him up a drink, although I'm afraid the whiskey is all spoiled. A thousand years is a long time for a bottle of good whiskey.*



He moved across the room and a warm peace came upon him, the close and intimate peacefulness of the old days when he had trotted, happy as a terrier, on his many errands.

He hummed a snatch of tune in minor key as he headed for the stairway.

He'd just look in and if Jon Webster were asleep, he'd leave, but if he wasn't, he'd say: "Are you comfortable, sir? Is there anything you wish? A hot toddy, perhaps?"

And he took two stairs at the time.

For he was doing for a Webster again.

Jon Webster lay propped in bed, with the pillows piled behind him. The bed was hard and uncomfortable and the room was close and stuffy—not like his own bedroom back in Geneva, where one lay on the grassy bank of a murmuring stream and stared at the artificial stars that glittered in an artificial sky. And smelled the artificial scent of artificial lilacs that would go on blooming longer than a man would live. No murmur of a hidden waterfall, no flickering of captive fireflies—but a bed and room that were functional.

Webster spread his hands flat on his blanket covered thighs and flexed his fingers, thinking.

Ebenezer had merely touched the warts and the warts were gone. And it had been no happenstance—it had been intentional. It had been no miracle, but a conscious power. For miracles sometimes fail to happen, and Ebenezer had been sure.

A power, perhaps, that had been gathered from the room beyond, a power that had been stolen from the cobblies Ebenezer listened to.

A laying-on of hands, a power of healing that involved no drugs, no surgery, but just a *certain* knowledge, a very special knowledge.

In the old dark ages certain men had claimed the power to make warts disappear, had bought them for a penny, or had traded them for something or had performed other mumbo jumbo—and in due time, sometimes, the warts would disappear.

Had these queer men listened to the cobblies, too?

The door creaked just a little and Webster straightened suddenly.

A voice came out of the darkness: "Are you comfortable, sir? Is there anything you wish?"

"Jenkins?" asked Webster.

"Yes, sir," said Jenkins.

The dark form padded softly through the door.

"Yes, there's something I want," said Webster. "I want to talk to you."

He stared at the dark, metallic figure that stood beside the bed.

"About the dogs," said Webster.

"They try so hard," said Jenkins. "And it's hard for them. For they have no one, you see. Not a single soul."

"They have you."

Jenkins shook his head. "But I'm not enough, you see. I'm just . . . well, just a sort of mentor. It is men they want. The need of men is ingrown in them. For thousands of years it has been man and dog. Man and dog, hunting together. Man and dog, watching the herds together. Man and dog, fighting their enemies together. The dog watching while the man slept and the man dividing the last bit of food, going hungry himself so that his dog might eat."

Webster nodded. "Yes, I suppose that is the way it is."

"They talk about men every night," said Jenkins, "before they go to bed. They sit around together and one of the old ones tells one of the stories that have been handed down and they sit and wonder, sit and hope."

"But where are they going? What are they trying to do? Have they got a plan?"

"I can detect one," said Jenkins. "Just a faint glimmer of what may happen. They are psychic, you see. Always have been. They have no mechanical sense, which is understandable, for they have no hands. Where man would follow metal, the dogs will follow ghosts."

"Ghosts?"

"The things you men call ghosts. But they aren't ghosts. I'm sure of that. They're something in the next room. Some other form of life on another plane."

"You mean there may be many planes of life coexisting simultaneously upon Earth?"

Jenkins nodded. "I'm beginning to believe so, sir. I have a notebook full of things the dogs have heard and seen and now, after all these many years, they begin to make a pattern."

He hurried on. "I may be mistaken, sir. You understand I have no training. I was just a servant in the old days, sir. I tried to pick up things after . . . after Jupiter, but it was hard for me. Another robot helped me make the first little robots for the dogs and now the little ones produce their own kind in the workshop when there are need of more."

"But the dogs—they just sit and listen."

"Oh, no, sir, they do many other things. They try to make friends with the animals and they watch the wild robots and the mutants—"

"These wild robots? There are many of them."

Jenkins nodded. "Many, sir. Scattered all over the world in little camps. The ones that were left behind, sir. The ones man had no further use for when he went to Jupiter. They have banded together and they work—"

"Work. What at?"

"I don't know, sir. Building machines, mostly. Mechanical, you know. I wonder what they'll do with all the machines they have. What they plan to use them for."

"So do I," said Webster.

And he stared into the darkness and wondered—wondered how man, cooped up in Geneva, should have lost touch with the world. How man should not have known about what the dogs were doing, about the little camps of busy robots, about the castles of the feared and hated mutants.

We lost touch, Webster thought. *We locked the world outside. We created ourselves a little niche and we huddled in it—in the last city in the world. And we didn't know what was happening outside the city—we could have known, we should have known, but we didn't care.*

It's time, he thought, *that we took a hand again.*

We were lost and awed and at first we tried, but finally we just threw in the hand.

For the first time the few that were left realized the greatness of the race, saw for the first time the mighty works the hand of man had reared. And they tried to keep it going and they couldn't do it. And they rationalized—as man rationalizes almost everything. Fooling himself that there really are no ghosts, calling things that go bumping in the night the first suave, sleek word of exclamation that comes into his mind.

We couldn't keep it going and so we rationalized, we took refuge in a screen of words and Juwainism helped us do it. We came close to ancestor worship. We sought to glorify the race of man. We couldn't carry on the work of man and so we tried to glorify it, attempted to enthrone the men who

had. As we attempt to glorify and enthrone all good things that die.

We became a race of historians and we dug with grubby fingers in the ruins of the race, clutching each irrelevant little fact to our breast as if it were a priceless gem. And that was the first phase, the hobby that bore us up when we knew ourselves for what we really were —the dregs in the tilted cup of humanity.

But we got over it. Oh, sure, we got over it. In about one generation. Man is an adaptable creature —he can survive anything. So we couldn't build great spaceships. So we couldn't reach the stars. So we couldn't puzzle out the secret of life. So what?

We were the inheritors, we had been left the legacy, we were better off than any race had ever been or could hope to be again. And so we rationalized once more and we forgot about the glory of the race, for while it was a shining thing, it was a toilsome and humiliating concept.

"Jenkins," said Webster, soberly, "we've wasted ten whole centuries."

"Not wasted, sir," said Jenkins. "Just resting, perhaps. But now, maybe, you can come out again. Come back to us."

"You want us?"

"The dogs need you," Jenkins told him. "And the robots, too. For both of them were never anything other than the servants of man. They are lost without you. The dogs are building a civilization, but it is building slowly."

"Perhaps a better civilization than we built ourselves," said Webster. "Perhaps a more successful one. For ours was not successful, Jenkins."

"A kinder one," Jenkins admitted, "but not too practical. A civilization based on the brotherhood of animals—on the psychic understanding and perhaps eventual communication and intercourse with interlocking worlds. A civilization of the mind and of understanding, but not too positive. No actual goals, limited mechanics —just a groping after truth, and the groping is in a direction that man passed by without a second glance."

"And you think that man could help?"

"Man could give leadership," said Jenkins.

"The right kind of leadership?"

"That is hard to answer."

Webster lay in the darkness, rubbed his suddenly sweating hands along the blankets that covered his body.

"Tell me the truth," he said and his words were grim. "Man could give leadership, you say. But man also could take over once again. Could discard the things the dogs are doing as impractical. Could round the robots up and use their mechanical ability in the old, old pattern. Both the dogs and robots would knuckle down to man."

"Of course," said Jenkins. "For they were servants once. But man is wise—man knows best."

"Thank you, Jenkins," said Webster. "Thank you very much."

He stared into the darkness and the truth was written there.

His track still lay across the floor and the smell of dust was a sharpness in the air. The radium bulb glowed above the panel and the switch and wheel and dials were waiting, waiting against the day when there would be need of them.

Webster stood in the doorway, smelled the dampness of the stone through the dusty bitterness.

Defense, he thought, staring at the switch. *Defense—a thing to keep one out, a device to seal off a place against all the real or imagined weapons that a hypothetical enemy might bring to bear.*

And undoubtedly the same defense that would keep an enemy out would keep the defended in. Not necessarily, of course, but—

He strode across the room and stood before the switch and his hand went out and grasped it, moved it slowly and knew that it would work.

Then his arm moved quickly and the switch shot home. From far below came a low, soft hissing as machines went into action. The dial needles flickered and stood out from the pins.

Webster touched the wheel with hesitant fingertips, stirred it on its shaft and the needles flickered again and crawled across the glass. With a swift, sure hand, Webster spun the wheel and the needles slammed against the farther pins.

He turned abruptly on his heel, marched out of the vault, closed the door behind him, climbed the crumbling steps.

Now if it only works, he thought. *If it only works.* His feet quickened on the steps and the blood hammered in his head.

If it only works!

He remembered the hum of machines far below as he had slammed the switch. That meant that the defense mechanism—or at least part of it—still worked.

But even if it worked, would it do the trick? What if it kept the enemy out, but failed to keep men in?

What if—

When he reached the street, he saw that the sky had changed. A gray, metallic overcast had blotted out the sun and the city lay in twilight, only half relieved by the automatic street lights. A faint breeze wafted at his cheek.

The crinkly gray ash of the burned notes and the map that he had found still lay in the fireplace and Webster strode across the room, seized the poker, stirred the ashes viciously until there was no hint of what they once had been.

Gone, he thought. *The last clue gone. Without the map, without the knowledge of the city that it had taken him twenty years to ferret out, no one would ever find that hidden room with the switch and wheel and dials beneath the single lamp.*

No one would know exactly what had happened. And even if one guessed, there'd be no way to make sure. And even if one were sure, there'd be nothing that could be done about it.

A thousand years before it would not have been that way. For in that day man, given the faintest hint, would have puzzled out any given problem.

But man had changed. He had lost the old knowledge and old skills. His mind had become a flaccid thing. He lived from one day to the next without any shining goal. But he still kept the old vices—the vices that had become virtues from his own viewpoint and raised him by his own bootstraps. He kept the unwavering belief that his was the only kind, the only life that mattered—the smug egoism that made him the self-appointed lord of all creation.

Running feet went past the house on the street outside and Webster swung away from the fireplace, faced the blind panes of the high and narrow windows.

I got them stirred up, he thought. *Got them running now. Excited. Wondering what it's all about. For centuries they haven't stirred outside the city, but now that they can't get out—they're foaming at the mouth to do it.*

His smile widened.

Maybe they'll be so stirred up, they'll do something about it. Rats in a trap will do some funny things—if they don't go crazy first.

And if they do get out—well, it's their right to do so. If they do get out, they've earned their right to take over once again.

He crossed the room, stood in the doorway for a moment, staring at the painting that hung above the mantle. Awkwardly, he raised his hand to it, a fumbling salute, a haggard good-by. Then he let himself out into the street and climbed the hill—the route that Sara had walked only days before.

The Temple robots were kind and considerate, soft-footed and dignified. They took him to the place where Sara lay and showed him the next compartment that she had reserved for him.

"You will want to choose a dream," said the spokesman of the robots. "We can show you many samples. We can blend them to your taste. We can—"

"Thank you," said Webster. "I do not want a dream."

The robot nodded, understanding. "I see, sir. You only want to wait, to pass away the time."

"Yes," said Webster. "I guess you'd call it that."

"For about how long?"

"How long?"

"Yes. How long do you want to wait?"

"Oh, I see," said Webster. "How about forever?"

"Forever!"

"Forever is the word, I think," said Webster. "I might have said eternity, but it doesn't make much difference. There is no use of quibbling over two wards that mean about the same."

"Yes, sir," said the robot.

No use of quibbling. No, of course, there wasn't. For he couldn't take the chance. He could have said a thousand years, but then he might have relented and gone down and flipped the switch.

And that was the one thing that must not happen. The dogs had to have their chance. Had to be left unhampered to try for success where the human race had failed. And so long as there was a human element they would not have that chance. For man would take over, would step in and spoil things, would laugh at the cobblies that talked behind a wall, would object to the taming and civilizing of the wild things of the earth.

A new pattern—a new way of thought and life—a new approach to the age-old social problem. And it must not be tainted by the stale breath of man's thinking.

The dogs would sit around at night when the work was done and they would talk of man. They would spin the old, old story and tell the old, old tales and man would be a god.

And it was better that way.

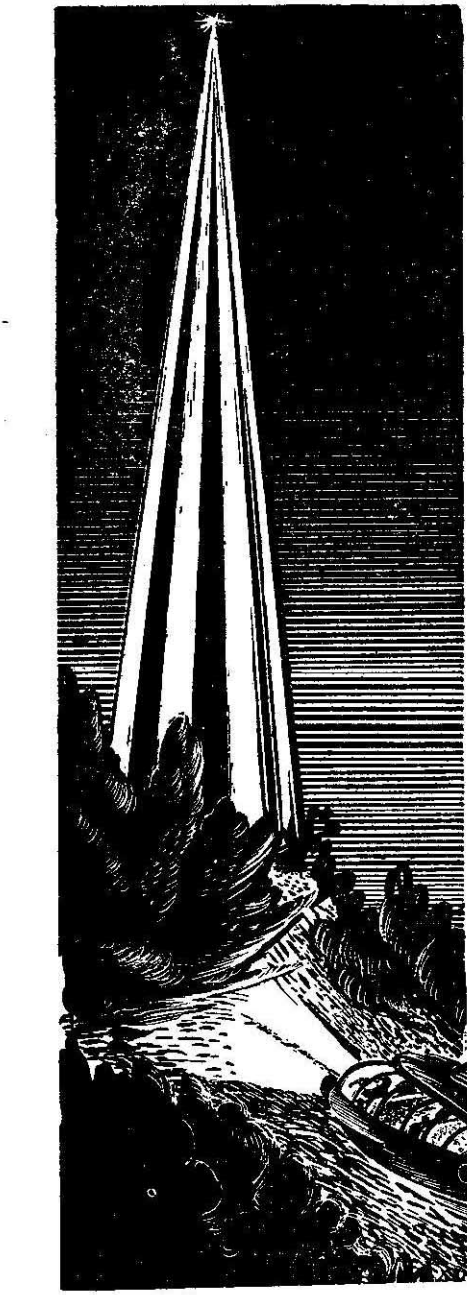
For a god can do no wrong.

THE END.

THE ANALYTICAL LABORATORY

Sorry we ran out of space this month. Will have to make it next month.

THE EDITOR.



TOWER OF DARKNESS

The planet was a deadly place—deadly not to men, but to their ambition. It seemed to be cursed by the Tower, and against the Tower neither strong will, courage, not the flame of human ambition succeeded. It took something quite different—and unanswerable.

The day had almost run its course when Manson eased the interstellar ship *Argo* down to the Port Ruthven landing field. It seemed to those in Control that *Argo* was dragging the sun, the swollen red orb that from distant Earth was a mere, tiny point of light, down the sky with her. As the ship lost altitude and crept down the long ladder of fire that was her main drive, as the rugged, serrated horizon rose all around

BY A. BERTRAM CHANDLER

her, so the sun dipped lower and lower towards the western hills. And when the slight, unavoidable shock forced them deep into the padding of their chairs, and when LeClerc, at a word from Captain Grant, reached out to switch off the interplanetary drive, the first of the jagged pinnacles had reached up and implanted its black, irregular outline on the ruddy disk.

There was barometric equilibrium between ship and outside world. Somebody flipped over the switch that would open the control room ports. The thick, transparent circles slid to one side into the space between the inner and outer shells. The fresh air—air with all the taints inevitable in the atmospheric envelope of an inhabited world—tasted good. It was well water—ice-cold and chemically impure—after weeks with nothing but distilled water to drink. There was the smell of dust, of growing things, the acrid bite of frost.

From the fort, faint and silvery, nostalgic, drifted the notes of a bugle. There was silence, broken almost immediately by the dull thud of the sunset gun. The flag, lifted by the light evening breeze, black against the darkling sky, quivered at its halyards, slipped slowly and smoothly down its staff. The glaring lights came on around the landing field, shouted man's challenge to the first, faint stars. From outside came the noise of whirring wheels, of loud voices. The spell was broken.

"That will do, gentlemen," said Grant.

Manson lit a cigarette, watched LeClerc, the navigator, putting the covers over his instruments.

He had grown to like the suave little Frenchman, during the trip, though by his rather austere standards, Manson tagged LeClerc as only two cuts above worthless. The little man had drifted happily from ship to ship, from planet to planet, carrying with him two reputations. One of them was that of being an accurate and reliable navigator. The other—well, that was given him by honky-tonk managers and high-society hostesses from old Sol to the Ridge and back.

Manson loosened his safety belt, got out of his chair and walked to the nearest port. From this he could see neither the administration buildings nor the fort, and he was looking away from the tiny settlement that was Port Ruthven.

"What's that, Frenchy?" he asked, his voice casual.

"That?"

The navigator snapped the cover of his plotting machine into place, walked, with his quick, short steps, to the other's side. He joined the chief pilot at the open port, stared with him towards the slender monolith that reared its graceful height into the dusky sky. Invisible it should have been, for not a light broke the severity of its outline and it was all of ten miles distant. But it was high, and the material of which it was built seemed the very quintessence of darkness. It stood out against the faint lumi-

nosity of the sky, the dim, flickering stars, and it was as though it had been etched there on the very surface of the twilight, so sharp and distinct it was.

"I do not know," said LeClerc.

"You don't know?" Manson was mildly incredulous. "But you've been here before, Frenchy."

The other shrugged his shoulders.

"So I have been here before, Bull. And yet I do not know. Look," he went to his book rack, selected one of the *Pilots,* rapidly flicked over the pages until he came to the one he wanted. "Look! Read for yourself, my friend."

Manson took the volume.

"Port Ruthven," he read aloud. "Landmarks: To the north of the settlement, about ten miles distant, is a tower, standing two thousand five hundred feet from base to pinnacle. It is thought that it plays some part in the religious life of the natives. Ruthven reports that, although frank in all other matters, they displayed the utmost reticence when questioned about the remarkable building. It is called, in their language, *Tamar ur Cholon*—a literal translation of which is 'Tower of Darkness'—"

"Tower of Darkness," repeated LeClerc. "And if you will read on, my friend, you will find that astronauts are warned against displaying too much interest in the religious life of the aborigines. I knew one such who would not be warned—"

"What happened?"

"I do not know. He was missing for a few days. The commander of the Fort refused to act—after all, he had gone outside the settlement boundaries without an escort. And then he came back just an hour or so before sailing. And it seemed that something had gone out of him. He was normal enough—if you didn't look at his eyes. And he was quite capable of performing his routine duties. But—he wasn't interested. In anything. Two days out he came down with the sickness they call Darshan fever. It is rarely fatal. In this case it was."

"Why?"

"Again I do not know. But our surgeon said that the patient had no will to live. It was as though he was not interested even in staying alive."

"Interesting. Did he talk?"

"No. He could tell nobody of where he had been, what he had seen or done. He—"

"Skip it, Frenchy." Bull Manson stood before the open port a second or so longer. The navigator thought that he saw the big broad frame shiver a little, although of that he could not be sure. And it may have been caused only by the cold night air, the drop in temperature of the well-heated compartment. "Skip it," said Manson again. "I'm a trouble shooter. There's trouble here, but it has more to do with human inefficiency than some one human's damfoolishness. I can't mess with that kind of thing." Then—"What

say we put on our number ones and see what the beach has to offer?"

"Very little, I fear. But the soles of my shoes are aching for the kiss of good, solid earth—and my eyes are crying out for figures of the kind I can't feed into my plotting machine. Let us go."

The dapper little man flung his arm over the shoulder of his big companion. Together they walked to the open hatchway, descended the wide ladder leading down into the body of the ship.

The pilot book will tell you that Port Ruthven has a Terran population of five thousand, that it stands on the south bank of the *Tamar ur Liran*—River of Darkness—and that its imports are all manner of Earthly manufactured goods, and its exports the *Chirin* weed and native works of art. And the book goes on to say that the fort commandant is, ex-officio, port captain, and that the civil government consists of a council of twelve elected members under an elected mayor, and that there is a hospital with five hundred beds, and that there is infrequent road and air communication with other parts of Darsha and a frequent spaceship service to all colonized sectors of the Galaxy.

But the bald words of the pilot book cannot call into life the picture of an outpost set among the more distant stars. Not that this is much loss. All such small colonies are the same—a huddle of plastic buildings, somehow just failing to achieve the grace and beauty of design intended by their builders, garish and cheap against their alien surroundings. And there is the pathetic hunger for news from Earth, and for such luxuries—small in fact but bulking big in the artificial environment—as cigarettes and cosmetics, films and fashion books. And there is the continual rivalry between civil and military governments, between mayor and fort commandant, the friction and the scandal and the ill feeling.

There is entertainment to be had—crude and raw as befits those for whom it is intended. Not only spacemen straight from the darkness and loneliness of the interstellar deeps—they are a philosophical breed and take whatever is offered in the way of diversion, provided that it is not too much trouble for them to go and find it. But also the people of a city under siege—for that is all that such outposts are. The investing armies may not be corporeal—but the material is only one aspect of reality. There is the omnipresent sense of strangeness, of alienage, the misshapen, unrecognizable constellations marching in straggling procession across the night sky. And under the light of strange suns all things are strange—wives and husbands, friends and children.

And all this pales into insignificance beside the fact that—more often than not—the Terrestrials are themselves aliens, a mere handful of barely tolerated alien life among the teeming millions indige-

nous to the planet. They must walk carefully and speak fair to the beings amongst whom their lot is cast. They tremble always upon the brink of the massacre that will follow hard upon the heels of real or imagined insult, the whim of some savage ruler. If there should be trouble—if exports, or trade percentages, should fall below those expected, they knew that it would be investigated, even as Darsha was being investigated. They know vaguely that the arm of the Terran Central Government is long and realize with a dreadful clarity that its action is not instantaneous.

But there is entertainment to be had—crude and raw as befits those for whom it is intended.

In a pavilion hard by the darkly swirling *Tamar ur Liran* sat LeClerc and Manson. A bottle was on the table before them. The air was blue with tobacco smoke and with the softly scented fumes of the *Chirin* weed. The convoluted clouds and spirals of smoke shook and quivered to the harsh, rhythmic cacophony of the shiningly perspiring negro band. On the stage a red-haired girl was dancing—dancing and casting her sequin-studded veils from her one by one. The scene was as old as man.

"We could be two of Hanno's Phoenicians just back from the circumnavigation of Africa," said Manson softly.

LeClerc did not hear. To him the girl on the stage was woman, the throbbing of the drums the eternal beating of the heart of the race.

Manson started to speak again, then thought better of it. He refilled his glass from the bottle, lit a fresh cigarette and sat well back in his chair. He did not look at the stage—he had seen it all too many times before. He had seen the people too many times before as well—but they, unlike the girl on the stage, were not acting, were not pretending a virginal rapture of the dance that they could never feel. He was seeing them unguarded, with all screens down. What he saw was not particularly inspiring—but it was real.

He let his glance rove over the crowded room, the tables, each with its little circle of unsatisfied pleasure seekers. He saw fellow officers from *Argo*, soldiers of the garrison, men and women in civilian clothes, unimportant corpuscles of the body of the little entity that was Port Ruthven. He noted, not without a faint disapproval, that too many of the guardsmen had neglected to change from fatigue to dress uniform, had not bothered to shave before enjoying their evening's liberty. He reflected wryly that the mythical Englishman who had insisted on dressing for dinner in the jungle was far more than a mere figure of fun.

He stiffened in his chair.

"Frenchy!" he demanded urgently, gripping the other's arm, "who's that?"

Reluctantly LeClerc tore his eyes from the garishly lighted stage. He followed his friend's

glance to the table where sat the tall brunette—black hair, white skin, a form-fitting black dress—and her companion.

"That is Natalya Orlanoff," he said. "The mayor's daughter."

"No. Not her. That . . . *thing* with her."

"That *thing*," replied the navigator, a faintly sardonic accent on the noun, "is Leporex, the Darshan trade commissioner. They have the usual set-up here. One of the natives lives inside the city as trade commissioner and—if the truth be known—as hostage."

"Oh," said Manson shortly.

"A pity," said LeClerc, his warm eyes straying back to the stage, "that one never sees the governor himself at such a place as this, anywhere, no? Some small association with the . . . how you say . . . facts of life would benefit any legislator."

To himself, *"Pleasure-seeker,"* Manson said disgustedly.

He let LeClerc give the stage his undivided attention once more, and himself studied with undisguised interest the strangely assorted pair at the other table. He felt a little annoyed with the navigator. Until now the girl, the mayor's daughter, had been no more than a blur of black and white, an out of focus picture beside the bizarre Darshan. Now he found it hard to concentrate upon the complexity of tendrils, the globular, furry body that was the native. He began to wonder why it was that he ever had been more than ordinarily interested —for he had seen in his travels many an alien life form. Perhaps it was the peculiar nature of the ornamentation affected by Leporex. He had known that such of the cargo as was intended for trading purposes consisted mainly of clocks and watches—but had assumed that those acquiring the timepieces would use them in the orthodox manner. He had not been led to believe that the Darshans were a race of primitive savages. One had only to look up to the Tower of Darkness to realize that they were not. Yet the native trade commissioner wore upon one tentacular arm no less than a dozen wrist watches.

They should have conveyed a strong impression of barbarity, or savagery. They didn't. Manson gave up wondering why this should be so and let himself look at Natalya Orlanoff.

This must be part of her duties as mayor's daughter, he told himself; to act as the hostess to little monstrosities that looked like something dredged up from outside the hundred fathom line. Although she was probably far safer with the Darshan than she would have been with a Terran escort—Anyhow—here was this unspeakable Leporex seeing the sights of Port Ruthven and monopolizing the only good-looking girl in the place. And it wasn't even that the Darshan could appreciate it. It would be all one to him if his hostess had one eye and a wooden leg.

Manson poured himself another drink and, suddenly, felt very

sorry for himself. The little part of his brain that was, on these occasions, a coldly disapproving but entirely powerless censor was telling him that he would be wise to lay off the local brew. He heard the warning, appreciated its timeliness—and poured himself another drink.

The band was playing something else now—a thing that was all strident brasses and insistent drums. The pilot shot a sidewise glance at LeClerc; the little navigator was still intent on the garishly lighted stage. He looked back to the mayor's daughter and the native trade commissioner. Their eyes met his. There was no hostility in the exchange of stares. There was curiosity; there was, from the girl, something that could have been an appeal for help. And the brasses screamed and the drums were the hammers of creation. The music lit a rhythmic flame, faintly flickering, behind the white face of the girl. It was impossible for one not of his race to detect any emotion on the face of the Darshan. It was hard to believe, even, that the pupilless eyes were alive. Yet—and this was a matter of feeling rather than knowledge—it seemed to Manson that to the native the music was no more than a series, a combination, of unpleasant atmospheric vibrations.

Manson's chair grated harshly on the floor as he rose to his feet. He stood there a second, swaying ever so slightly, a giant of a man still drawing his strength from the great Earth mother that was, to most of those present, but a dust mote circling a faint, far star, long ago and far away. There was a vitality, a solidity—all that ebbs slowly and almost imperceptibly from those too long absent from the planet of their birth. Some of the slovenly soldiers looked at him incuriously. Some of their companions looked at him with more interest—but this rapidly faded as they saw him walk, slowly and carefully, to the table of the mayor's daughter and the Darshan trade commissioner.

Then Manson was looking down at the tall, dark girl and her alien companion. Momentarily, he was tongue-tied. Had it not been for the hint of encouragement in the girl's dark eyes he would have retreated ignominiously. Then—

"Miss Orlanoff," he said. "I thought that I recognized you. Would you mind if I—"

"It would be a pleasure."

The girl extended a slim hand. Manson took it, held it a long second longer than was necessary.

"Leporex," said the mayor's daughter, "this is an old friend, a passenger on the *Argo*." Manson wondered if the native noticed the glance that flickered briefly over the insignia on his sleeves, and if the girl knew his true mission.

"Won't you introduce me, Manson?" came the voice of LeClerc. Manson started. He had not seen the little navigator leave the table. But his presence at this moment got him over an awkward hurdle.

The girl was able to complete the little ceremony—the Darshan acknowledging in a thin, sibilant whisper that was a parody of Terran speech. Then there was a brief, awkward period. The spacemen knew that the girl wanted to tell them something. But there was some inhibition. It was obvious that what she wished to tell them, or ask of them, was not to be heard by the native.

Manson and LeClerc drew up chairs and sat down.

"Your first visit to Darsha?" asked the native of the chief pilot. His voice was high and thin, the merest ghost of a sound against the clamorous background of the music.

Manson started to reply. He hesitated. That little, invisible censor, coldly sober in the corner of his brain, told him to go carefully. Very carefully.

"No," he chanced slowly. Then again, "no."

"Mr. Manson was here some years ago," said the girl. "He was a cadet on the *Draco*."

Manson smiled, his breath taken.

"Indeed?" The ghost of a voice was like a little, inquisitive wind. They could almost hear the rustle of the dessicated debris of dead years that it swept out from the forgotten corners of the mind. "Perhaps you can tell me what became of my friend Captain Clarendon."

"Captain Clarendon was never on the *Draco*," said LeClerc quickly.

"No?" There was a pause whilst the native's eyes, unrelieved pools of darkness, regarded the little navigator.

"Shall we all go round to the house?" asked the girl, a certain urgency in her voice. "This show is very boring. How do you find it, Leporex?"

"Incomprehensible."

The girl rose first. The trade commissioner was on his multiple feet a moment later. Manson looked around for the slovenly waiter so that he could pay the reckoning. But when it was brought the man ignored him, presented the slip of paper to the mayor's daughter. She initialed it with a little gold pencil. She half smiled—the first time that Manson had seen so much as the shadow of an emotion on her face.

"You have been the guests of the city of Port Ruthven," she said.

Manson mumbled his thanks. LeClerc said nothing—just bowed slightly from the waist. It was more effective than words could ever have been.

A waiter brought the girl's fur-lined wrap, helped her into it. The Darshan was unclothed: looking at him, Manson wondered if any clothing could be devised that would fit that body. The party threaded their way through the tables to the door. Outside, after the garish interior lightning, it was dark. A little wind sighed over the *Tamar ur Liran*, cold with the breath of interstellar space. Overhead sprawled the Great and Little

Bears, subtly distorted, frostily scintillant. The warm light from the windows of the place they had just left, the faintly heard strains of strident music, seemed to call them back.

Manson shivered and turned up the wide collar of his uniform blouse.

The girl led them to the parking lot where her own vehicle stood among those of the many other patrons of the establishment. She opened the door. With unconscious arrogance Leporex got in first, taking the seat next to that of the driver. The two spacemen got in next, taking the rear seats. The girl was last. They heard the gyroscope whine as she started it, listened for the clicks as the parking props slid into their retracted position. On its single wheel the car slid out of the parking lot, turned sharp to follow the road along the river.

In the sharp beam of the headlight the trees along the river bank stood out in every detail. They were not too unearthly in appearance—their alienage lay in the angles made between twig and bough, bough and trunk. It was nothing that Manson could put his finger on. They were just trees. And they were *wrong*.

Now they were rolling up a broad, tree-lined avenue at right angles to the river road. Widely spaced, each in its own garden, stood the villas of the colonists. From big windows streamed bright lights, the symbols of the struggle of those inside to push back the dark. It seemed to the spacemen that over the whole town hung the spirit of a false, mirthless revelry. It was all part of some obscure struggle, a battle between man and some unknown, unknowable adversary. And man was losing.

The car ground to a stop.

It had halted outside a long, low building, the colonnaded frontage of which gave it a vaguely classical appearance. Its counterpart stood on thousands of worlds. Manson did not need to be told that this was the City Hall, the mayoral palace.

The parking props descended to the hard driveway with audible thuds. The note of the gyroscope descended the scale as its power was shut, as it spun to a long-delayed but inevitable standstill. The car door opened, letting in the cold night air.

Manson was out first. He stood by the open door ready to assist his hostess to the ground. But the Darshan commissioner took the proffered arm as though by right. The touch of the tentacles on his sleeve, even through the thickness of the cloth, made the chief pilot want to cry out. It took more will power than he had known that he possessed to keep from flailing out wildly with that arm, to stop himself from dashing his fist into the featureless surface of eyes and appendages that served the Darshan for a face. Had he not known what must be the consequences of such an action he would have done

so. But he swallowed—and remained motionless.

He saw LeClerc get down from the car. He saw his shipmate assist the mayor's daughter to the ground with a Latin grace that he could never hope to equal. And he felt what he could diagnose only as a stab of envy.

They—the two Earthmen and the native—followed the mayor's daughter into the palace. They followed her through rooms that must, once, have been fit for the entertainment of Galactic princes. Neglect now lay, an almost visible patina, over all these rooms. Almost visible— For there was nothing obvious, no untidiness, no dirt. It was psychic rather than physical. The heart had gone out of the place.

They found the mayor in a small room, half study, half lounge. The introduction, although made, was not necessary. Only a Slav could be the father of the Slavic girl who had brought them here. And Orlanoff was the last of a long line of poets and dreamers. He could have starved in an attic and plotted revolution under the Czars. He could have carried a rifle or manned a machine gun in the mad days when the old regime went down in flame and smoke, when the Red Dawn came up like thunder over the empire of the Romanoffs. He could have starved in an attic and plotted revolution under the Soviets—

The man with him, the big man in the untidy, stained uniform with the elaborate insignia on the epaulettes, must be the commandant of the fort. And, like his host, he was drunk. It was a hopeless sort of drunkenness. There was no merriment in it—none of the spirit of good fellowship that comes when two boon companions split a bottle or so together. It was not even drinking to forget. It was drinking because all else was futile.

"Father," said the girl.

The two men looked at the newcomers with dull, incurious eyes.

"Father," she said again, "I've brought Leporex back from the Golden Parrot. And guess who I met there—Bull Manson. Don't you remember him—he used to come to our dances when he was a cadet? And this is a shipmate of his, Mr. LeClerc—"

"Bull Manson," mumbled the mayor. "Yes, yes. Of course. And Mr. LeClerc. I'm pleased to meet you, Mr. LeClerc. But we will drink with our good friend Colonel Blucher here and ignore the fact that outside the night is cold—and that it will grow colder—"

With a hand that shook, with bottle neck chattering on tumbler rim, the colonel refilled his glass. He rose unsteadily to his feet. He declaimed in a thick voice:

"One Moment in Annihilation's Waste,
One Moment, of the Well of Life to taste—
The stars are fading and the Caravan
Starts for the Dawn of Nothing—Oh, make haste!"

Manson looked at the navigator. The other returned his glance. The little, dark clever face was serious, worried. They both looked at the girl. She was biting her lip. They saw a look of hopeless appeal in her eyes. Then she turned her head away quickly. It seemed that a strong aura of disapproval had emanated from the native—disapproval not for the sodden wrecks who were sprawling in the chairs, but for those who still retained some shreds of self-respect, on whose mental horizon still glowed the pale light that was hope for the future—for *anything.*

Colonel Blucher levered himself up from his chair. Clambered would almost be a better word. He clutched for support at the arms of the piece of furniture. He mumbled something in an indistinct voice.

"—of the Well of Life to taste—" Manson thought he heard him say.

Then he cast adrift from his insecure moorings at the chair. He staggered across the room. Natalya drew back, but her way was blocked by Leporex. The colonel caught the girl with one arm around her waist, with his free hand he tried to raise her face for a kiss. She said nothing but struggled silently. In spite of his condition the soldier was a strong man. Slumped in his chair the mayor was a dumb, uninterested spectator.

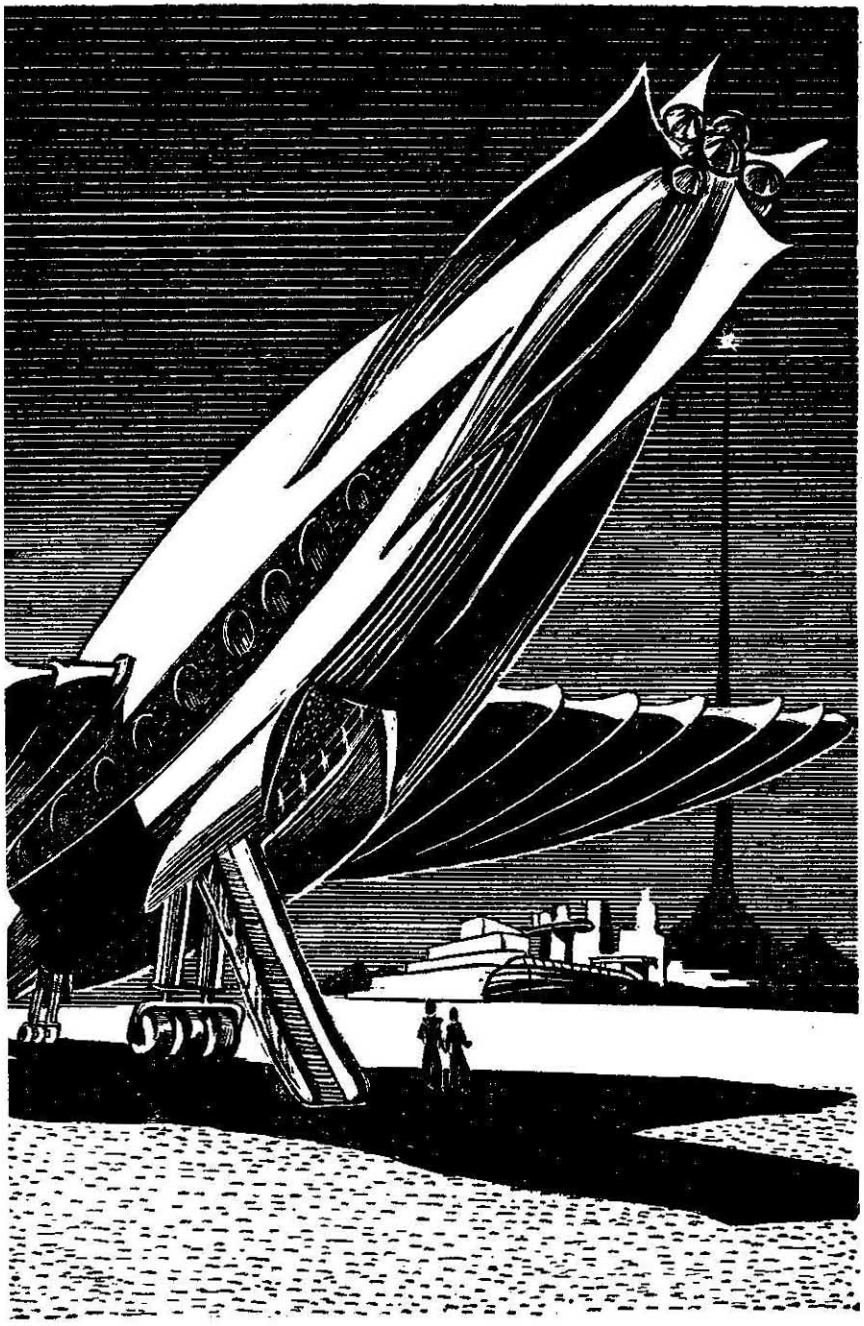
With one stride Manson was across the room. He seized the colonel by the collar of his uniform. With his left hand he caught the wrist of the arm that was around the girl's waist. He twisted—hard. And he flung the commandant from him as though he were some piece of carrion that would soil his hands. The heavy body thudded to the floor. It stirred feebly. Then the soldier raised himself to his hands and knees, his shaggy head shaking like that of some bewildered animal. He stood briefly erect, then collapsed into his chair. His unhurt arm reached out for the drink he had left on the low table.

Manson wanted to spit, to do anything to clear the vile taste of the room from his mouth. He wanted to demand of the mayor what sort of man he was to let his daughter be treated thus in his own house, by his own guest. But Orlanoff was asleep, or almost so.

"The cold—" they heard him whisper. "The cold— The cold and the dark— The end of all—"

Natalya said something too—something unheard by everyone but Bull Manson. Two syllables, barely breathed, but they said that she admired him, and trusted him, and knew that she had been right in introducing him into this fantasy as she had. She said, "Thank you."

The dark—*Tamar,* in the language of this world wearily circling its faint, dim sun. *Tamar—Tamar ur Cholon*—the Tower of Darkness. Orlanoff whispering in



their minds took on substance, was clothed with insubstantial ghosts of words.

"*Tamar ur Cholon,*" Leporex was saying. "Tonight you come to the Tower of Darkness—"

"Tonight—" Natalya's voice was a whisper almost as tenuous as that of the native. "Yes, tonight. But my friends—"

There was a hesitation that told of the weighing of unknown factors in the Darshan's mind. Then—

"They may come."

"We shall be charmed," said LeClerc, with an irony that was wasted on Leporex. And—

"What goes on?" demanded Bull Manson.

The alcohol-induced belligerence was fast fading. He knew that the girl wanted them to come, was expecting them—*him*—to deliver her from some unknown danger. And he was not sure that he wanted to go. He was remembering the navigator's unpleasant little story about the shipmate who had lost interest in everything—even living.

"What goes on?" he said again.

The mayor's daughter swung to face him, the black of her dress momentarily molding the long, firm curve of her thighs. Yet there was no vitality in her, and there was the sense, subtle, hard to define, of something missing. But she swung to face him, and although her white face was expressionless, the black eyes were eloquent.

"I do not know," she whispered. "My father became interested in the Tower of Darkness. He was taken there by Leporex. The colonel has visited the Tower of Darkness. And many citizens have been gone. You will ask why, with *this* before us as a warning," there was nothing but contempt in the gesture with which she indicated the sprawling mayor, "we should go. But we must. It stands there —tall, compelling. Both by day and night it bulks big on our narrow horizon. Can't you see? It is the urge to know—"

"It is Truth." The voice of the native was a barely audible whisper, heard in the mind rather than with the ears. "It is Truth—and the answering of all questions."

One of the many smooth tentacles came up to slide, with a revoltingly caressive motion, over the little, shining watches strapped to the armlike appendage. Manson knew suddenly that they were not worn as ornamentation, that in them was a religious symbolism beyond his comprehension.

"Cold and dark—" muttered the mayor. "No light . . . nowhere any light any more . . . and the darkness everlasting—"

Somehow they found themselves outside the door. From the room they had left came the unsteady chattering of bottle neck on tumbler rim, the sound of two, dreary voices raised in dreary song. Manson and LeClerc fell in, one on either side of the girl, a bodyguard. The trade commissioner, not looking back, led them out of the palace. Manson was glad that the native

was not looking back, had not looked back. For he had taken the opportunity to slip the colonel's heavy service blaster from its holster, and it was making an unsightly, obvious bulge in his trousers pocket.

They all got into the monowheeled car—Leporex first and then the mayor's daughter and her escort. As before, she took the driver's seat, and as before the native sat beside her. In silence they skimmed down the broad avenue to the river road. The lights were still harshly bright over the highway, from the houses they passed. There was traffic now —townspeople returning from the various places of entertainment. There was drunkenness at the wheel, weaving headlights and protesting, mishandled machines bearing their fallible masters into dangers and hair-breadth escapes that they themselves, given independent volition, would have avoided. It was, in short, an exhibition that would not have been tolerated on any other colonized planet of that Galaxy.

But the girl appeared not to notice. With easy skill she pulled away from seemingly inevitable collisions, from every hazard of the dark, monster ridden road. She sent her car whining along the river bank, past the Golden Parrot and similar establishments from which still streamed garish light, from which still drifted the rhythmic beat of meretricious melody. Then hard left she swung, over a bridge that flung its frail, slender arch across the River of Darkness. There were guards at the bridge, and a gate. But the gate was open and the soldiers snapped briefly to attention as the car swept by.

From behind them came the glow of the city lights, but ahead the sky was dark. Black against the faint, northern constellations, a deeper, sharply etched black against the dimly luminous blackness of the night sky, loomed the Tower of Darkness. And as the miles unrolled under the single, whirling wheel of the car the monstrous monolith reached up into the sky, reached out and up for the far, faint stars, the lights that were an affront to its own negation of all light.

And Manson was afraid. It wasn't a physical fear—he was a strong man and armed, and he was not called "Bull" for nothing. But he was afraid as his mind groped vaguely with his first dim concepts of the grim symbolism rearing its dreadful height before him. And he heard LeClerc saying something softly, in an awed voice—and yet with that faint touch of ironical amusement that never left him.

"Alike for those who for Today prepare,
And those that after a Tomorrow stare,
A Muezzin from the Tower of Darkness cries
'Fools! Your reward is neither Here nor There!'"

And the white ribbon of the road stretched before them, brilliant in the beam of the headlights, rolling back swiftly and smoothly under the wheel of the car. And

the Tower of Darkness loomed ever more huge and frightening, higher and higher, until all the world ahead, save for the last, short shred of the roadway, was black.

The car slowed, rolled to a halt under an enormous arch. The parking props clicked to the ground. The gyroscope, shut off, spun slower and slower, its whine deepening and dying, running down, running down— All around them were the people of Leporex, unseen, sibilant voices in the darkness. Tentacles reached into the car. Manson struggled to draw his gun, but his arms were pinioned. He was lifted from his seat, set down, standing, on to something hard and solid. He could feel the girl against him, firm yet soft, warm. His frightened mind caught hold of that warmth, clung to it and the sound of her regular, unhurried breathing. On his other side was LeClerc. He could not see the navigator, but he knew that he was smiling. He knew that even this could not shake the other's outlook, that inimitable compound of kindliness and cynicism, youthful eagerness and weary experience.

Surrounded by soft, cold bodies, unable to stir a finger, the mayor's daughter and the two spacemen were half led, half carried, across the cold, hard floor. And there was a confused period—short or long they had no means of knowing —when they felt themselves borne steadily upwards. It was not that they felt the floor pressing against their feet—it was that, for frightened seconds or minutes, there was *no* floor. No floor—and the nightmare sense of flight.

Then they were standing once more, standing on a smooth, cold surface. A *cold* surface. The chill struck upwards through the soles of their shoes, crept up through feet, and legs, and body. The air about them was still and cold, dead—yet alive with the eerie, half-heard whisperings of the beings all around them.

Slowly, hesitantly, light dawned. No more than a dim, green pallor it was, ally rather than enemy of the darkness, and cold. The waves of cold beat all around them, through them. The cold and the dark, the last, implacable enemies. The last realities. The only realities. The beginning and the end of all.

Before them, limned in pale-green fire, loomed the Machine. Homely it was, familiar, no more than a magnified projection of a commonplace piece of mechanism. Alien it was to the natives of this world—and yet of all man's vast stock of manufactured goods it was that most in demand for barter. For it was the symbol of their dark worship, of their hungry, implacable god, of their faith that was the negation of all faith.

In their ears, amplified until it was the pulse of ultimate doom, beat the noise of the Machine. And between each stroke and its successor the interval was longer, longer, until the dreadful, irrational fear that every stroke

would be the last drove all else from the shrinking human minds. And on the heels of the fear came resignation, realization—the full, shocking impact of the joyless philosophy of the natives.

Beat by beat, through gear trains, by the friction of almost frictionless bearings, the last remaining ergs of energy in the mainspring were being dissipated. Throughout the Universe suns without number squandered their energy, their very substance, in short, futile flarings of light and heat. Short, futile flarings not as measured against the pitifully brief duration of intelligent life—but as seen against the background of the ever encroaching dark, the eternal night. The clock was running down.

All this, and more, flashed through Manson's mind. Like all men he had accepted without question the validity of the second law of thermodynamics. Accepted it —but with the intellect only. Now it was an emotional acceptance—and the acceptance brought despair.

The clock was running down.

And the gelid air was alive, was pulsing with thought. There were the thoughts of the natives, organized, beating down the opposition put up by the three from Earth. *Accept,* they cried wordlessly, *accept—and put an end to your endless striving for you know not what. Ours is the way, the only way—the way to oneness with that which is greater than all the stars. Ours is the way of peace, of acceptance, of resignation. Ours is the way of peace—*

Soundlessly, wordlessly, came the thoughts of the mayor's daughter. They were pictures, they were a song. They were the dawn and the sunset, they were Reveille and Retreat, they were the sunset gun.

The sunset gun—

The sunset gun, and the flag, dark against the dark sky, creeping down its halyards, and the swift strides of the dark, the night, the cold and the dark, nevermore any light anywhere, and darkness for evermore and evermore.

Something exploded in Manson's brain. It was an oath, it was a shout of protest and defiance. It was a hand, warm and friendly, thrust out into the darkness to grasp those of his comrades. It was a ladder by which the girl could climb from the abyss into which her treacherous thoughts had led her.

It was the roar of machines, and the hoarse song of those who built the machines, tended the machines. It was cities, thrusting, many pinnacled, through the low clouds. It was man the artisan, man the builder.

And it was the gleaming armadas of interstellar conquest, the pomp and pageantry of galactic empires. It was investing fleets, raining fire and destruction upon rebellious worlds; it was great battleships fighting on against odds with but one gun left to fire—and one man left to fire that gun. It was man

the fighter. It was man reaching out to the stars.

It was the flare of rocket drive against the stars, against the stars, against the cold darkness between the stars, the cold darkness, the cold, the cold and—

It was the roar of machines, the song of power, the music of moving parts interacting, the song of steel, of swift moving steel. But discordance crept into the song, there was wear, erosion, the wearing out of the Machine, the running down of the clock, the cold and the darkness, the night, and darkness for evermore and ever—

And so it was that Bull Manson —great, hearty, brilliant Bull Manson—failed.

He had voiced his defiance with an oath. The clock was running down, and with his ringing oath he had said, "And when it does—we'll wind it up again!"

It was magnificent. It was not enough. It failed. Custer was magnificent, too, to those who read the ancient legends.

The cold pressed close. Radiant energy is the source of life, but radiant energy is only the symptom of imbalance. Collapsing matter must radiate, and then the time must come when all excess matter-energy is dispersed and redistributed; and then the stars will grow cold. Forces must balance. Forces—*will* balance. In the Tower of Darkness, in the slowing beat of the Machine, the ultimate darkness was palpable. Cold was there, emanating from the destructive fervor of the solemn natives. Darshan civilization had declined and died, and in the rightness of its dying, it was carrying humanity.

A little moan escaped Natalya's soft lips, and she leaned against the man nearest her, faint, sick, and not caring.

The man was LeClerc. As she touched him, as her weight came to him, his glossy head turned to her. She was woman; and with all his unthinking grace, he slipped his arms around her. It was dark, and it was cold, but—

But that could wait. LeClerc kissed her.

Full in the eyes of the Darshan priests, they kissed. So perfectly timed was that kiss, its emanations so completely disruptive, that the strange, dark figures recoiled. And now there was music—crashing cymbals, strident brass, and the living pulse-beat of the drums. There was light—harsh, garish, flickering in time with the music, stronger and stronger, brighter and brighter, fighting back the cold and the darkness.

The Tower of Darkness was a looming shadow on the road behind them. Black it stood against the morning sky, ominous, forbidding. But their backs were turned to it.

The girl was driving. Beside her sat LeClerc. They were very close. Alone in the rear seat was Manson. He sensed what the finish of the story would be for

the navigator and the mayor's daughter, but he was only a little jealous. He knew that his friend had saved them all from a philosophy of dark despair too much for the human mind to bear, and he was grateful. And curious.

LeClerc, his arm still over Natalya's shoulders, turned to look into the back seat.

"So," he said. "So our Mr. Leporex has promised not to play at missionaries any more. So he thinks we aren't suitable to receive the great truth of Tamar." His face grew serious. "If I had a god, my friend, I would pray that we never are."

Bull Manson laughed. "Promised? Leporex promised?" Another deep peal of laughter escaped him. "We . . . you horrified him, LeClerc. We are unfit. You hear, you hedonistic devil? We're unfit!"

"Unfit, then," smiled the Frenchman. "And therefore you, my friend, will doubtless recommend in your report that the administration here be replaced by personnel who have shown that they take the. . . . ah . . . better things of life for their intrinsic value, and not as a means of forgetting the encroachment of the shadows. No?" He chuckled. "Hedonists —who will properly take good care of Darshan exports in-between times."

Bull Manson looked at the little navigator's dark silhouette with an ever-growing respect, thinking of the difference between Natalya's two kisses—the colonel's, and LeClerc's; wondering—

"Tell me," he said. "How did you know?"

"I did not know," replied the other, decisively. "I felt. I felt what I have always felt; and feeling so—why, the tastes and colors of *now* are of greater importance than the end of time or death or the course of life. You call that Hedonism, no? My friend, there is more truth, more reality, in the thighs of a dancing girl than in all the philosophies of this, or any other world."

Then—

"Do you think, Bull, that you could drive this car?"

THE END.

BRASS TACKS

For back copies we don't have, you might try Julius Unger, 6401—24th Avenue, Brooklyn, New York.

Dear Mr. Campbell:

Having been unfortunate enough to wait until '43 to discover the world of science-fiction—and I thank the gods that the time was not longer—I began trying to make up for lost time, hounding each and every fan I made contact with, visiting second-hand magazine stores, and finally resorting to the use of my personal time machine; all for what purpose? Why, to get back issues of Astounding, of course!

You might well wish that I had never done so, for acquiring some of those older numbers brought about this missive. To wit:

I did find a few Astoundings from the period 1937-'39, so I got in on the mag at the time when you were bringing about the changes which have made it what it is today—the leader.

It has been written that, "Many men know the art of flattery, few know the way to praise." As I am poor at both, I'll leave them to someone else, and continue upon the course I have planned.

I stated before that I got in on the "mutant editions," and naturally, began comparing them with the present publication. Several things bothered me as I did this—not the least of which was my younger brother—among them the old questions that are always bothering Ye Old Ed—art, reader's column, art, stories, art, reader's column and art. The ones that impressed me most were art and the reader's column.

Sooooo. Those book jackets you had illustrating the serials and most of the other stories—1939—surely did improve the looks of the mag and the enjoyment of the stories. I don't know just how much you have to say about the art work, but perhaps if you were to make an appeal to readers, asking how they like the present illustrations as com-

pared with those of a few years back, you would find if their opinions have changed. I see that you —or someone—are giving us a couple of full page spreads now, but I look at those jackets and sigh.

I realize that a blatt column is a place for educated and unedjacated alike, provided that what they have to unload is proper and for the good of the order; however, Brass Tacks, in the last six or eight months, has reverted almost completely to the old Science Discussions. True, the topics have not been abstract problems in physics or chemistry; nevertheless evolution, trajectories, et cetera, have come in for their full share of the pie. I, for one, would rather see the return of Science Discussions. Now don't get me wrong; I can enjoy a good letter anent a problem that arises as much, if not more, than the next reader, but Brass Tacks should remain Brass Tacks.

About all I can say on the stories is to nominate Padgett's "Fairy Chessmen" for second—at least—on the yearly ten and make a report for the Lab:

April 1946.

1. "Pattern for Conquest"—Smith's serial is getting interesting; though I get a bigger kick out of rereading his Venus Equilateral stories. They are certainly worth the expended effort.

2. "Black Market"—One couldn't begin to compare this with Mr. Jones' "Fifty Million Monkeys" or "Renaissance," but I guess it will have to suffice until he hands out another masterpiece. I'll be waiting.

3. "Swamper"—Shelton.

4. "Memorial"—Nothing against the story, but I liked Mr. Sturgeon's "letter" in the December issue almost as much as I did "Memorial."

5. "Loophole"—Giving a story last place makes one think it was no good; I really enjoyed your short, Mr. Clarke.—Dale Jones, Greggton, Texas.

Boucher's unusual article was an extremely interesting piece—and unique in making a genuine effort at unbiased prophetic interpretation of Nostradamus. Unfortunately, the limb he went out on proved weak. It broke down completely.

Dear Mr. Campbell:

I have followed with interest your many articles and editorials on Atomic Power in the last year or so, and sincerely believe they will be extremely helpful when the next atomic war comes along—conceding that we have just finished Atomic World War No. 1.

You predict the next conflict in some three or four years, and here you have disagreed slightly with old faithful Michel de Nostradame, as translated by Tony Boucher.

You see, I was running through some old issues of *Unknown Worlds* this afternoon, when I came to Boucher's article, "Out On a Limb," which appeared in the October 1941 issue. I hadn't read it before, and it proved very interesting in the light of what has happened since its publication. To be sure, many of

the prophecies as translated by Boucher didn't come off just as he foretold, but close enough to them to be uncomfortable.

I quote from the article in question:

"X, 100

"Le grand empire sera par Angleterre,
Le pempotam des ans plus de trois cens:
Grandes copies passer par mer et terre,
Les Lusitains n'en seront pas contens.

"The great empire will be for England,
All-powerfulness for more than three hundred years:
Great armies passing over sea and land,
The Portuguese will not be pleased.

"The last line has perplexed commentators, though I cannot see why. Surely no nation, which was once itself foremost in trade and colonizing, will be pleased to behold another rise up to rule the seas. The strange word *pempotam* is probably derived from the shocking Greek-Latin hybrid, *pan-potens,* all-powerful. *More than three hundred years implies less than four hundred,* and four hundred years from the publication of this quatrain comes to 1958. The time of the pan-potent empire is almost up."

Or so says Boucher. But wait. Nostradamus was speaking in round figures, wasn't he? And when you're speaking of centuries, 1958 could mean 1948 just as well, couldn't it? So perhaps you're not at odds with Nostradamus after all. But I hope you are. I recently filled in my collection of Astoundings, giving me a complete set from 1939 on. I'd like to have time to read all of them over before the bomb drops on Los Angeles.

Perhaps it's time for another article by Boucher on the great prophet. What did he foresee in the way of atomic power, Tony?—Gene Hunter, 2503 Burton Avenue, San Gabriel, California.

Ever read Kipling's "Tommy Atkins"?

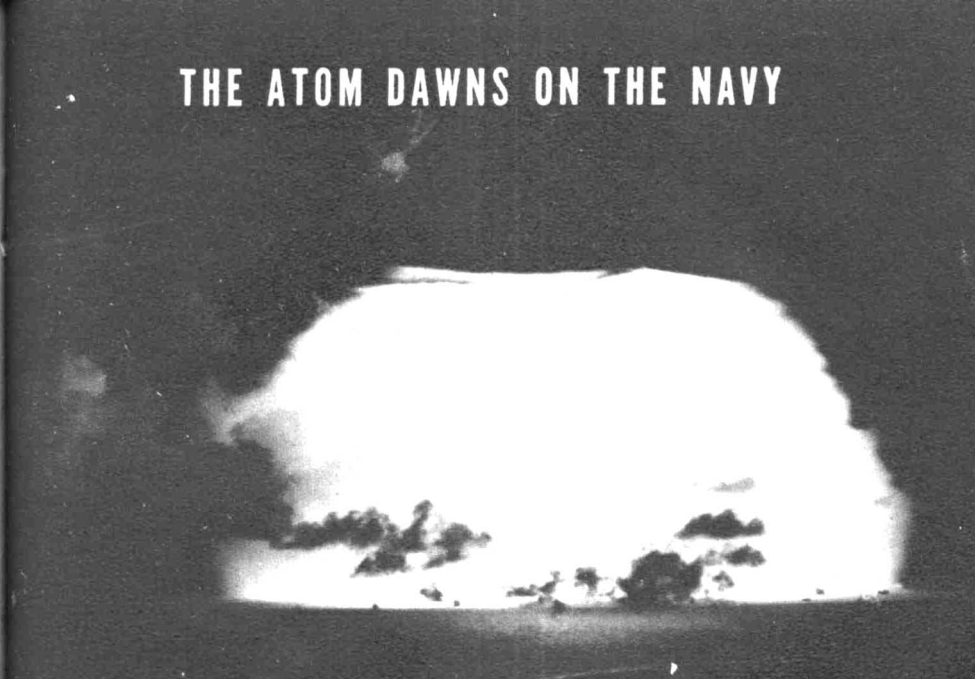
Dear John:

Haven't written since sometime before I went into the army to make things safe for the big shots. As you probably know from observing those around you, the soldier is the darling of the public while a war is on but as soon as it's over he is the forgotten man. Why not have a story on this line in Astounding? Padgett or George O. Smith could handle it nicely. Or better yet, get one of your specialists on psychological studies. L. Ron Hubbard could do a long novelette on it and make it good.

What I'm really writing about though is Smith, the one and only, the incomparable spinner of super-dooper interplanetary, intergalactic

Continued on page 132

THE ATOM DAWNS ON THE NAVY



***In next** month's issue, a more complete discussion of Bikini will be possible; this shot of Bikini I—the air-burst bomb—serves better than any other so far released to give the proper scale of atomic energy. The toys in front of the fireball belong to the United States Navy; the low dark mass sprawled across the water in the extreme foreground is Bikini Atoll. Looking closely at the original, you can see a perfectly circular lighter area of water surrounding the immense fireball, spreading out a little ahead of it in all directions. That is the water shock-wave; sound travels faster in water than in air, so the water shock-wave is racing ahead of the incandescent sound-wave in air that is the fireball.*

The unimaginable brilliance of this immense fireball can be judged only by this: the jet-black background is the sky, lighted by the tropical sun; the black clouds are shining in the sun's brilliant light.

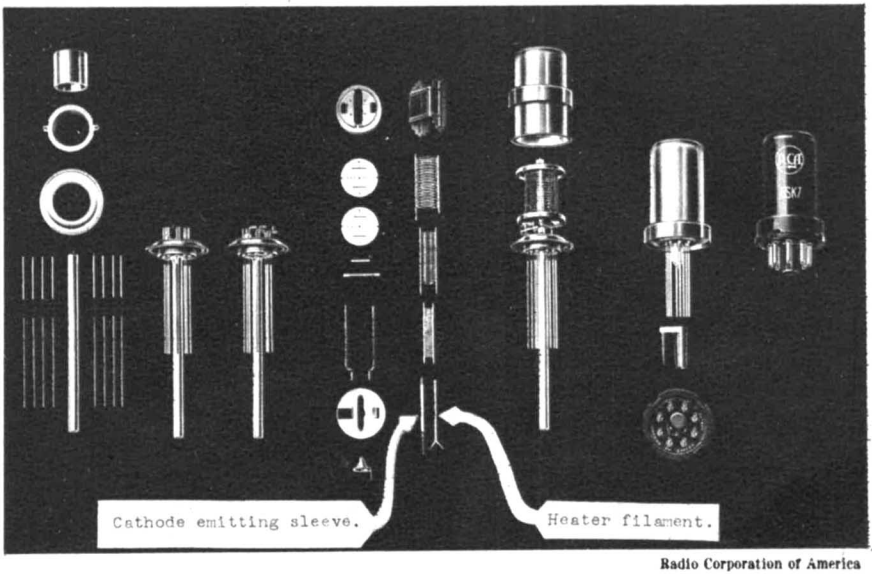
ACTIVITY

BY J. J. COUPLING

***Whether** it's a cathode ray tube for television, a magnetron for radar use, or a simple diode for a household receiver, an electronic tube is dependent on a source of electrons. And that means free electrons—electrons outside of metal wires. The activity of the electron emitting cathode is the critical point in electronic tubes—and nobody has any real knowledge of how it works!*

Electrons are the universal currency for the interchange of charge. This doesn't mean that electric currents are always streams of electrons. Often within a single medium, as, for instance, the electrolyte of an electroplating bath, none of the charged particles constituting the current flow is an electron. In gas discharges such as take place in neon tubes, thyratrons and mercury vapor rectifiers, both ions and electrons are present. It is in current flow between the boundaries of various substances, at the national frontiers of compounds or elements, so to speak, that electrons manifest their international currency.

The ions whose motion constitutes current flow in electrolytes and gases are distinctive little bits of the substance through which the current is passing. It is true that for a neutral atom or a molecule to become a charged particle or ion it must lose one or more of the electrons in its make-up—to become a positive ion—or gain one or more extra electrons—to become a negative ion. It is also true that a copper ion, for instance, is a very different thing in its properties from a copper atom. The point to be made is that the copper ions in a copper plating bath and the nickel ions in a nickel plating bath and the neon ions in a neon discharge all differ from one another, but the electrons present in conducting substances are all the same and are interchangeable.

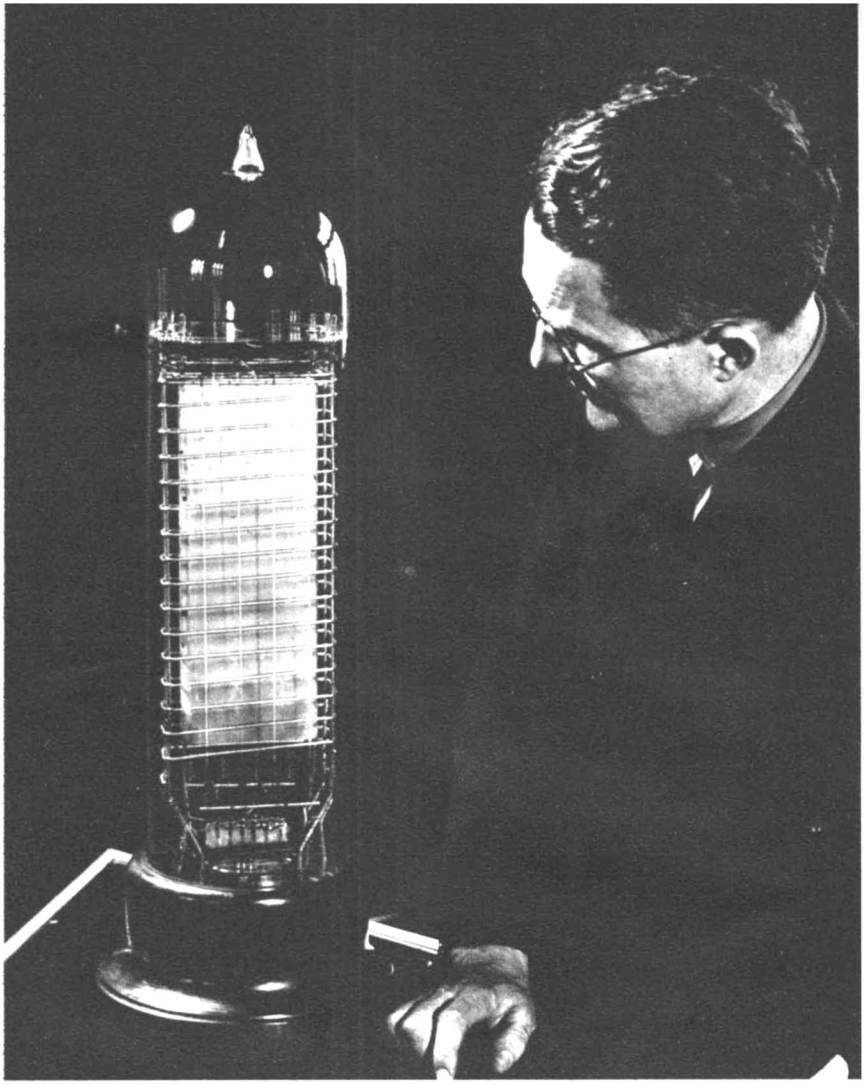


Radio Corporation of America

In this typical heater type tube, the electron source is a layer of barium and strontium oxides on the outer surface of a nickel tube, which is heated from within by an enclosed low-voltage filament.

Consider for a moment an electric current which flows successively through a copper sulfate solution, a copper wire, a hydrochloric acid solution, a nickel wire and a neon tube. In the copper sulfate, the current consists of positive copper ions moving toward the negative electrode and of negative sulfate ions moving toward the positive electrode. In the hydrochloric acid solution the current consists of positive hydrogen ions moving toward the negative electrode and of negative chlorine ions moving toward the positive electrode. In the neon discharge the current consists of positive neon ions moving toward the negative electrode or cathode and of electrons, negative of course, moving toward the positive electrode or anode. In the copper and nickel wires—and in any other metallic conducting path, for that matter—the current consists of electrons.

Now, when a copper ion reaches a negative electrode, it doesn't move right into the substance of the electrode and continue its current-carrying function; instead, it picks up an electron which has conveniently arrived as part of the current flowing in the circuit and becomes an atom of copper. Similarly, the sulfate ions do not flow into the positive electrode; the charge they bring to that electrode flows out through it as an electron. Similar phenomena take place in flow through the hydrochloric acid electrolyte, and the positive neon ions which reach the cathode of the neon



Westinghouse

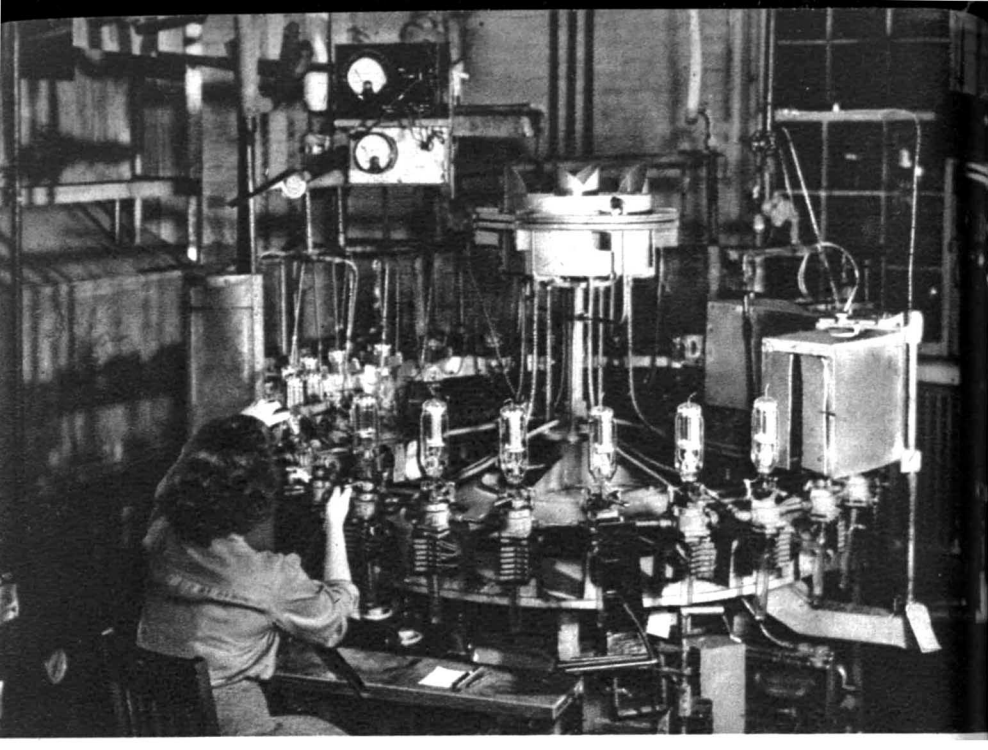
This large three-electrode—triode—tube was built to demonstrate effects of a magnetic field on electron streams. The thin outer vertical wires are the electron emitting source, the spiral inner winding is the control grid, and the enclosed metal plate is the anode.

tube pick up electrons and bounce off as neon atoms. Electrons are the interchangeable charges which cross the boundaries barred to ions. An electron may travel through part of a circuit as the excess negative charge which, tacked onto a chlorine atom makes it a chlorine ion; it may go through another part of the circuit as part of some other ion, or traveling as a *free electron* in a metal connector, or it may be *emitted* from the cathode of an electron tube and flow freely without collision through a high vacuum to the anode, there to pass into the metal and continue its journey around the electrical circuit. Ions may act as local carriers within the boundaries of a substance forming part of an electric circuit, but electrons are the world travelers which make the round trip.

We know that it is easy to establish current flow through a circuit consisting entirely of conductors in physical contact with one another. Electrons pass freely from one conductor to another. Any voltage, however small, is sufficient to establish a flow of electrons through a loop of copper wire. At some contacts between conducting substances, as in batteries, voltages are produced, but if these contacts are included in a closed electrical circuit consisting entirely of conducting substances, a current is sure to flow if there is even a very small net electromotive force in the conducting circuit taken as a whole. With electron tubes the situation is quite different.

The high vacuum of a radio amplifier tube is a very good insulator instead, and electrons are by no means completely free to pass from the cathode into the vacuum; special provisions must be made to get them out. At low voltages, a neon tube is almost a perfect insulator. The neon gas doesn't naturally have ions as do electrolytes. Neon ions are produced only when electrons accelerated to a considerable velocity hit neon atoms. For neon ions to be produced continuously so that the neon discharge may be maintained, eletrons must get out of or be emitted from the cathode of the neon tube into the rarefied gas. Once they are out, the electric field due to the voltage applied to the tube accelerates the electrons to such a speed that they can ionize the neon molecules they hit, and so the discharge can be maintained.

Electrons can be emitted from a cathode by several mechanisms. The simplest is perhaps *field emission.* If there is a strong enough electric gradient away from a metallic surface, electrons are dragged out, rather by main force, it seems. The fields required for field emission are enormous, and the magnitude of the currents attained is very small. The necessary field strength for field emission is attained even at high voltages only at sharp points on a metallic conductor. Field emission can be a nuisance in very high voltage vacuum devices such as million-volt X-ray tubes, and to avoid field emission all the electrodes at which there is a high field must be made very



Westinghouse

After assembly of "innards" and glass envelope, air is exhausted from tubes by semiautomatic pumping machines operated by girls.

smooth, so that tiny points which would make the field intensity even higher are avoided. The only practical use of field emission that I know of is in certain emission electron microscopes, in which the application of a few thousands of volt draws electrons from tiny points made exceedingly fine by an etching process. The emitted electrons are allowed to strike a fluorescent screen, and form a greatly magnified picture of the emitting point, a picture useful in deducing the properties of the substance forming the point from which the electrons are emitted.

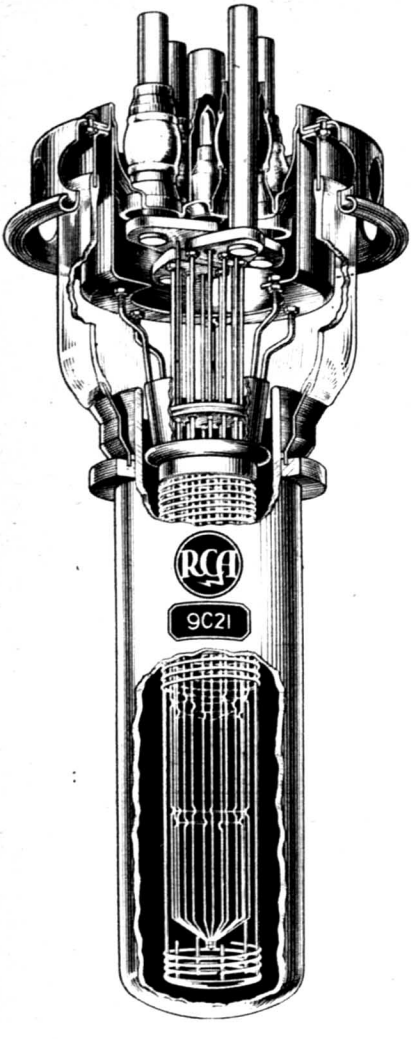
Secondary emission is another process by which electrons can leave a metallic or other conducting electrode and get out into a vacuum or rarefied gas. Secondary emission is much more useful in electron tubes than is field emission. The secondary emission multiplier is now a familiar device. In such multipliers the electrons which leave the electrodes are liberated by the impact of other or primary electrons. In multipliers the electrodes are of substances specially treated to secure a high secondary emission ratio, that is, a large number of emitted secondary electrons for each im-

Westinghouse

Forming a filament type cathode—electron emitter. Thoriated tungsten has a much lower work function than pure tungsten, and yields usable quantities of electrons at from 1300C to 1700C—yellow heat.

pinging primary electron. All substances will, however, emit some secondary electrons when struck by primary electrons. Electrons are emitted, too, when fast positive ions strike a metallic or other electrode.

This process of emission of electrons by positive ion bombardment is, in fact, what makes the neon tube go, and hence it is very important indeed. Many of the electrons in a gas discharge are pro-



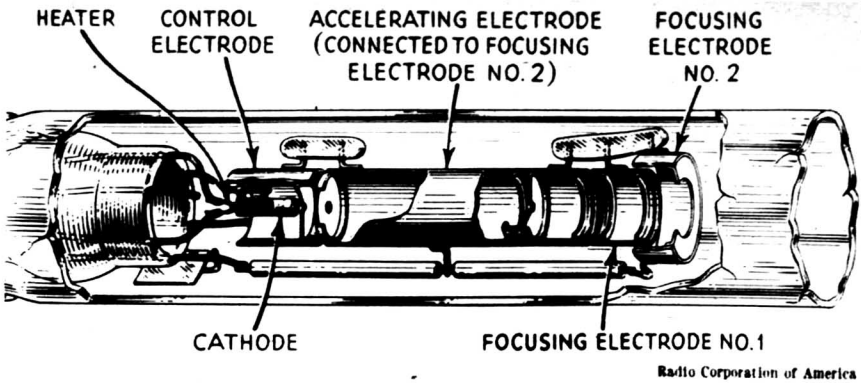
Radio Corporation of America

Cutaway view of a large transmitting tube. Emission takes place from the vertical "cage" of wires visible in the lower cutaway.

duced, like the positive ions, when electrons strike molecules of gas. All of the electrons move toward the anode and all of the ions toward the cathode. If there weren't an additional source of electrons at the cathode, the electrons would soon be swept out of the discharge space and no further ionization would take place.

Some gas tubes require a very high voltage for operation. If the tube is very long, like a long neon sign tube, a good deal of the voltage drop takes place uniformly along the length. Even if we made the tube short, however, we would find that a very considerable voltage was required to keep the discharge going. Part of this voltage drop cannot be avoided; the electrons which leave the cathode must fall through a voltage drop of about seventeen volts to produce ionization in neon and hence we must apply at least this much voltage to keep the discharge going. Actually, we know that we must apply considerably higher voltages in *cold cathode* gas tubes. The extra voltage is that required to give the positive ions heading toward the cathode sufficient speed to cause by their impact the emission of one electron for each ion which strikes. What this voltage is depends, of course, on the substance of which the cathode is made. By incorporating barium in the cathode, the operating voltage of the Western Electric 727A neon filled tube has been brought down to around sixty volts.

Cold cathode tubes have their



Radio Corporation of America

This cutaway view shows the electron "gun" and accelerating and focusing electrodes of a typical mass production cathode ray tube.

place in the electronic art. Neon signs are examples of such tubes. So are the familiar voltage regulator tubes, such as the VR150. In such tubes advantage is taken of the fact that an almost constant voltage is required to maintain the discharge, a voltage almost independent of the current within certain limits. By treating the cathode so as to make it a good emitter and not so treating the anode, and by properly shaping the electrodes, a cold cathode tube can be made which will break down at a considerably lower voltage, when the anode electrode is made positive than when it is made negative; thus, the tube may be used as a rather inefficient rectifier. In the telephone system, three electrode cold cathode tubes with similar properties are used in party-line ringing circuits. The a-c ringing signal is applied together with a d-c biasing voltage. The gas tubes in the subscribers sets are so poled that a given bias will tend to aid breakdown in one set and hinder it in another, thus giving the desired selective ringing action.

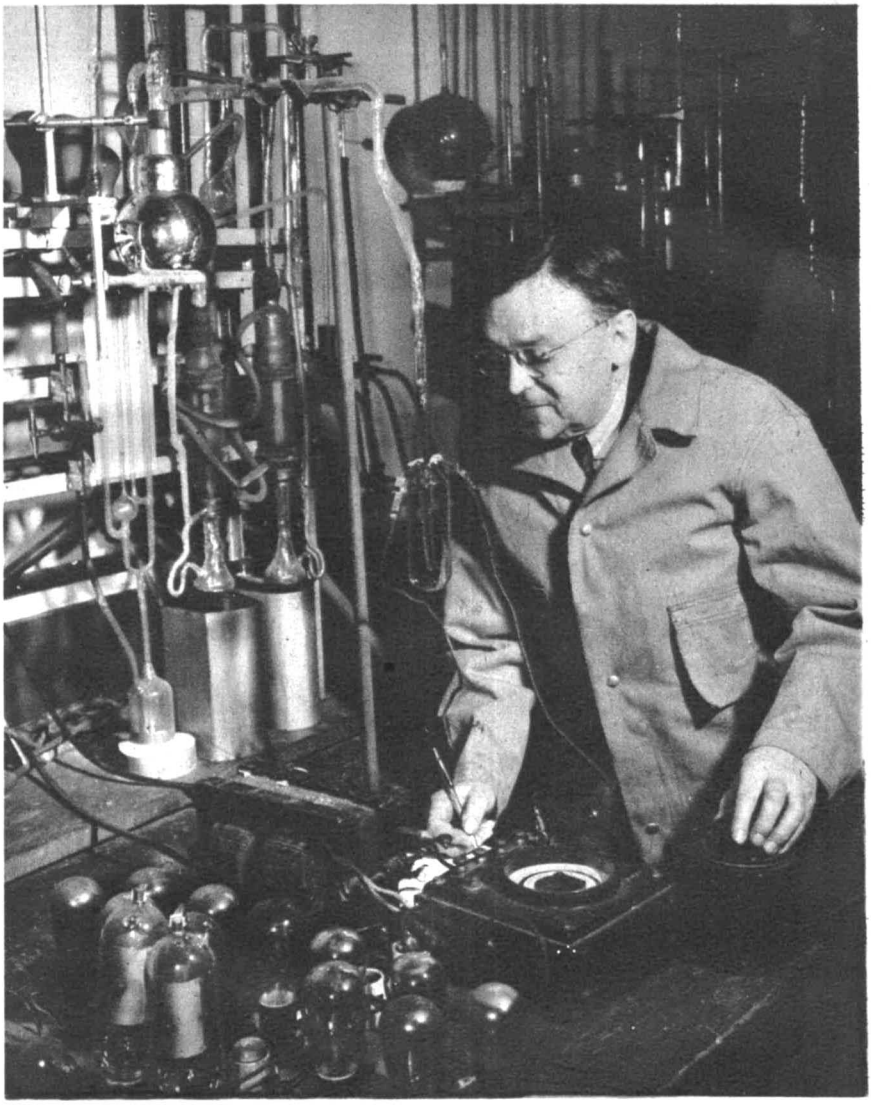
While cold cathode gas tubes have many uses, they have serious limitations. No matter what substance is used for a cathode, the cathode voltage drop necessary for the production of sufficient electrons to maintain the discharge is at least around fifty volts. If we desire to pass a considerable current through the tube, this represents a serious loss of power. What was needed to extend the usefulness of gas tubes was a cathode capable of emitting electrons copiously without being struck by rather high velocity ions; a cathode with a different mechanism of emission was needed. In secondary emission and in emission by positive ion bombardment, certain electrons in the cathode substance are knocked out of the surface by the brute force of a collision, a collision which doesn't help at all in freeing other electrons in the cathode. It would be very nice if we could do something to the cathode which would make it capable of emitting

electrons without any violent collision, if we could do something which would enable the electrons in the cathode to leave on their own hook, so to speak.

The problem is a very important one from many points of view. In early X-ray tubes, a little gas had to be left so that electrons could be produced from the cathode by ion bombardment. Too much gas meant that the tube could not be operated at a high voltage. Worse, in operation the tube tended to *clean up,* that is, the gas molecules were driven into the electrodes or otherwise trapped during operation, and eventually no discharge could be obtained and the tube became inoperative. When cathode ray oscilloscopes were first built they were cumbrous metal affairs which were continuously pumped. To provide a free path so that the electrons in the electron beam might travel to the fluorescent screen or photographic plate without the hindrance of innumerable collisions, a high vacuum was maintained in the body of the instrument. Such a vacuum was much too high for a satisfactory gas discharge, and so the cathode was located in a small separate chamber maintained at a higher pressure, and connected to the higher-vacuum portion of the instrument by a very small aperture through which the electrons passed. The gas which diffused slowly through this aperture was removed by fast vacuum pumps.

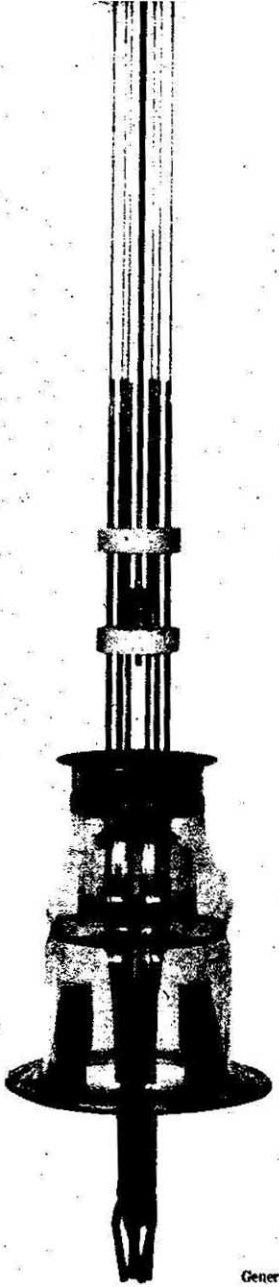
The means of getting electrons out of a cathode which solved these problems and made high-vacuum electronic devices possible is *thermionic emission.* It all seems very simple; one has merely to heat the cathode, and out the electrons come. In the mercury arc rectifier, thermionic emission occurs from a tiny intensely hot spot which dances around on the pool of mercury that forms the cathode. Here we still have the phenomenon of ion bombardment; it is ion bombardment which keeps the spot hot. However, the ions don't have to hit the spot hard enough to knock electrons out of the mercury, but merely hard enough to keep the spot hot enough to give thermionic emission. If the current is high enough to do this, then the total voltage drop across the tube need be only the comparatively low voltage necessary to accelerate electrons to the speed at which they will produce positive mercury ions. In other thermionic electron tubes the necessity of ion bombardment is completely removed. In the thyratron, the gas tube used to control large currents in so many industrial electronic devices, and in high-vacuum electron devices such as the Coolidge X ray tube, the modern cathode ray tube used in television, and the various amplifying tubes used in radio, the electrons come from cathodes heated not by bombardment, but by passing current either through the cathode itself or through a heater element embedded in the cathode.

Of the whole host of electron devices which thormionic emission makes possible, perhaps the most important as well as the most com-



Westinghouse

Dr. Harvey C. Rentschler measuring the solubility of oxygen in zirconium metal. The small piece of zirconium in the glass bulb will dissolve about 500 cc of the gas at 1cm pressure. Electrons are emitted more freely from this solution than from the pure metal.



General Electric Co.

Cathodes for high voltage transmitting tubes are pure tungsten.

mon is the ordinary amplifying tube used in every radio and in long distance telephony as well. The reader who is unfamiliar with the simple wonders of this device will find Figure 1 reasonably explanatory. The tube shown is a *filamentary triode*. It is a filamentary tube because the cathode is a thin wire filament, heated by passing current directly through it. The tube is a triode because it has three electrodes, the filament or cathode, an open mesh or grid of wires called the control grid, and an anode or plate.

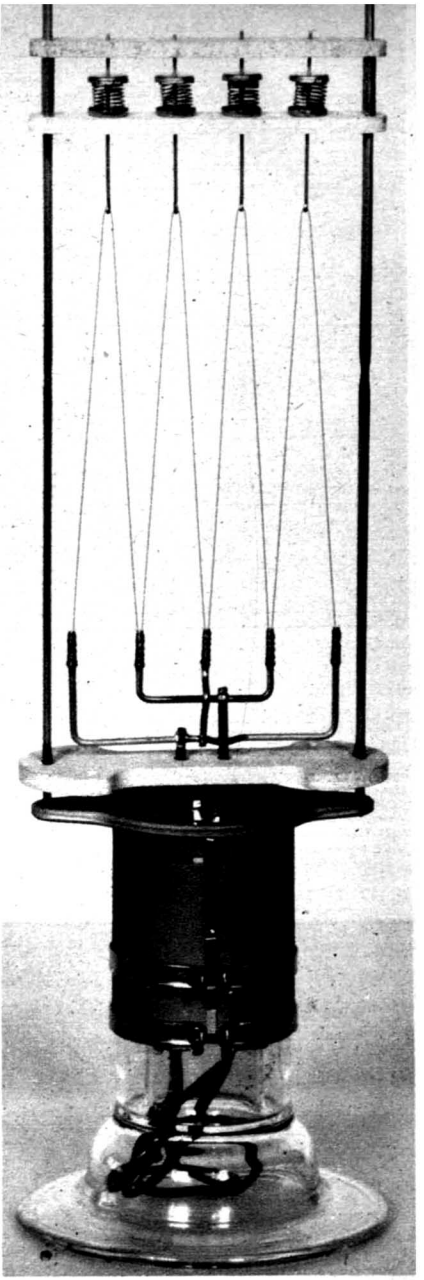
Electrons thermionically emitted from the hot filament are attracted by the positive plate, and reaching it, flow back to the cathode through the resistance (R) and the battery (B) which supplies the plate voltage. How many electrons flow from the cathode to the plate per second? If we apply between terminals a and a^1 voltage $(V)_g$ such as to make the grid very negative with respect to the cathode, virtually no electrons leave the cathode and, of course, none reaches the plate. Electrons leave the cathode almost standing still; to get to the plate they must be accelerated by a potential gradient away from the cathode. If the grid is very negative, the potential gradient is toward the cathode, not away from it, and electrons emitted thermionically from the cathode are immediately turned back. If the grid is made less negative, the influence of the positive plate leaks through the open meshes of the grid enough to provide the necessary gradient away

from the cathode, and electrons can leave the cathode—at a limited rate.

At a given grid voltage the cathode current is limited to a certain precise value because the negative charge of the electrons themselves tends to counteract the effect of the positive plate. The current thus assumes such a value that the effect of the negative grid together with the effect of the negative *space charge* of the electron flow itself just counteracts the positive effect of the plate. If the grid is quite negative, only a small space charge and hence a small electron current is necessary to counteract the small difference between the positive effect of the plate and the negative effect of the grid. If the grid is made less negative, the net positive effect of the plate is larger; a larger space charge is necessary to counteract this positive effect and a larger electron current flows to supply this space charge.

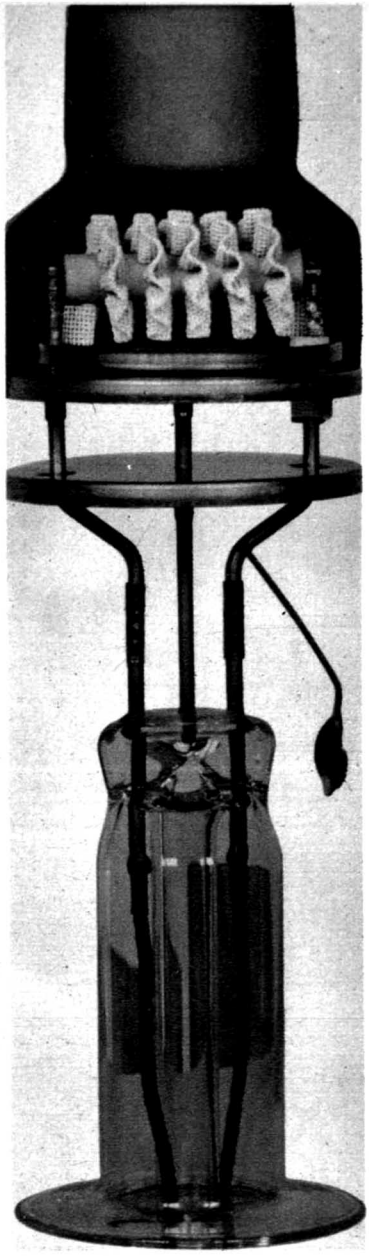
We thus see that the plate current of the triode of Figure 1 can be controlled by the grid voltage. Now, the plate current in flowing through the load resistance (R) produces a voltage drop between the output terminals b and b^1. If the resistance (R) is large enough, a change in the input voltage $(V)_g$ will produce a larger change in the output voltage (V) and we have an *amplifier*.

Many of the tubes in radios have not three electrodes, like the triode, but four—tetrode—, five—pentode—, six—hexode— or even more. The fundamental mechanism of control of the electron cur-



General Electric Co.

For lower voltage tubes, cathodes of thoriated tungsten are used.



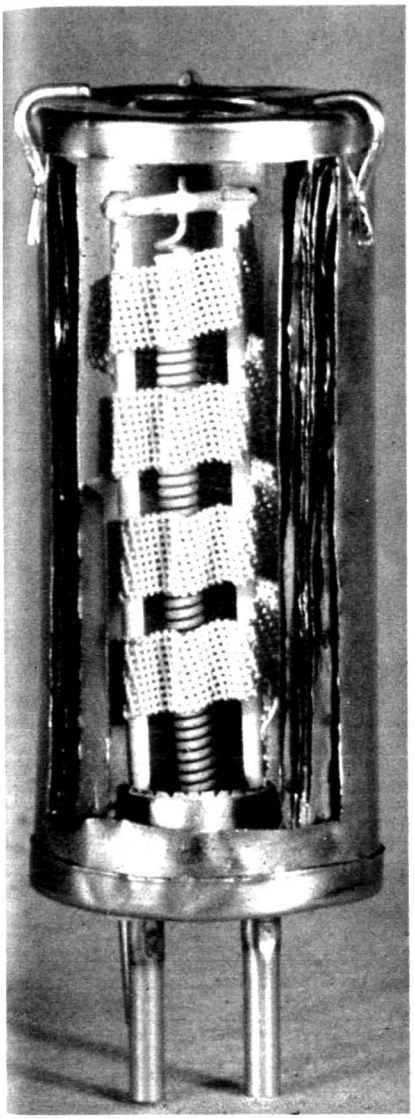
General Electric Co.

This cathode is an oxide coated filament. It is used principally in mercury-vapor rectifier tubes.

rent remains the same, however, and hence the whole operation of the radio depends on the control by the action of a negative grid of electrons thermionically emitted from a hot cathode.

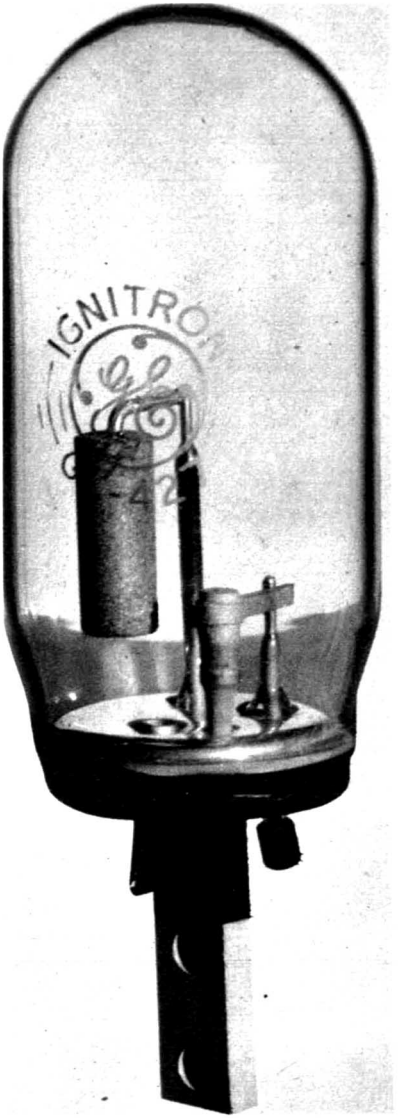
There is a catch, however; we must have thermionic emission before we can control it. Obvious as this is, it is an exceedingly touchy point. So far, in speaking of the virtues of the thermionic cathode I have perhaps given the impression that we have merely to heat any metal electrode to some reasonable temperature and electrons come out. Sometimes they do; if this is so we have an *active* cathode. But activity is one of the sorest points about thermionic tubes, because not only are cathodes unequally active, but sometimes cathodes refuse to be active at all.

One familiar with the art, as patent attorneys so aptly call the initiate, is reminded of a story on quite a different topic. Samuel Butler once remarked that anyone could drill a hole in the ground, but that only a few such holes became oil wells. Similarly, it is harder to build something living up to the fancy new name *electron tube* than it is merely to make a *vacuum tube*. Hard as it may seem to get all but one in each hundred thousand millions of molecules out of the glass or metal envelope of a tube, it is—no, not quite infinitely harder—but very much harder indeed to get a few electrons into the still rather populous space which, with all this pumping, contains perhaps a hun-



General Electric Co.

The spiral strip of screen shown is the cathode of a thyratron tube. It is heated indirectly by the coil of wire visible inside it.



General Electric Co.

A spot on a pool of mercury is heated by positive ion bombardment, and forms the emitting surface in this ignitron tube.

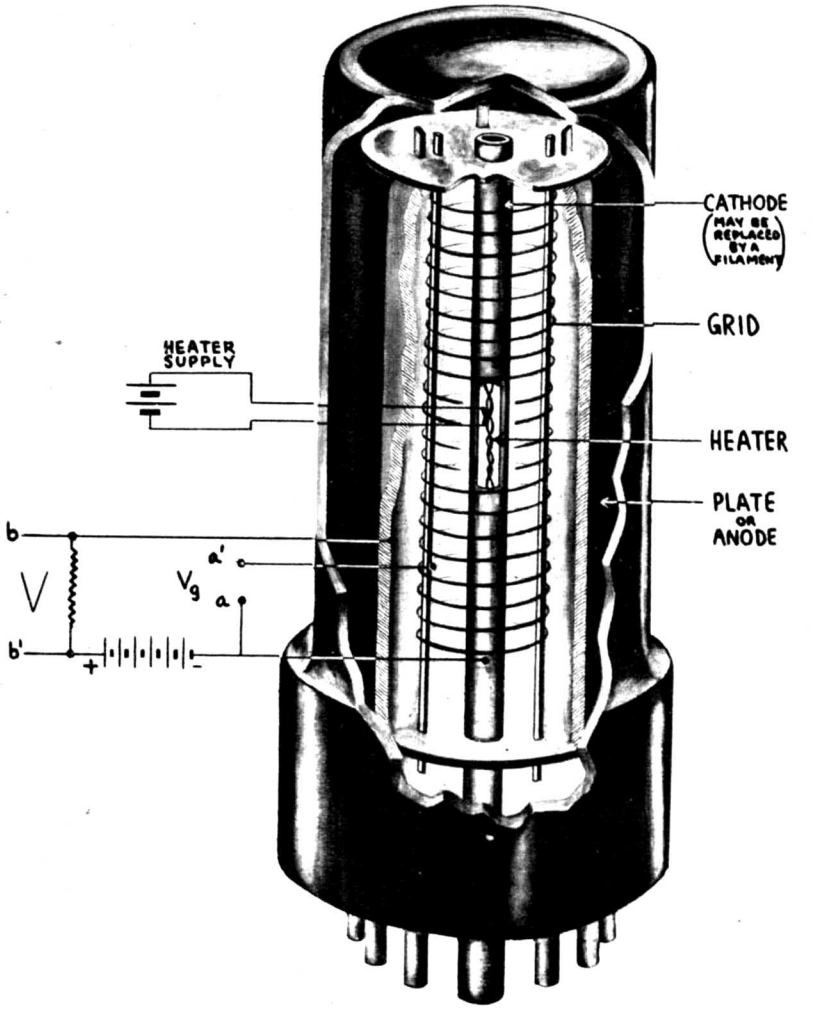


Figure 1. Flow of electrons from cathode emitting surface to anode in a vacuum tube is controlled by a grid placed near the cathode.

dred million molecules per cubic centimeter and is known by common consent as a hard vacuum. It is the bane of vacuum tube manufacturers and researchers, the art without artists, to get a thermionic cathode to emit electrons, the tenuous but absolutely essential constituent of electronic devices.

It isn't that candidates for thermionic emission are rare. In the filament of a small receiving tube there are around a million times a million times a million times a

million so-called free electrons. The trouble is to get them to come out in sufficient numbers to make the tube function. We need merely a steady flow of a hundred million billion per second to constitute a current of fifteen milliamperes.

The problem used to seem very simple to me. In the days of the UV201 I merely turned the filament rheostat clockwise—we used it for a gain control then—and the emission automatically increased. Oddly enough, it was simple, and tube manufacturers of those days found in tungsten a practically foolproof electron emitter. It's true that tungsten lights up like a lamp before electrons start to come out in appreciable quantities, but once it's up around 2,000 degrees centigrade —around 3,600 degrees Fahrenheit —apparently nothing can keep the electrons from leaving except, as has been explained, a negative grid voltage which produces a retarding field at the filament or cathode; and turns the electrons back. Indeed, a very few electrons will shoot past even a quite negative grid; electrons leave the cathode with a *thermal velocity distribution*, that is, an assortment of random speeds ranging from zero up toward infinity. While most of the electrons leave the cathode with very little energy indeed, a very very few are going fast enough to overcome a considerable retarding field.

Thermal velocities are, of course, the very essence of the mechanism of thermionic emission. It is hard for electrons to get out of a metal; they lose energy in leaving, and if they don't start toward the surface from inside with more kinetic energy than the energy they must give up, or the work they must do in leaving, they simply can't get through the surface and out into the vacuum. At room temperature, very few electrons have enough energy to get out of a metal, or anything else, for that matter. As the temperature is raised, however, the electrons bat around inside of the metal with higher and higher speeds, and at 2,000 degrees Centigrade, enough will leave tungsten to form a really useful current, enough, for instance, for an early radio receiving tube or a modern 50,000 watt transmitter tube, for transmitter tubes still use tungsten filaments or cathodes.

Going back to the time of the UV201, I am reminded of the time I first saw a radio with a vacuum tube of the Western Electric VT series; it must have been a VT1 or VT2. The filaments were glowing at something a little over a dull red, and if it hadn't been that the radio was operating satisfactorily, I would have concluded that the storage battery had run down. What was the difference between the VT1 and the UV201? Surely the electrons weren't going as fast in the VT1 filament as they did in the brilliantly lighted emitter of the UV201; they couldn't have been, for the speed of electrons in a hot body doesn't depend on the material at all, but only on the temperature. The answer must be, then, that it was easier for electrons to get out of the VT1 filament than out of

the tungsten filament of the UV201. This was, of course, the case; the VT1 filament had a lower *work function* than has pure tungsten. What made this so? We can answer at least in an empirical way.

Long before radio tubes were thought of, a German, Wehnelt, published in 1904 his discovery that a filament coated with an alkaline earth oxide is a copious low temperature source of electrons. Among the alkaline earth metals are barium and strontium, the chief constituents in modern oxide coated cathodes. Oxide coated cathodes entered the vacuum tube amplifier field largely through the work of Dr. H. D. Arnold of the Western Electric Company a good while later. Arnold first published his work in 1920, but by that time tubes with oxide coated cathodes were in wide commercial use in telephone repeaters and in early radio installations. It was an oxide coated cathode which glowed so dimly and yet shed such a light for the future in the VT1.

An ideal cathode would emit electrons freely, without any form of persuasion such as heating or bombardment. It would be such that electrons could leak off from it into a vacuum as easily as they pass from one metal into another. An ideal cathode would emit copiously; it should supply an unlimited number of amperes per square centimeter. A perhaps unsuspected requirement is that it should emit electrons traveling with practically zero velocity. The electrons emitted in a nuclear transformation or disintegration process wouldn't be any good in an ordinary electronic device simply because they have too much kinetic energy. If we had a tube with a radioactive cathode, we would have to apply a negative potential of millions of volts to the anode, or to the control electrode, if any to stop or lessen the flow of electrons. Finally, the ideal cathode would last forever,* its electron emission continuing unimpaired as long as needed. This is another, but a minor point against the radioactive cathode. Needless to say, there aren't any ideal cathodes. From real substances, electrons just don't leak off. Something has to be done to get them out, and, of course, something is done.

The early history of oxide coated cathodes seemed without rhyme or reason. It was found that if a wire intended to emit electrons was heated and rubbed with sealing wax and the sealing wax then being burned off, a truly phenomenal cathode was produced. Further work traced the emission to alkaline earth oxides, and the compound from which they came was humorously described as *barium resinate.* The sealing wax technique died hard, and for several years the process of coating filaments consisted in stringing fine platinum ribbon out in long lengths, heating it with an electric current, and rubbing a

* Strictly from the user's point of view, of course. A seller who doesn't use tubes would like to have all tubes last uniformly say five hundred or one thousand hours and then go completely dead. Early failures bring complaints; unduly long life balks sales. And who checks up on the life of tubes beyond the time it takes to forget having bought them—except commercial users?

resinous compound containing barium and strontium over it repeatedly. The narrow ribbon was then cut into lengths, put into a crude vacuum tube of the day, the tube was pumped and baked until a "hard vacuum" was achieved, and the filament was *activated*. This activation was a wishful process consisting of glowing the filament brightly, applying voltage, and drawing current to the plate until, in happy circumstances the plate got red-hot, giving off enough gas to produce a blue glow and further increase the activity and the current. After a lucky period of this treatment the filament became active; that is, it would emit electrons at a lower and reasonable temperature, at which it would last for a number of thousands of hours.

The early combined filament, that is, oxide coated filament in which the coating was burned onto the core material in air, did yeoman service in the telephone plant, and was replaced only in comparatively recent times. True, the expensive platinum was replaced by nickel, and the rubbing with sealing wax, in which the first wire rubbed was always discarded, probably for reasons entirely mystical, was replaced by a process of continuous dragging through a sort of paint of cathode coating. Still, these were small steady steps in the right direction.

Perhaps it is time to return to the familiar ground of the home radio set. Why did radio tubes glow so brightly long after the oxide coated cathode had appeared? I suppose that one of the chief reasons is that the American Telephone & Telegraph Company, owner of Western Electric, which developed the oxide coated cathode, withdrew from the home receiver and home-receiver tube field. Then, too, the pure tungsten filament was, after

Figure 2. Energy levels in a solid.

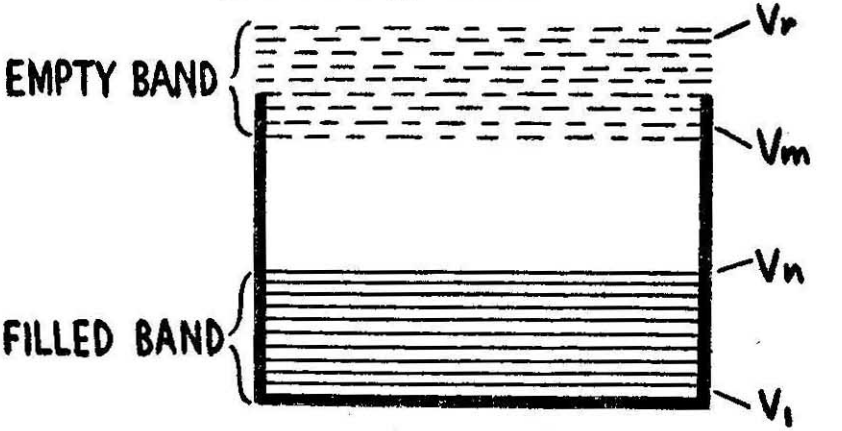


FIGURE 2

all, foolproof. A tungsten filament at 2,000 degrees centigrade always has plenty of emission. An oxide coated cathode at say 760 degrees centigrade may have plenty of emission, or, it may, and frequently does, not. The worst drawbacks to the tungsten filament in the early days were filament power required and life. Filaments lose heat chiefly by radiation, and the rate of loss of heat by radiation varies as the fourth power of the absolute temperature. The absolute temperature is 273 degrees higher than the centigrade temperature. A little calculation shows that for the temperatures quoted above, and for a given area, the tungsten filament will take about twenty-four times as much power to heat as the oxide coated cathode. Actually, the advantage of the oxide coated cathode isn't so great; especially in telephone repeater tubes, it is partly thrown away in putting in lots of filament, for oxide coated cathodes last longer when they are not required to supply the full current they are capable of emitting. This brings us at once to the point of life. A pure tungsten filament heated hot enough to emit copiously lasts a few thousand hours at the most. A telephone repeater tube with an oxide coated cathode may last around one hundred thousand hours, that is, around twelve years.

Oddly enough, it was neither filament power nor life that sold the radio industry on oxide coated cathodes. The life wasn't too important in radio sets, which are not turned on continuously. Too, with radio, the serious inconvenience in replacing a tube is financial, and that doesn't bother the tube manufacturer at all. As far as power goes, that wasn't important in the early radios, and when it was first apparent that there would be a market for tubes with less filament drain, tubes which would be operated from dry batteries, it was not the oxide coated cathode but the thoriated tungsten filament which first stole the show.

Thoriated tungsten, the filament of the famous old 201A and 199 tubes, the stand-bys of so many years of battery operated radios, will give as much emission at around 1,300 degrees centigrade as pure tungsten will at 2,000 degrees. Thus, it is sort of midway between tungsten and the oxide coated cathode. It does not have the good life of the oxide coated cathode, but that wasn't too important in home radios. What was perhaps most important is that thoriated tungsten is similar to pure tungsten in its physical properties. It can be drawn into fine strong wire, much stronger than the nickel commonly used as a base for oxide coating. Such fine wire can be used at a comparatively high voltage and low current, an advantage where dry batteries are concerned. In other words, thoriated tungsten fitted well with accepted manufacture and use. The 201A tube, with its thoriated tungsten filament, was practically a 202 pure tungsten filament tube with an improved filament and a getter—the silvery sheen which appeared first of all

in that vacuum tube—to absorb gas which could not have damaged the emission of pure tungsten, but might have been fatal to the activity of thoriated tungsten.

Thoriated tungsten served well in its day. It is still used, in fact, in transmitting tubes for moderate powers and voltages too high for oxide coated cathodes to stand. And thoriated tungsten brought with it activity troubles. Its activity was greater than that of pure tungsten because a thin layer of thorium at the surface of the filament reduced the work function, that is, the work needed for electrons to get out of the filament. The thin layer was driven to the surface of the tungsten-thorium alloy composing the filament by heating or flashing the filament. Once there, it resulted in enhanced emission. Would it stay? Gas molecules bombarding the filament could destroy it; hence, the vacuum had to be better; hence, again, getters. Eventually, it would just evaporate away. Do you remember suggestions for restoring the activity of 199 tubes by running the filament very hot for a few minutes while not drawing plate current? Pure tungsten was pretty tough; it ran so hot that anything hitting it bounced right off again, leaving behind what would stand the highest temperature, pure tungsten. With thoriated tungsten we got—poisoning.

But if we are to talk of poisoning, we should really get back to oxide coated cathodes which, in the years we have covered, weren't very important in the radio field. What did bring them into prominence? The answer is, a-c operated radios. There were a few early all a-c radios using 199 tubes, with filaments connected in series and run from a rectified and filtered supply. Around 1928, however, there appeared queer two-ended tubes without any filaments at all! It is true enough that these tubes had hot emitting cathodes, but they weren't by any means fine filaments of wire. Instead, they were little nickel tubes, coated on the outside with a mixture of barium and strontium oxides. They were made hot by a fine tungsten wire inside of the cathode tube or sleeve, and hence such cathodes were called indirectly heated cathodes. The voltage across the heater wire didn't appear in the radio circuits connected to the cathode. The cathode was all at the same voltage or electrical potential; hence, it was an *equipotential* cathode.

Soon it was found that the heater leads could be brought out of the same end of the tube as the rest of the leads, and the double-ended tube disappeared. The filament did come back and stage a losing battle. It was found that heavy, low voltage oxide coated filaments used with center tapped filament transformers weren't too bad in radio-frequency stages as far as hum went, and were all right in the last audio stage and, of course, as rectifier tubes. It was much easier, however, to put a fine grid close to a smooth nickel tube than to a flimsy filament, and the superior performance of close-spaced, high-gain tubes

soon drove filamentary types out of radio-frequency stages. Filamentary tubes, notably the 45 and the more recent 2A3, persisted long in audio output stages, but pentodes like the 59 and especially beam power tubes such as the 6L6, all with indirectly-heated equipotential cathodes, have driven the triodes out of the audio stages. Finally, even the rectifier sockets succumbed, and such tubes as the 83v close spaced, low drop, high efficiency equipotential cathode rectifier replaced the older filament rectifiers. The filament seems gone for good from the radio, and we now have to say cathode to make sense.

The cathodes of these modern tubes aren't quite the same thing as the old combined filament, with its repeated coating and burning on in air. Instead, the modern equipotential cathode is coated by spraying on a mixture of barium, strontium, and sometimes calcium carbonate held together with an organic binder something like a lacquer. In fact, the process is so much like painting that in one manufacturing plant custom decreed that it be done by the department responsible for all other painting and finishing. It took a good deal of educating to convince the expert painters that there was more to a good cathode coating than a smooth surface and a white color.

The preparation of carbonate is, of course, part of the art of making good cathodes. Sometimes barium and strontium carbonates are simply mechanically mixed together, giving a "mixed carbonates" coating. Other coatings are prepared from co-precipitated carbonates, that is, carbonates precipitated from a solution of soluble salts of both barium and strontium by the addition of sodium or ammonium carbonate. The preparation of the carbonates is a fine field for controversy. Are mixed carbonates or co-precipitated carbonates better? Most people prefer co-precipitated carbonates for most purposes. Sometimes, however, a strong feeling will arise that mixed carbonates are better in a particular tube, and mixed carbonates are still used on occasion. Then, if co-precipitated carbonates are to be used, should they be precipitated with sodium carbonate or with ammonium carbonate? If sodium carbonate is used, there may be difficulty in washing the sodium salts out of the precipitated carbonates, and shiny globules of sodium have occasionally made their appearance in completed vacuum tubes. There seems to be no real assurance, however, that the sodium does any harm. At any rate, if ammonium carbonate is used there is no chance of free ammonium appearing in the completed tube. But suppose the precipitating agent has been chosen. Should the precipitation be fast or slow? A fast precipitation gives small crystals of carbonate, while a slow precipitation gives large crystals. Which is better? Or, is uniformity of more importance? There seem to be as many answers as there are experts.

Once the carbonates are precipi-

tated, washed and dried, they must be mixed with a binder and are always ball milled. In ball milling the mixture is put in a rotating drum, or a tubular bottle in experimental work, together with smooth round flint pebbles, and the drum is rotated for a number of hours. How many hours? Enough to break up agglomerates of crystals and give a smooth creamy solution, but not enough to grind too much material from the container and pebbles into the coating. But, how many hours? Again there is a variety of answers.

Once the coating has been ground to the desired degree of smoothness, whatever that is, it must be sprayed onto the cathode sleeve. The coating may be thick or thin, smooth and almost enamellike or porous and rough like blotting paper. Spraying very wet, with the nozzle close to the work, gives a smooth coating; spraying very dry with the nozzle far from the work gives a loose porous coating. How is this important texture controlled? Moderately skilled girls are told by the engineer about how to spray the coating, and they spray it until someone runs into trouble. Then they may be told to do something different, or to do what they were told to do in the first place. Some people say that a fine smooth coating is hard to activate. Some people say that a rough coating doesn't work so well in a vaccum tube. Still, what the girls spray on makes the radio sets of the world run, whether it is rough, smooth, or just what the operator sprays on that day.

When the cathode is coated, it is put into place in the electrode assembly and the electrode assembly is sealed into an air-tight or, as it is called, vacuum-tight envelope of glass or metal. Need the cathode be fresh, or is it allowable to store cathodes after spraying? Certainly, coated cathodes bought from large tube manufacturers can be activated, but this doesn't completely answer the question, and it certainly doesn't indicate what precautions if any are necessary in storing. Anyway, the electrode assembly holding the cathode is sealed into the envelope. The tube is then exhausted, and the envelope is heated or baked. A glass envelope may be baked at from 350 to 450 degrees centigrade, depending on whether it is soft or hard glass. A metal envelope may be heated red hot with gas fires. When glass tubes are exhausted, a coil connected to a radio-frequency oscillator may be put around the tube and the elements heated red-hot by high frequency induction while the final stages of the pumping and the activation are carried out.

When a satisfactory vacuum has been reached after bake-out and, perhaps, high-frequency heating, the cathode is broken down; that is, it is heated hot enough to convert the carbonates to oxides. It may then be "activated" by heating hotter, with or without drawing electron emission. The getter is then flashed. The getter is usually barium or magnesium, protected for handling by inclosure in a fine metal tube or between thin metal sheets.

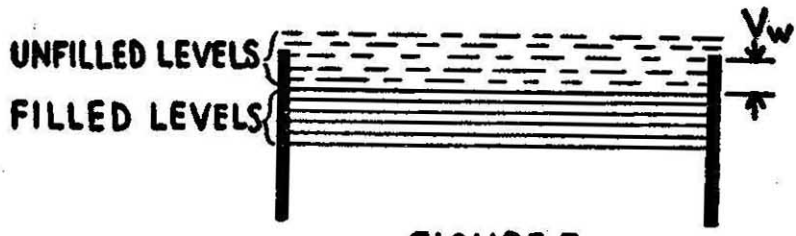


FIGURE 3

Figure 3. In metals emission occurs from a partly filled band of levels. Thermal agitation throws electrons into levels higher than the potential barrier, from whence emission can readily take place.

It may be flashed by passing current through it, or, in glass envelope tubes, by induction heating. After the getter has been flashed, the tube is sealed off, and is complete except, perhaps, for aging.

Perhaps this schedule of operations may seem vague; it is purposely so. In the laboratory, ah, in the laboratory, the pumping schedule may be very elaborate indeed. Hours of bake-out may be called for, until the combined mechanical and oil or mercury diffusion pump system has given a vacuum of a millionth of a millimeter of mercury. Such a vacuum is quite beyond the capabilities of the most sensitive McCleod gauge, and the pressure must be measured with an ionization gauge, in which the current of ions produced by an electron stream of constant intensity is measured to the last microampere. Once the desired vacuum has been attained, the cathode may be broken down with the envelope hot, or, the tube may be allowed to cool slowly, the electrodes may be heated with high frequency, and the cathode broken down, or, the cathode broken down with the electrodes cold, all according to the personal prejudices of the skilled engineer. Perhaps the heater voltage will be raised a volt at a time, with a slow evolution of gas; again, the heater voltage may be raised in stages. How hot should the cathode be made during breakdown and activation? Try to find out! Current may be drawn on the pumps, either as a part of the activation, or to heat electrodes by bombardment. In this case, the engineer knows before the tube is sealed off whether or not it is active.

If it isn't, he is at liberty to lose his temper and depart from his careful schedule. He may, for instance, run the heater voltage way up and try to get enough current with a high voltage applied to obtain the satisfying blue glow of a gas discharge, after which the cathode may or may not be active. Or, he may heat the cathode a little hotter and gradually nurse the voltage up in the hope of getting emission. Or, he may seal

the tube off and age it afterward by running the cathode hotter than normal and applying d-c or a-c voltages to the electrodes as suits his fancy. If aging doesn't "bring the tube in," it is time to try again.

Compared with this elaborate procedure, commercial pumping is simple indeed. Common radio receiving tubes are pumped on a rotating machine having a circle of rubber ports at which the glass tubulation, by means of which the tube is exhausted, is gripped by a rubber chuck. Tubes are inserted as the circle of ports rotates, at a point at which the port is not connected to the mechanical vacuum pump. As the port rotates away from the position of insertion, it is connected to the pump. A little further on, the tube passes into an oven and is baked out. Further, a high-frequency field may heat the electrodes. When a very moderate vacuum compared with that needed for operation has been achieved, the cathode is heated, broken down, activated, the getter is flashed—or may be flashed after seal-off, the tube is sealed off by an automatic gas fire, the port passes to a position at which it is cut off from the vacuum system, the tube is removed and the stub of tubulation is withdrawn from the port; another tube may be inserted. The thousandth of a millimeter of mercury vacuum necessary for operation? The getter cleans up the considerable residue of gas left after pumping and activation.

Aging of commercial tubes usually consists of running the cathodes hot and applying a rather big alternating voltage for as long as is necessary to get activity. What does this do? Well, with good luck it makes the cathode active. But, suppose the cathode isn't active; what then? In a single tube, it might mean a leak or perhaps an inclusion of some foreign material in a particular cathode sleeve. Usually, however, a large percentage of all of the tubes have poor activity when poor activity is encountered. There is an *activity bust.* The speedy machines continue to grind out tubes, but a quarter, or a half, or all of them have too poor activity to pass test.

One might think that activity busts would occur only in the manufacture of new types of tubes, and would be explainable on the basis of some new feature of construction or processing. This is not so. While the worst activity troubles are encountered with new designs, and while production of standard types often goes along with little trouble most of the time, still activity busts are encountered in the manufacture of tubes which have been made successfully—except for other activity busts—for years. Suppose we consider what is done in the case of an activity bust such as this.

Initially, processes are inspected. If the cathode coating hasn't been analyzed recently, it is analyzed. The cathode nickel may be analyzed. Sources of sulfur or of

chlorides, known poisoning agents, are looked for. Tube mounts may be washed and the water analyzed. Or, tube mounts may just be washed, in hot distilled water, before seal-in. This is a common precaution anyway, and one recommendation is that mounts be washed when an activity bust is encountered and the washing be continued until another bust is encountered. Then it can be stopped in an effort to cure that bust. If the bust is persistent, the pumping schedule can be changed. Usually, the bust ends and activity returns at some point in this frantic scurrying around for a remedy, and everyone is too relieved to wonder seriously just which change if any constituted the remedy. Sometimes, of course, a really probable cause of bad activity has been uncovered.

One may well ask, what does cause poor activity? Something more will be said about this later. For the moment the vast folklore of the oxide coated cathode can be drawn on in an effort to give an answer. Sulfur is a well-known poisoning agent, although the inclusion of some sulfur compounds in cathode coatings results in no loss of activity. Chlorides are supposed to be particularly poisonous. Chlorides come chiefly from the perspiring hands of assemblers. Some people believe in seasonal fluctuations in activity, blaming not only perspiration but humidity itself. Lack of adequate data, and lack of an adequate measure of activity make it hard to decide some of these points. It is believed with some grounds that assemblers should refrain from running their fingers through their hair, especially if it is greasy; assemblers, however, work for money, not love of the job, and it is hard to convince them on such points. Dirt of all kinds is supposed to be suspect if not bad, but active tubes have been made with mounts which were exposed to dusty air for months, and in at least one instance mouse droppings inadvertently sealed into a tube did not noticeably impair the activity. One company in an effort to get at the truth left coated cathodes near the sea, in a city, out in the country, and in a pigsty for a period of time, then sealed them in tubes and measured the activity. All I remember is that the cathodes from the pigsty seemed best. One large laboratory had a red-haired assembler; every tube she made was active. She quit after a few months, and no one yet knows whether it was coincidence, science or voodoo.

So far the matter of cathode nickel hasn't been mentioned. In this connection, one is reminded of the story of how Thomas Edison sold his competitors the secret of making good microphones. After the money had changed hands he took the inquirers into the yard of his plant and, pointing to a pile large enough to last him for years, said, "I use that coal there." Similarly, in the good old days before the war each tube manufac-

Figure 4. Thermal agitation in a semiconductor can't throw electrons from the filled levels clear up to the "empty" band, but can move them from the impurity levels to the "empty" layer. The more impurities the more impurity levels, and the greater conductivity.

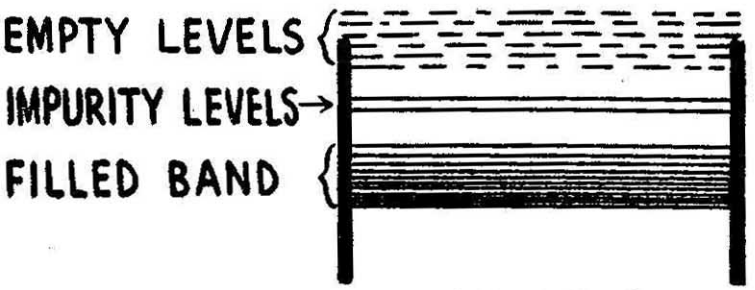


FIGURE 4

turer had his nickel supplier set aside certain ingots which had been tested. Nickel from such ingots was rolled down and formed into cathodes as needed. Everyone was reasonably happy with his special tested and approved nickel; rejected ingots could always be used for some other purpose.

With the coming of the war and the nickel shortage, the practice had to be discontinued. To soften the blow, the nickel companies offered to set aside certain tested ingots, not now for a single manufacturer, but for vacuum-tube manufacturers in general. Gratefully accepting, each manufacturer tested an assortment of ingots. But, there was no agreement. An ingot accepted by one manufacturer was rejected by others, and a strong suspicion arose that it was pure coincidence when all agreed on any one ingot. The awakened manufacturers and the nickel companies are still trying to come to some agreement on what activity is, how it should be measured, and whether nickel can be judged by any analysis or test in a reasonably objective way. Wars do unexpected good in some small ways.

The best that can be said for the cathode art, and it is a very good best indeed, is that year by year cathodes get better and better. Where once oxide coated cathodes were used in very low voltage low power tubes only, they were used during the war in special tubes operating at several thousands of volts, and, indeed, in the pulsed magnetrons which supplied such huge peak powers in British and American radars. Current densities go up, too. Early telephone repeater tubes were run at around six milliamperes per square centimeter, while some modern tubes are edging over a hundred milliamperes per square centimenter.

with, it is true, shorter life. The center of the cathode of the gun of a cathode ray tube in a television receiver may deliver around an ampere per square centimeter at the highlights. All this advance has, however, been pretty much a matter of art, to which science has contributed in verifying small points rather than in suggesting even minor steps. The readers of Astounding will emphatically want to know, just what have the scientists been doing about this?

The best answer seems to be that the scientists have been sitting in their ivory laboratories for the best part of the time. Their contribution has been divided into two parts, theoretical and experimental. Treating the theoretical contribution first, we may say that there was initially considerable confusion as to how the electrons got out of an oxide coated cathode. Did they have to overcome a potential barrier at the interface between the oxide and the nickel core, and thereafter merely percolate through the pores of the coating? Or, could electrons from the core pass freely into the oxide, only to find a potential barrier at the surface? During the thirties, the physicists pretty definitely settled for a limitation of emission at the surface, and early experiments lent a good deal of weight to this view. The standard theory of emission is well stated in Fowler's book, "Statistical Mechanics."

Metals, such as tungsten, have many electrons, one per atom, in fact, which can move about in the *lattice,* as the array of atoms in a solid is called. It is these free electrons which move when an electric current passes through a metal, and the plenteous supply of free electrons in metals explains their high conductivity. It is the free electrons, too, which, thrown about with sufficient speed when a metal is heated, manage to shoot past the potential hump or barrier at the surface of the metal and so constitute the thermionic emission of a metallic cathode.

According to quantum theory, electrons can move freely through a lattice only within a certain range of speeds or energy. In fact, according to quantum theory, no two electrons can have quite the same speed, and further, there is a finite number of speeds for which unhindered motion through the lattice can take place. We might, as shown in Figure 2, represent a solid as a sort of trough containing electrons. We can then represent the allowable velocities or energies as horizontal lines. There may be more than one range of allowable speeds. In Figure 2, two ranges are shown, one range corresponding to electron energies from V_1 to V_n electron volts, and the other corresponding from V_m to V_k electron volts. An electron having an energy corresponding to any one of the many distinct voltages in such an allowable *band* of energies can move freely through the lattice of atoms. Here, however, is the

rub. If there is one electron with each allowable energy or *energy level* in a band, so that the energy band is filled, there is no net motion of charge in the band. The number of electrons moving to the right is just the same as the number of electrons moving to the left. The only way a net flow of charge or current can be produced is to make electrons jump up into unfilled energy levels.

Now, in a metal the energy band containing the *conduction electrons* is only partly filled, as shown in Figure 3. The solid lines represent filled levels, and the dotted lines represent allowable speeds which no electrons happen to have. Under such circumstances, when an electric field is applied an electron can jump a little way up in energy and travel in an unoccupied level. Under these circumstances, there are no longer equal numbers of electrons traveling in both directions, and we have an electric current. Further, thermal energies, which the electrons get when the metal is heated, can throw electrons up from lower levels to unoccupied higher levels. Now, some of the higher levels, those lying at energies higher than V_w volts above the topmost level which would be occupied if the metal were at absolute zero temperature and there were no thermal energies, represent speeds high enough for the electrons to escape from the surface of the metal. This has been represented in Figure 3 by making the sides of the trough which represent the surface of the metal extend to a height V_w above the upper level shown as occupied. Heating the metal throws some electrons into energy levels above this; such electrons are free to pass the surface of the metal and escape, constituting thermionic emission.

Unfortunately, in metals electrons have to have very high thermal energies to escape. Now, in some other substances, there are unoccupied bands which lie mostly above the height of the potential barrier, or, above the energy needed to escape. These substances are insulators and semiconductors. In *insulators,* there are, fortunately or unfortunately, no electrons in such bands, and hence there are none to escape. We will remember also that as the lower bands are completely occupied with electrons moving in random directions, there can be no net electron flow in any one direction, and that is why the material is an insulator. In other substances, called *semiconductors,* there are a few electrons in an upper, usually unoccupied, level, and there can be both conduction and emission.

Electrons get into the upper or conduction band of semiconductors in a rather interesting way; that is, through impurities in the material. The effect of adding impurities is to produce a few new allowable energy levels, as shown in Figure 4. When these lie close enough to unoccupied levels, thermal ener-

gies are sufficient to throw electrons up into such levels. This accounts for the conductivity of semiconductors. The higher the temperature, the more electrons are thrown up and the greater the conductivity* of the semiconductor. If the upper levels are mostly above the energy required for escape, there is a good chance that electrons thrown up into them by thermal energy will be emitted, and this is presumably the mechanism of emission from oxide coated cathodes.

What does this theory predict about emission from semiconductors? It says, of course, that emission should increase with temperature, which seems natural enough anyway. It also suggests that the more impurity levels, that is, the more impurities, the more electrons there will be to be thrown up into the band where conduction can take place and from which emission can take place. The increase of conductivity with impurities is well verified in many semiconductors. Presumably, we have only to find what impurity is doing the job in oxide coated cathodes, add a lot of it, and improve the cathodes.

There were other reasons for trying to get barium into or onto cathodes. It was known that a monomolecular layer of barium covering a tungsten filament made it a better thermionic emitter by lowering the work function, that is, by lowering the potential barrier at the surface. Perhaps electrons could leave barium and strontium oxides so easily because of a layer of barium at the surface. Early experiments in which something, presumably barium, was evaporated onto the surface of oxide coated cathodes seemed to indicate that this was so. Such evidence seemed all the more reason for getting as much free barium into the coating as possible.

At this point, the physicists seemed reasonably well satisfied with themselves. A theory had been provided. There was no evidence against it. Some experiments seemed to confirm it if anything. They turned their attention to other matters, and left some practical people quite convinced and earnestly endeavoring to get more free barium into their coatings. When we review the experimental evidence, however, it doesn't seem too clear. Objections are many, but two are particularly obvious. First, most of the cathodes on which the physicists worked were, while not completely dead, still, real stinkers by practical engineering standards. Second, when physicists found that cathodes behaved peculiarly at the usual operating temperatures, giving data which was not repeatable, and showing no clearly defined limit to emission, they simply low-

* The fact that the conductivity of metals is less at high temperatures is explained in terms of distortion of the lattice due to thermal agitation. Such distortions tend to hinder the motion of the electrons, which would encounter no obstruction at all to travel through a perfectly regular lattice.

ered the temperature until the cathodes became tractable. This meant, of course, operation at very much lower current densities than in actual vacuum tubes. It seems to have been rather blandly assumed that the properties of cathodes at these low temperatures bore a very close correlation to operation at usual temperatures. In all, the experimental evidence is rather unsatisfying.

One important correlation which might be looked for is one between electrical conductivity, which should increase with the number of impurity levels and hence with the impurity content, and emission, which should also increase with the number of impurity levels. This raises the question of measuring conductivity, no easy matter in a thin coating of oxide. We can't believe, either, that some automatic regulating mechanism makes the amount of impurity a function of temperature only. Just look at the conductivity data of Figure 5, where the logarithm of the conductivity of barium oxide has been plotted vs. the reciprocal of the temperature according to the data of various workers. So far there has been no correlation achieved between conductivity and emission.

Despite the unsatisfactory state of experimental evidence, a number of workers did and do have a good deal of faith in the "accepted"

Figure 5. Graph showing agreement (?!?) between various measurements of electrical conductivity vs. temperature for barium oxide.

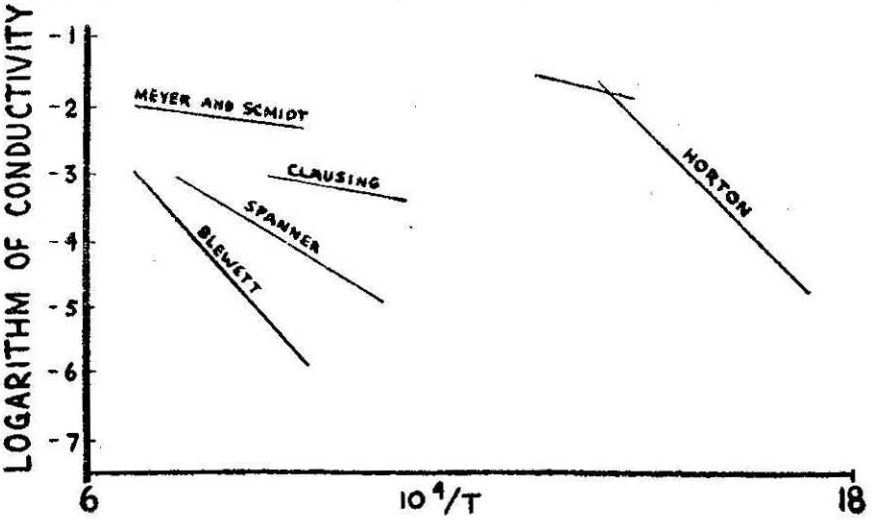


FIGURE 5

theory of emission. One particular worker had enough faith to load his cathodes up with free barium during activation by partially reducing the oxides with methane. The cathodes were good; they were neither better nor worse than good cathodes produced without methane. Other workers believed the theory but didn't let it influence their practice. So things continued, up to the war and, largely, to the present.

During the war there was a good deal of work done on cathodes in government laboratories. Too, a good deal of work had been done before the war, but was not published during the war. Some of this material, new and old, came out at a meeting of the American Physical Society in New York on January 25 and 26, 1946. A group of ten papers was presented. These papers disclosed the work and thought of physicists, chemists, and practical vacuum tube engineers. For those who want to know the present state of the art, the material presented will scarcely be satisfying, but it is certainly confusing and to a degree illuminating.

For instance, G. E. Moore, of the Bell Telephone Laboratories, after reviewing the usual theory of emission and pointing out that there was little real evidence to support it, described an experiment in which barium oxide was evaporated on a tungsten emitter. We will remember that the increase in emission of tungsten when barium was evaporated on it led some workers to postulate a monomolecular layer of barium on the surface of oxide coated cathodes, and a too general faith in free barium as a good thing. Moore showed that barium oxide evaporated onto tungsten increased the emission much more than did metallic barium, and, moreover, that the best emission was obtained with much less than a monomolecular layer. This last disposed of any contention that it was really barium which had increased the activity.

L. A. Wooten, also of the Bell Telephone Laboratories, showed by careful microchemical analysis of cathodes withdrawn from tube structures into a special side tube, and analyzed for free barium separately from the rest of the electrodes, that there certainly wasn't enough free barium in many active cathodes to form a monomolecular layer over the surface. He found no correlation between the amount of free barium and the activity. The method was not sensitive enough to measure the extremely small amounts of barium found in some of the best cathodes accurately, and there might or might not have been enough to explain the activity according to the usual impurity center theory.

Professor E. A. Coomes of Notre Dame, who was at the M. I. T. Radiation Laboratory during the war, told about his work on cathodes intended to de-

liver pulses of emission of the order of a micro-second long. He described cathodes which gave pulsed emissions of from 30 to 90 amperes per square centimeter. While poor or inactive cathodes appeared to run out of emission at the surface of the oxide, as expected according to the usual theory, very active cathodes run at usual operating temperatures showed no limit to emission at all, except that they blew up at current densities above a certain value. Coomes showed that there was a large voltage drop between the nickel core and the oxide, and ascribed the blowup or sparking to the electrical energy dissipated at this boundary.

A. S. Eisenstein of M. I. T. showed rather convincingly by X-ray diffraction studies that the crystal size of oxides in cathode coatings depends entirely on the treatment during breakdown and activation, and not at all on the original size of the carbonate crystals. What then of the controversy about the most desirable carbonate crystal size and the special methods of preparation designed to get a certain size?

E. G. Widell of R.C.A. showed curves of emission vs. percentage composition for coating mixtures of barium and strontium oxides. Coomes reported, however, that by using suitable activation schedules he could get about as good pulsed emission from pure barium oxide as from mixed oxides. B. R. Corson, of Hytron Corporation, also emphasized that an activation schedule suitable for one tube and coating might fail completely with another tube or coating, which could, however, be activated with some other more suitable schedule.

To the casual physicist, the care needed in the construction and processing of commercial tubes to avoid poisoning from gases emitted from mica placed so as to get too hot, from oxidation caused by seal-in fires, and from variations in texture of coating must have seemed a formidable obstacle to getting accurate and meaningful data on cathodes.

It is clear that as far as science goes, the state of the oxide coated cathode is confused indeed. Not only does theory fail to help us make good cathodes; it seems not to fit all the evidence. Maybe cathodes work sometimes one way and sometimes another, which isn't as ridiculous as it may sound. At any rate, while some physicists are uninterested and others confused, cathode making continues to be an art practiced, it seems, by artists with a good deal of witch doctor in their make-up. When something goes wrong, this or that demon is exorcised, and eventually things go right again. And, unlikely as it seems, cathodes continue to improve.

THE END.

BRASS TACKS

Continued from page 98

yarns. When do we get Edward Elmer's "Last of the Lensmen"—or whatever he will call it. I have been, and still am, waiting to hear how Kinnison vanquishes the last of the Boskonians. I thought they were through but just before I left the states you mentioned in "In Times to Come" that Kim still had another battle to fight and I want to be in on it. Please hurry it up and make the installments long ones since most of us hold our breath between issues when Smith is holding forth in Astounding. It's plenty rough to hold one's breath for more than three months!

As for your other writers, my opinion of them is almost uniformly good. Van Vogt and Padgett lead the pack with George O. Smith close behind. Murray Leinster still turns out a gem occasionaly. It is to your credit that you only print those of his which hit the mark and allow his—Leinster's—pot boilers to go on to other magazines.

A. Bertram Chandler hits above fifty percent which is good in any league. Will F. Jenkins really had something in "A Logic Named Joe." We should see more of them —both Jenkins *and* Joe, in fact! Also, please give Howard a chance to elaborate on his background for "Depth." Maybe he has something there.—Lee Hall.

I realize the problem's tough. That's why I want to see a few hundred millions invested in the necessary research. No problem has ever been solved by merely acknowledging the thing is too difficult. And this problem carries a tag that says "Solve it—or die!"

Dear Mr. Campbell:

Your last few editorials have been very thought-provoking, certainly offering sharp arguments in a thoroughly messed up field. The latest one, however, sort of moves in on my elected work. Since the announcement of atomic power developments there has been an almost hysterical rush to acclaim the radioactives possible of production as magical cure-alls in cancer. You didn't make it clear that there are two main approaches in the use of radioactivity in cancer warfare.

First approach is, I believe, direct irradiation of the "wild growths"—either from an external agent or internally: such as by radium implants or circulating radioactive molecules. An example of the latter is the recently developed treatment of thyroid carcinoma by means of radioactive iodine which is selectively absorbed by that gland. The only theoretical advantages this type of irradiation has over the external or the implant types is that there is no skin barrier to plow through and that the individual molecules can be distributed intimately among all the cells of the tumor mass, especially if the substance employed is selectively absorbed by that mass. This whole first field is now essentially a blind alley. All further developments can only be in an in-

crease in strength of irradiation and in finding substances which are selectively taken up by the malignant growths. The increase in strength is contraindicated—for the reason that it would, as far as I can determine from available material, increase the harmful and not the beneficial effects of irradiation. Endarteritis obliterans, cicatrization, necrosis are the end results, not to mention radiation burns and stimulation of new malignant growths.

The search for selectively absorbed, therapeutic radioactives and the second approach—use of radioactives in determination of tumor metabolism—are of necessity intimately related, obviously. The whole matter hinges on the presumption that the wild cells have some variations in metabolism from normal cells, which can be exploited. The use of the individual radioactives, of carbon, hydrogen, oxygen, nitrogen and possibly phosphorus and sulphur is not indicated in metabolism research for the obvious reason that both malignant and normal cells need them in proportions which most probably are not significantly different. Differences in the use of organic fragments might be the deciding factor as you suggest, but the tests necessary to determine what fragments are effective, which structural variations are tumor-toxic and how the structures of the fragments will be affected by the normal metabolic processes of the body before reaching the tumor cells will be both exhausting and demanding of only the highest skill and techniques. An entire new method of study, differing remarkably from present chemical, physical, and microscopic methods, will be absolutely essential —and progress will have to wait upon the development of this method.

Then again, the types, varieties, numberless variations of malignant growths are infinite. Literally, no two are alike. The sensitivity of the different classes of tumors to irradiation varies in no known sensible pattern and the variations of individual cases in even the radiosensitive groups is something fierce. Really the only sensitive growths are the grade 3 and 4 carcinomas and some of reticulum-cell origin.

The last named are particularly fiendish in that recurrence after radiation "cure" brings with it a growth which is tremendously increased in malignancy and decreased in radio-sensitivity.

And there is no real reason to believe that the metabolism of a leiomyoma and a basal cell carcinoma or of a lymphosarcoma are similar enough to be affected by one or even related agents. If you would take some time to look up the types of malignant tumors and the gradations of those types, you would get some idea of the great number of individual growths possible and, if these vary significantly in the factor used as a basis for treatment, the task of developing treatments for each type would be something like that of the monkeys at the typewriters.

I am only in third year at P & S, but from reading here and there and listening like a good little boy to the really intelligent men up here I've arrived at a few conclusions of my own as to malignant growths, but at this stage I'm not capable of organizing this mass of material. You really ought to get one of your best writers or an interested and qualified reader to give you the real low-down in an article, which would be quite timely.—T. J. Petrick, 616 West 165th Street, New York 32, New York.

What? Do away with thirty percent of science-fictions' plots!

Dear Mr. Campbell:

R. D. Swisher's article on the Haldane-Milne cosmology gave rise to a train of thought which I will pass on for what it is worth.

I was particularly interested in the concept of intra-molecular life processes being constant in kinematical time. Muscular activity was used as the illustration, and the calculation made that at the time of the dinosaurs, muscular activity was some ten percent less efficient than now. Carrying that line of thought a little farther back, it becomes obvious that the evolution of terrestrial life from marine forms had to await a favorable ratio between kinematic and dynamic time. The geological evidence indicates that that ratio was attained in late Silurian or early Devonian time—some 300,000,000 years ago—uranium measurement. At that time the first amphibia appeared along with the first terrestrial forests. If Haldane's concept is valid, that dual appearance might be more than coincidence.

We don't know much about the basic nature of thought, intelligence, mental activity—whatever you wish to call it. It is at least intra-molecular and possibly "deeper" than that. But it would not be doing violence to Haldane's theory to assume that the evolution of intelligence also awaited a favorable kinematic-dynamic time ratio. If true this would open the door to a number of fascinating modifications of conventional theories of evolution—social as well as biological. Of particular interest to the S-F fan, however, is the fact—postulating the Milne cosmology—that all these factors are operative throughout the entire universe. In short, that nowhere in the universe could there be a race mentally in advance of our own. The statement should be qualified, of course. It could not cover electronic, subelectronic or other forms of "life" existing on different energy levels from our own, which have appeared in science-fiction at one time or another. Local specializations of intellectual activity might also throw a race ahead in certain fields.

Such a concept is rather rough on a lot of first-rate science fiction, too. We would be in a bad way without the Arisians, the Emonso, the Loard-Vogh, and various Elder Ones. But it is an interesting field for speculation.—Philip C. Good, Box 294, Wadsworth, Ohio.

It will be difficult to get National Executives to accept voluntarily the powerful limitation implied by responsibility—to—the—world instead of simple responsibility—to—his—nationals.

Mr. Campbell:

Your editorial, "Denatured Atoms" appearing in Astounding for July, 1946, besides being an excellent discussion of the problem of making atomic energy safe for peacetime uses, contained an idea so fundamentally *right*, that I could not resist writing my approval. This idea is contained in the last paragraph, and after reading it, the preceding ones, though important, faded into insignificance.

I think that for a long time I have had a feeling that what you propose is necessary, although I could not definitely put it into words. Reading the newspapers, one sees such headlines as: "Russia rejects atomic control plan," or "U. S. dissatisfied with Rumania's reply." Who is Russia? and who is U. S. or Rumania? The sources of those acts or decisions are always individuals. How would those individuals act if they could not hide behind the Nations they represent, and if they were responsible as individuals for their actions?

If the concept you propose were universally accepted, there would be no wars.

As a final comment I should like to say that there seems to be one great impediment to the operation of the idea, and that is: Unwillingness of National leaders to accept individual responsibilities. How could the idea be put across to the world?

Your editorials are always good. Please keep up the good work. They show vision and superb clarity of thought.—Edgar R. Schott, Benton, Missouri.

Now we need the space woof!

Dear Mr. Campbell:

To clarify Mr. Murrell's question in the July Astounding regarding space warps, I believe he has gone a bit too far in his assumptions. In the first place, it is not necessary to completely disrupt space to create a warp. A space warp is merely a part of space that is different. If you warp a rubber band by stretching it, it is different. It has different characteristics. All space is warped, as a single electron in the entire universe would effect all space. Whether the electron causes the warp or whether it is the warp, I am not prepared to say.

If you were in a portion of space that was strongly warped, say in the proximity of a very massive dwarf star, you would probably have difficulty determining that the space was warped, as you would see warped also as well as your measuring instruments. The theory that you might be able to pop out of a hole in space next October and avoid the heat of this summer is probably a lot of poppy cock. It would take vast amounts of energy, and I doubt that you could do it without the liquidation, atomically, of a dwarf star or two.

Space may be warped in at least two warps—probably more. You could have a "stretched" condition or a "compressed" condition. These, of course, are compared to what we consider normal space. Even if space were badly stretched, as near a dwarf star, it could be stretched more, or, as we leave the massive dwarf, the stretch would become less.

This stretching of space is the cause of the illusion of mass attraction or gravity. It appears that a positive particle warps space in one manner while a negative particle warps it in another. This gives rise to some interesting possibilities regarding electrical attraction.

I believe a neutron is not a primary particle, but rather a composite particle very tightly bound up into what seems to be an electrically neutral particle. That is a very difficult thing to prove, however, until you break one into two parts.

I hope you have space to print this, warp the space you have a little, even if it takes a lot of energy. I think some of my fellow readers may find it interesting.—Robert E. Butler, 4020 Warwick Boulevard, Kansas City, Mo.

The "Child of the Gods" series is coming up. Van Vogt's done three to date.

Dear Mr. Campbell:

As usual, I finished the July issue the day it arrived. While sweating out August, why not let you know what I think of July?

Of course I'm prejudiced, but Van Vogt comes first with his "Film Library." The same wonderful style, the same wonderful characterization, even in a story where the idea is the most important thing. When do we get the promised series of the age of atomic ritual? One isn't enough. One thing about "Film Library" that isn't quite like Van Vogt—we don't get any superbly casual superrace intruding for a moment to remark that man is the race that will rule the sevagram—don't I wish I knew what he meant by that in "The Weapon Makers"! I like those touches. But in this story it wasn't necessary.

Next I liked "The Blindness." Latham shows tremendous promise for a new writer—his "N-Day" was excellent. The idea of giving consciousness to Halley's comet is something I haven't thought of since Knight's "Testament of Akubii"—potential consciousness in all atomic structure.

Third, "Cold Front," which was good, interesting and routine writing. It was much better than the weather story last issue.

Padgett's "Rain Check" comes fourth; I was tempted to put it before "Cold Front," but the latter did its job too capably, and after all, it was the cover story. This is good Padgett, and I liked the O. Henry ending.

Fifth, "Trouble." More of this interesting series. But I was more impressed by Smith's letter in

Brass Tacks. These aren't as enjoyable as Venus Equilateral, I feel.

"Stability" comes last. Sorry. It was good writing, the science was well-explained: but to me the idea was unimportant. I just can't get worked up any more about protoplasm thrusting forth slimy gray pseudopods.

The article can't be classed with the fiction, of course, or I should put it right after Van Vogt. It was wonderful. That's a fascinating idea, an artist at last being able to express himself completely in a permanent record. It should provide material for a short story, at least.—Harold F. Van Ummersen, Jr., 145 Cabot Street, Newton 58, Massachusetts.

I know—I know. And that's my point. The United Nations Law Enforcement Division would have to do the job of arresting, indicting and trying. But—the nation would have to accept that an executive under indictment was automatically suspended from his office.

Dear Mr. Campbell:

I saw your statement that to recognize that a country could not be criminal but only individuals would make it easy to try an individual who ordered the breaking of international law. I do not believe that it would.

For one thing just where is there an actual code of International Law that would define the specific offense? In the second place who would decide when it was broken and who would try the offender? Finally what would happen if he refused to surrender?

Let us take President Roosevelt for example. Many people said that he violated the customs of international law by such acts as ordering the American Navy to sink German vessels on sight while we were still at peace. They claimed that he was justified by succeeding events. Just suppose that Germany had lodged a complaint against him and it had been decided that he should go on trial. Just who would indict him and who could try him? The only thing that could be done would be to seize him by force.

Since he would still be the lawful head of the government he could order the army and navy to defend him and they would be forced to obey or face trial for treason.

Furthermore, the people would rally around him on the grounds of unlawful interference with their affairs. You may say that the people would refuse to support any person who was under such indictment, but they haven't refused to do so yet. There are many other points to be covered, but that should be enough to show that it wouldn't work.

Just one more thing. What if both sides were doing the same thing at the same time?—Edwin Sigler, 1328 N. Market, Wichita 5, Kansas.

THE CHRONICLER

BY A. E. VAN VOGT

Part II

Synopsis

Injured in an automobile accident, Michael Slade discovered the "soft spot" in the center of his forehead was a third eye, concealed since birth by an overlay of skin. While in the hospital, he read a statement of his case in the local newspaper by Dr. McIver, eye specialist:

***Concluding** the story of a man thrown into a strange world of highly civilized barbarians, and a decaying city—*

The doctor "... thought it would be an interesting experiment to bring all three eyes back to perfect vision. He agreed that this would be difficult, since Mr. Slade's third eye has a bare perception of light, and also because the famous eye-training systems now in existence have a hard enough time getting two imperfect eyes back to focus together.

"'Nevertheless,' Dr. McIver concluded, 'the human brain is a strange and wonderful machine. When it is relaxed everything balances. But when it is tensed for any reason, eye, ear, stomach and other organic troubles begin.'"

The philosophy of the importance of tension and relaxation on the functioning of the nervous system interested Slade. Being independently wealthy, he set about the task of recovering his full vision by natural methods as first discovered by Dr. Bates and later developed to a high state of skill by other practitioners. His first success, though not permanent, came quickly. For several minutes all three of his eyes worked in perfect balance with perfect vision. The results were amazing.

He saw another plane of existence coexisting with that of the Earth plane, in which three-eyed men lived in caves. So strong was that picture that the two-eyed world faded completely from his vision, and only returned when an inhabitant of the other plane, a nude woman, spoke to him sharply.

The experience shocked him. The human mind, he realized, maintained its balance on its plane of existence by an absolute faith in the certainties of space and time as seen and experienced through the medium of two eyes. But he had three eyes, which meant that he need only recover his vision in order to enter that other plane permanently.

His eyes, reacting to what they had seen, suffered a severe retrogression. And it was only by returning to the farm where he had spent his childhood that he was able to relax sufficiently for a second excursion into the world of the three-eyed. The event occurred at dusk, and it was only after darkness had settled that he realized what had happened. He headed towards a light in the distance. The light turned out to be the entrance to an apparently deserted spaceship. It was, however, not deserted. In a dim corridor of the ship he discovers that he was being watched by the same woman whom he had first seen in a nude state near the caves.

Once more the shock was too great for his precariously balanced vision. He tumbled back into the Earth plane of existence, and this time, convinced that the mysterious woman was striving to draw him into some darksome plot, he determined to make no further attempt to get back to the three-eyed plane. He remained at the farm for a time, then retuned to his city home. There he discovered from his servants that the three-eyed woman had visited him during his absence, and had left a set of records. The records, he quickly found, constituted a language course in Nazia,

the tongue of Naze, the land of the three-eyed people. The records contained references to the city of Naze, and warnings about Geean, ruler of the city. An accompanying note suggested a meeting between Slade and the woman, who signed herself "Leear," beside an abandoned granary near the Earth city of Smailes.

Slade decided to keep the rendezvous for the purpose of obtaining information. The interview turned out to be merely a lure. Before any conversation could take place, the woman precipitated him by artificial means into *the city of Naze.*

Nightmare city. While he crouched in a hiding place, waiting for her agent, Slade saw a man pursued by blood hunters and drained of his blood. Leear's agent, a young girl, finally arrived. Her name was Amor, and she led him to a dingy apartment in one of the queer spire-like buildings of Naze. There he met Caldra, a slow-moving leader of the group conspiring against Geean, and there he discovered for the first time that Leear, the woman of the ship, was trying to break through the energy barrier, which protects the city. For a thousand years this barrier had prevented the mass of the people of Naze from leaving the city and living in a normal fashion. The quarrel between Leear and Geean went deeper than that, but Slade was unable to discover from Amor and Caldra the reason for the fact that only one city remained on the three-eyed world, and that apparently all the people who lived outside of Naze were cave dwellers. He was also horrified to discover that practically every individual in the city was an addict of the human blood drinking vice. Amor told him that at one time Caldra and she had been blood drinkers, but had learned to fight the craze.

On the second night of his stay, however, Caldra came into his bedroom, tied him, and took some of his blood. She drank it, and she had barely released him when agents of Geean swarm into the apartment, stabbed Caldra and Amor to death, and prepared to remove Slade to the central spire of Geean. One of the agents was not human, a great bearlike beast with a catlike head and an intelligent way of handling itself. Slade did not have an opportunity for detailed observation. The shock of events precipitated him back to Earth, where he decided to remain.

Back in his city home trying to live a normal life, he slowly discovered that there was no normal place in a two-eyed world for a three-eyed man. His friends shunned him. His wife proceeded with her divorce suit, and rebuffed his plea for a reunion. At last, convinced that he had no recourse but to return to the three-eyed world, he set about recovering his vision. He had a conviction that this time the results would be permanent.

The story is told against the background of an investigation by a coroner's jury, which is trying to determine what caused the violent death of Michael Slade, whose smashed body had been found near the city of Smailes.

Slade's final entry into the world of Naze was near the caves, where he had first seen the nude, three-eyed woman.

VI.

The change this time was like the click of a camera shutter. He felt his eyes working, then his house vanished, and then—

It was raining, a warm but heavy rain. The water came down on the marsh near the caves in a multitude of slanting drops, like millions of tiny knives cutting the surface. Under that blurring curtain of water, the landscape looked wilder, less civilized. Its very green lusciousness made it primitive, but the green was there, ornamental and gorgeous.

Slade, who had started to mull over the problem of rain in one plane of existence and snow in another, under the same sun, felt a warm, wet trickle of water run down inside the collar of his waterproof suit. It didn't bother him, but it took his mind off of the why of the rain. He stepped automatically under the overhanging branch of a nearby tree, and from its uncertain shelter—the water poured from it—peered up at the ledge.

Some of the excitement died out of him. The hill looked lifeless. All the fires were out, and not a human being was in sight. It was the rain, of course. They'd be inside the caves.

Since he had no intention of climbing to the ledge until he had been discovered—spears and knives might flash just a little too swiftly if he surprised them in their caves—his problem was to find shelter. He constructed himself a crude house of dead branches overlaid with large, fronded leaves. Then he scraped away a heavy layer of dead wet leaves, and was pleasantly surprised to find that the ground underneath was comparatively dry.

He slept fitfully throughout the afternoon and evening. During the night he was awake for a long time. Just before he finally slept, he thought sharply, "I'll have to wake up before they do."

When he opened his eyes, the sun was shining from a blue sky. And several three-eyed men were kneeling around the open end of his shelter. Beyond them were other men, and in the farther background, women and children.

Very slowly, Slade sat up. He pushed the shelter over on its side, and climbed to his feet, but that, too, was an automatic movement. The convulsive thought came that the strain inside his head and in his muscles would produce organic tensions strong enough to precipitate him back to the United States.

But nothing happened. The people and the marsh and the cave hill remained in his vision as steady as sanity itself. He was welded to this plane of existence as if he had been born here.

It was not until that thought had come and gone that he noticed none of the men carried arms of any description. The relief that came was almost as tremendous as had

been the first shock. Before he could speak, one of the men nearest him said gently:

"Careful. You're not completely stable yet."

The man reached forward and placed his palm over Slade's center eye. The movement was too unexpected for it to be resisted. The delayed reaction, when it finally came, was half-hearted. Slade started to take a step backwards, and then, realizing the meaning of what was happening, he stopped in amazement.

These people knew that he was not of this plane. *And they knew why.* The next thought followed hard on the first:

The cave dwellers were NOT primitives.

It was too big an idea to grasp all in one instant, particularly as the man who had touched his forehead now stepped back with a smile, and said:

"I think you will be all right."

Slade hadn't noticed the fellow's voice before. Now, he did. It was calm and melodic, without harshness, the words so easily spoken that they were like a flow of music produced by a master.

That fact, also, held his mind only a moment. He stood looking around him at the men and at the women, and his relief grew second by second. They were smiling, friendly; they were good-looking and alert, a high physical and mental type. Slade allowed himself a flashing memory of the degenerate blood addicts of the city of Naze, and comprehended with finality that, whatever was the basic reason for the deadly siege of the city by the ship of Leear, these clean and decent-looking cave dwellers were evidence in favor of the ship.

He realized that it was time he said something. He said, "Thank you. I am a friend. My name is Michael Slade."

The tall, eagle-eyed man who had already spoken nodded. "My name," he said, "is Danbar."

They shook hands. It was so simply, so generously done that Slade was not sure then or ever afterwards as to whether shaking hands was a common custom among these people. Or whether Danbar had instantaneously and without hesitation responded to the habits of a stranger.

As their hands separated, Slade noted for the first time that the man was inches taller than himself, and marvelously strong-looking. He had a lean, handsome face. Except for his extra eye, he would have been good-looking in any group of two-eyed human beings. He seemed about thirty years old.

He smiled. He took Slade's arm, and led him to another man, a splendid-looking chap who had been watching the proceedings from the background.

Danbar indicated the other. "Malenkens," he said.

The way he said it made it sound a distinctive and important name. And, looking at the man, Slade did not doubt but that he was being introduced to one of the leaders of the tribe. With Malenkens, too,

the handshake was warm, but his smile was sterner, more aloof.

Danbar said, "You can meet the others later. Now, let us reurn to the ledge for breakfast."

Contact was established as easy as that.

The winding path that led up to the caves was made of cement steps flanked by ornamental shrubs. A cement sidewalk ran along the entire length of the ledge, with smaller sidewalks leading into the caves. In between the sidewalks, green, velvety grass grew in neat plots that could only have been planned by skillful gardeners.

Slade, pausing before the first cave, peered into an interior at least as uncavelike as what he had already seen. The floor was of cement, but it was covered with throw rugs. The walls and ceiling were plastered over a base of cement. The chairs, tables and bunks that he could see were of unpainted wood, but they were well-designed and had been sandpapered to a smooth polish. The overall result was astonishingly modern.

Danbar touched Slade's arm, and motioned him to follow Malenkens, who was proceeding along the ledge. As he walked, Slade found himself surreptitiously looking for Leear. He was not greatly surprised when he failed to locate her, but neither did he accept her absence as final. She had been here once. There was no reason why she should not come back. And, besides, she must know that this would be his point of entry into the three-eyed world.

Malenkens stopped, and spoke for the first time. "In here," he said.

The cave was a structural duplicate of the one into which Slade had peered. The three men sat down in chairs, and Malenkens spoke again.

"Slade," he said, "we have been estimating your situation from the time you wakened, and in my judgment it will take about six years to adjust the rhythm of your life to our group. That takes into account your untrained resistance, and the fact that it will probably require several months for you to help Leear destroy the barrier of Naze and Geean. And, of course, it assumes that you will not be killed or dangerously injured."

He added, "I am not trying to alarm you. I am merely stating the facts as I see them. Now, Danbar will take over."

Danbar did not move, but continued to sit in his chair. He looked at Slade speculatively. "You will be wondering," he said, "what Malenkens was talking about. Watch."

He vanished.

For a minute, Slade sat where he was. He had no particular thoughts, though the memory came that, when Leear had hovered above him near the granary, he had not been able to see her against the stars. She, too, must have been invisible.

At the end of the minute, it struck him that perhaps he was expected to do something. He stood up, bent over Danbar's chair, and

gingerly moved his arm through the space where Danbar had been sitting. There was no resistance to the movement. He glanced over at Malenkens, but the man did not look up.

Slade sat down again, heavily this time, trembling a little. There was no reason at all why Danbar, having rendered himself invisible, had not climbed to his feet and walked in a leisurely fashion to the cave entrance, or perhaps he was standing beside his chair, watching his guest's reaction. There was no reason why he shouldn't have done one of those things, but Slade had the vaguely sinking conviction that Danbar had done nothing of the kind, and that in fact he was still sitting in the chair.

Primitives, Slade thought. *And I believe they were primitives.*

These people had learned the innermost secrets of the human nervous system. They were so far ahead of their two-eyed cousins that comparison seemed almost ridiculous. Or wait a minute—what was it Malenkens had said? *". . . It will take you about six years to adjust the rhythm of your life to our group—"*

The first burning excitement stirred Slade. Did he mean that at the end of six years he, too, might be able to render himself invisible at will? Or did he mean—?

Slade pressed the thought back into his mind. He forced himself to lean back in his chair. He parted his lips to speak to Malenkens, then closed them again. The man was looking the other way. The moments dragged, and there was no sign of Danbar. His absence began to be disturbing. For the second time the possibility occurred to Slade that he was expected to do something.

He stood up uncertainly. On a sudden impulse he seated himself in Danbar's chair. That didn't last long. The thought came that it would be a very humorless situation if the man chose to materialize in the chair.

Slade walked to the entrance of the cave on the doubtful expectation that Danbar would be outside. The ledge was a veritable hive of activity, fires burning brightly, women stirring caldrons, children already becoming nuisances with their games and noise. But of Danbar there was no sign.

Slade stood for a moment peering out over the marsh. The view was gorgeous beyond all imagination. The water gleamed in the sun, and it was alive with colorful growth. Far out, he caught a glimpse of birds fluttering, and he thought with a thrill: Three-eyed birds! In the distance beyond the marsh trees reared to amazing heights, and he could see the haze of mounting hills beyond. Everywhere was the green of perpetual summer.

Slade turned back into the cavern, quivering inside. What a wonderful plane of Earth he was on. Never, surely, would he have the slightest desire to return whence he had come.

There was, of course, the problem of Naze— That brought Slade

back to reality with a start. He saw that Danbar had still not rematerialized. He thought, "Invisibility? If I had to figure out some way of making myself invisible, knowing what I do now about the art of seeing, I would try to disturb in some way the vision centers of those who were looking at me. Perfect vision is possible only when the mind is relaxed. Therefore I would try to tense their minds in some way."

The rationalization brought a sudden startled thought. Why, of course. He *was* expected to do

something. He drew a deep, slow breath, and let it out with a sighing sound, simultaneously letting all his muscles go lax. The eye specialist, Dr. McIver, had always maintained that the human body could relax with one breath.

In that instant Slade proved it. As he started to draw his second breath, Danbar reappeared in his chair. The man looked up earnestly at Slade.

"Very good, my friend. I was hoping that you would manage to figure that out for yourself." He went on, "You have experienced for yourself one of the basic truths of the human nervous system. During the next few months you will be taught the ultimate secrets of relaxation, relaxation so complete that, even in the final issue, there is no limit to the control that can be exercised over it. But now—"

He stood up, smiling. "Let us," he said, "take our chairs outside and have breakfast."

Slade followed the two men out into the brilliant sun.

VII.

On the thirty-second day of his stay with the tribe, Slade lay at ease on a knoll above the marsh. From his position, he could see the caves about a mile away. It was a marvelous day. It had rained a little in the morning, but now the sky was as clear and blue as could be. Before him, in a garden-like vista, the green, green grass and shrubbery still sparkled with raindrops that hung heavy on every blade and sprig and leaf and branch.

The whole world around him was as wonderful as ever, and yet Slade was conscious of dissatisfaction. "I'm an active person," he thought. "My nerves are still afflicted with the neurotic desire to do things."

He even had an impulse pushing at him. That odd metal device that he had found half-buried in the ground near his farm the night he had seen Leear in a shadowed corridor of an old spaceship—it would be interesting to go and get it, and examine it.

He did not move. He had to admit that the previous month had, in its way, been exciting. The world of relaxation was an inward world of unending discovery. His knowledge began with the muscles, lectures about and exercises with. Exercises? It was not exactly the right word for what he was doing, Slade had decided, but he continued to use it for want of a better. Exercise suggested physical activity, but the relaxation exercises were the reverse of movement. They were stillness. They were inhalation and exhalation as effortlessly as possible. They were long minutes of lying upon carefully arranged pillows while the mind concentrated gently upon certain muscles, and always the message his brain sent was: "Let go, let go, let go."

Gradually, over the weeks, he learned the basic philosophy behind the relaxation. A correct posture, and good breathing habits. When at fault, those two things alone

caused tension repercussions that affected the entire body. Tension made for bad vision and poor hearing. Tension was responsible for quick fatigue, for lack of strength and for narcotic cravings. Tension caused the kidneys to inject a fluid into the blood which caused high blood pressure, melancholy and a negative attitude towards life. Tension subtly changed the acid content of the digestive fluids. Tension was, literally, the devil of the nervous system, but getting rid of it was merely the first, preliminary step to the control of the body.

The second phase was normalization of the nerves. Every nerve, individually and collectively, was capable of a positive or negative action. It could pass an impulse to seek another path to the brain. It was doubtful if more than five percent of an ordinary person's nerve impulses followed direct routes. It was true, of course, that many of the detours were used over and over again, but it was no justification for a bad habit to point out that it was repeated endlessly, particularly when the cumulative results were *un*sanity, early old age and a confused mind.

The entire ninety-five percent of misdirected nervous energy had to be re-channeled along direct routes and this was done by concentrating on key nerve paths. In every case, positive training was necessary. As with muscular relaxation, one could not just seek out a lazy environment and take it easy. Definite things had to be done. Muscles consistently relaxed by a system eventually stayed relaxed. Nerves repeatedly told to establish a direct channel, with a picture of that channel clearly visualized, did eventually make the exact channel demanded.

Nerve control led to the third or molecular phase, about which, when Slade had asked him, Danbar merely said, "You will see. You will see."

Lying there on the knoll above the marsh, it seemed to Slade that he knew the muscular relaxation exercises sufficiently well to be able to do them for a short time without an instructor standing by. He should be able to walk to the area where his farm existed on the Earth plane, and get the machine buried in the ground there.

He climbed to his feet with sudden decision. *I'll ask Danbar or Malenkens,* he thought.

Danbar, to whom Slade made the request, after the evening exercises, looked disturbed. Then he glanced questioningly at Malenkens. It was the latter who said:

"Leear told us you would be restless." He paused, frowning. Then he looked at Slade from under lowered lashes. "I've decided to be fairly frank with you, Slade. We are training you to help Leear against Naze. You must not think that we are parties to her plan. We merely exercise certain restraints upon her. You may wonder what that means, so I will explain.

"It is Leear's intention," he went on, "to involve you again in Naze. We have no power to prevent her from doing that, nor actually do we want to. Somehow, Geean must

be killed, and the people of Naze freed. According to Leear, only you can do this, how she has never explained.

"What we did was to delay her plans until you could be given at least preliminary training in our marvelous system."

He finished quietly, "I think you will agree that, under these circumstances, you would be wise not to involve yourself in minor side issues."

Slade was shocked. The more he thought about it the greater grew his shock. It was curious but, though he had not for a minute forgotten Leear or Naze—incredible Naze—somehow the long sweet month of pastoral existence had blurred the darker potentialities of that memory.

Now, here it was, plainly stated. On occasion in his past life, he had had a reputation for facing facts with a brutal honesty, and his comparisons had startled his business associates. That was the way he finally looked at his present position. The comparison that occurred to him was that he was like a pig being fatted for the slaughter.

He spent the night, narrow-eyed, sleeping fitfully, and in a fury every time he woke up. By morning his mind was made up.

So Malenkens and the others had only persuaded Leear with difficulty to delay putting him immediately in jeopardy. Well, that was just fine. He owed her nothing anyway but a punch in the nose for being indirectly responsible for the death of Amor and Caldra.

Since her intention was to use him without so much as a by your leave, his purpose could only be to prevent her by every possible means from involving him.

The determination gave him considerable satisfaction until near morning, when it occurred to him that it might not be any too easy to prevent her machinations. The trouble was he knew so little, so desperately little. He had not the faintest idea what methods might be available to these people who knew the innermost secrets of the human nervous system, and in addition had a spaceship loaded with gadgets, one at least of which was capable of transmitting material objects from this plane of the Earth plane and back again.

The new possibilities calmed him. He would have to be very clever indeed, to ensure that she didn't get him into Naze again. And anger would be his poorest asset in carrying out that purpose.

At breakfast time, he emerged from his cave, seated himself beside Malenkens, and said:

"I think it's time that I find out something about the history behind the war between the ship and the city."

Malenkens said, "I see that you have been thinking of what I told you last night." Slade waited, and Malenkens went on, "I do not regret having said it, but I cannot say more. We promised Leear that we would let her tell you the entire story."

"Then tell me," said Slade savagely, "who is Leear?"

"She is one of the silver belts."

"One of the what?"

Malenkens was grave. "Her personal plans for you would suffer a psychological defeat if I told you more. You must wait. I can say this. If you survive the destruction of Naze, the universe will be yours for the taking."

Temporarily that silenced Slade. Coming from Malenkens, those were momentous words. They brought his first sense of exhilaration at the greatness of the adventure into which his destiny had brought him.

The exhilaration was brief. The tremendousness of the reward implied by Malenkens suggested an enormous compensating sacrifice. Slade stiffened slowly. He disliked the thought of being on an unfriendly basis with these kindly people, but it was time he stated his position without equivocation.

He did so, pretty much as he had already decided. No co-operation with Leear until he was good and ready. It was ridiculous for her to assume that a man could be shoved blindly into a situation, again and again, and told to get out as best he could, each time without having more than a sketchy idea as to what was going on. He for one refused to have anything to do with such a plan. And if he ever went in, it would be on the basis of full information with his eyes wide open.

"You will have to kill a man," said Malenkens in a strangely drab voice. "You have never killed a human being. It is Leear's unalterable conviction that you could not bring yourself to commit a cold-blooded murder, and that only under the stress of violent danger could you be nerved to kill. Such is her opinion, and, having observed you for an entire moon period, I agree with her."

"Thanks," said Slade dryly. "I'm still not interested."

He finished his meal in silence. He felt uncertain as to just what his position was with the tribe, but he decided in the end that what had happened was not a breakup. He would remain for a while at least, and make his plans on the basis of careful thought. There was no use rushing off, half cocked.

He attended his morning relaxation exercises as usual.

During the second month, the tempo of his life seemed faster to Slade. He realized what it was. He was more alert, more wary, eager to learn things. He kept a watchful eye on the men, and slept with a gun under his pillow.

Towards the end of the month, it struck him that no one in the tribe had ever seen the automatics in action. And that it might be a good idea to fire one of his precious bullets as a sort of a deterrent. He hesitated about that, because even one bullet might be important in a crisis. And yet, it seemed clear that Leear would never get him into Naze against his will unless male members of the tribe trussed him up, and gave him into her power.

It was a month of several dis-

coveries. He had been wondering about the animal life of this plane. "It's there," Malenkens assured him, with an odd smile. "It all depends on whether they decide to find out your reaction to seeing them."

That didn't quite make sense, but over a period of four weeks he had glimpses. And, finally, every time, the glimpse revealed the animal watching *him*. There was a tiny, dark creature too fast for a clear picture to form of its shape. A long, slim, spotted beast, too thin to be well muscled, and resembling a dog, trotted off disdainfully into the brush, after looking Slade over with an aloof eye. There was a horselike beast that peered at him thoughtfully for several seconds, and then galloped off snorting. And then, finally, there was a really shocking meeting with an animal.

Slade was walking along in a pathless valley adjoining the valley of the caves when a chance glance to the rear revealed a beast bigger than himself trotting along not more than ten yards behind him. It had a head that had both cat and bear features, and its body was long, and sleek, and grayish-brown.

It was the same type of beast that had bent over him that night in Caldra's and Amor's apartment.

Slade felt a thrill as sharp as fear, and snatched at his automatic. The animal's teeth glinted like knives as it snarled at him. Its great paws came up. It whirled, and dived into concealing brush.

A nith, Danbar told him, and then was silent when Slade described what had happened in the apartment in Naze. Later, Slade saw him talking earnestly to Malenkens. The two men fell silent as Slade approached, so he was pretty certain they had been talking about him.

It was startling, that sudden discovery that he was being discussed. It emphasized the unsatisfactoriness of his position, and made immediately necessary, it seemed to Slade, a demonstration of his powerful weapons.

He had been thinking about the best method for doing that, and finally it seemed to him that he had it. A bird. For two months he had watched birds with gay plumage frisking through the foliage over and around the marsh. Wary were those birds. He could spend an hour crawling towards a flock. And then, just before he got close enough for a good look, the birds would take off towards a remote destination. Gradaully, his desire to have a close look at a winged creature with three eyes became almost an obsession.

It seemed to him, now that if he could shoot one from the ledge, he would, figuratively, kill two birds with one stone.

On the following morning, he brought a chair out of his cave, laid one of his automatics on his lap, and sat watching the brush below. After ten minutes, he noted that people were glancing at him from the corner of their eyes. A few minutes after that, Danbar pulled up a chair and sat down beside him.

"What makes you think," he

asked, "that your weapon will fire in this plane of existence?"

"Eh!" said Slade.

After a moment, the possibilities stunned him. He took careful aim at a distant flock of birds. He paused to say, "This gun makes a loud noise, so prepare yourself." Then he squeezed the trigger.

Click!

It was an empty sound. It left Slade with the chilled feeling that he was naked and helpless. The sun was as warm as ever, but for two months his two automatics had given him confidence and courage. They buttressed his spirit every time he thought of how easily the several dozen tribesmen could overpower him and give him to Leear.

Now, that buttress was gone.

For a moment, Slade sat quite still, then he ejected the cartridge into his palm, and began to pry out the bullet. He spilled the powder onto the cement sidewalk in a little pile, and then walked over to the nearest fire and picked up a burning faggot. He touched the flame to the powder. It burned with a slow sputter, like thick paper. Beside him, Danbar said:

"The chemical combination will have to be slightly different. I have no doubt it could be made to work."

Slade had no intention of waiting to find out. His protection was gone. Without a word, he entered his cave, strapped on his second automatic, stuffed into his pockets the smaller articles he had brought from Earth—and returned to the outside. Danbar fell into step beside him.

"You are leaving us, Slade?"

Slade said, "Where is Malenkens?"

"He's gone."

That was the second great shock. "Gone! Where to?"

He saw that Danbar was looking at him oddly. "Malenkens is not one of us, Slade. He visits us occasionally. He is one of the . . . silver belts."

Slade was silent. He realized what had happened. He had been handed over to one of the Leear hierarchy. For the first time it struck him how consistently Malenkens had been in the foreground of his tribal life. Danbar was speaking again:

"Do not blame us too severely, Slade, for anything that happens. None of us here have attained further than the molecular phase of body control. We are helpless in this struggle between the ship and the city, and so long as the city exists we can never attain the final stage of self-control.

"It is a jarring factor. Its existence prevents certain basic rhythms. The *thought* that people like ourselves are caught behind its barrier, forever unable to escape—and that is the main purpose of the barrier—to keep those people there under Geean's control—weighs upon our spirit, and makes it impossible for us to realize our potentialities. And the result of that is that we, too, are at the mercy of Geean."

Slade had the impression that he was listening to an apology. It

thawed him. "Thank you," he said, "I have nothing but friendship for your people here."

Danbar said, "Go with luck, my friend."

It took more than an hour before the cave ledge was finally out of sight.

VIII.

The scene grew wilder by the hour. He saw no animals, but birds by the hundreds squawked in the brush and in the trees, on average a very different type of bird than those that had been in the vicinity of the caves. They were less wary. Frequently, he could walk right past them without disturbing them. Towards evening, he picked up a stick and knocked two pigeonlike creatures out of a low shrub, and had his first three-eyed birds.

In that dusk, with his fire sputtering defiance at the gathering darkness, with the cries of night birds all around, he ate fresh fruit and pigeon roasted over a spit.

After eating, Slade pondered the problem of two-eyed and three-eyed creatures, and the worlds they lived in. There must be common ancestry. The human form would not have repeated easily. Way back, various creatures of the two-eyed world had developed a third eye, and had gone automatically, without their even being aware of it, into this special universe.

Actually, like sight and sense itself, the explanation probably went to the very roots of reality. What didn't exist for the mind, the senses ignored. And in some intricate fashion, the object or objects ceased to affect the body as a whole.

It was not a new idea. But the old formulation expressed by the phrase, "Is the cat sleeping under the stove while I'm not around?" failed to take into account the certainties of the human mind. The absolute conviction that the cat was there whether the observer was present or not. Blind folk acquired certainties from hearing and touch.

The mind alone counted.

As the night wore on, Slade began to think, in the uneasy periods between dozes, of guns that wouldn't shoot. It was a thought that was to occur again and again during the days that followed. It almost but not quite altered his plans.

He had intended to get the metal device, then turn sharply southward, and so walk entirely out of the territory of Naze and Leear. It was an unheroic role that he proposed for himself, and it made him a little defensive, a little ashamed.

Here am I, he thought, *in the strangest adventure a man ever got into, and I'm playing it cautious.*

There were men, he knew, who would not hesitate a minute about plunging deep into the affair. Such men would now be on their way to Naze with the intention of beard-ing Geean in his great central tower.

Lying in the darkness, Slade's lips tightened. It was no use kidding himself. Not for him was the bold course. The important thing was that he do not let caution send

him southward without the metal object. It might prove without value. But it was a clue, and, who could tell, it *might* still be in a workable condition. He couldn't leave it behind him.

The forest were quiet, the valleys long, the hills gradually higher. A great, virgin continent spread before his footsteps, but the amazing realization was the sensational familiarity of the route. There was a slight difference in the depth of the canyons and the height of the hills. The extensive marshes, the trees and the forests of shrubs were absolutely different. But the general contours were the same. And he had made the hundred mile trip to his farm so often that he wasn't lost for a minute. It was a wonderful feeling.

He came finally on the sixth morning to the long, hilly plain at the end of which—on the Earth plane—was his farm. Very cautiously, using every possible cover, he approached the point where the spaceship had been that night. From afar, he saw that it was not there, but his caution did not relax for a minute.

Within ten minutes of reaching the area, he found the machine. He used a sturdy branch he had picked up en route as a crowbar to pry it out of the ground. It was deeply imbedded, and it took considerable perspiration and twenty minutes to loosen it.

It came up finally, and showed its shape. A boxlike affair, with a wheel attached to one end. It was not too small in size, but its lightness was amazing. Pure magnesium, or even lithium, might have matched it, but little else.

He estimated the weight of the box and the wheel together at something less than thirty pounds. It glittered in the sun, untarnished by its long exposure. Slade made no effort to examine it immediately.

All that day, he carried it on first one shoulder, then another. About an hour before dusk he came to a burbling creek, and decided to stay there for the night. It was rather exposed, but he was tired, and the nearest forest looked many miles away.

He ate hurriedly, then, his curiosity as strong as ever, he bent over the machine. Atomic and magnetic power, Malenkens had told him once, were the energy sources of old Naze. "Naturally," the man had pointed out, "they will work a little differently here than where you came from."

After his experience with his automatics, Slade could appreciate that. Nevertheless, he decided that he preferred this one to be magnetic.

He studied the machine intently.

It was the wheel that puzzled him. Only one wheel. And so large, too. The metal box, into which the shaft of the wheel disappeared, was only about a foot cube. The wheel was a little over two feet in diameter, and it curved out from the shaft like a flower with long petals that formed a cup shape. It was big enough to be a small cornucopia. It could have

acted easily as a small cement mixer, so spacious was it.

"Hm-m-m!" said Slade.

Perhaps the angle was not to think of it as a wheel just because it rotated easily on a shaft.

Still, it looked like a wheel.

He spun it. It whirled and finally came to a stop. Nothing else happened.

He fumbled over the box, searching for a control device. In a way he had done that before. Now, however, he was thorough. But there was nothing.

He noticed three brighter spots on one shiny side of the machine. They looked like dents made in the hard substance. But there were no dents. His probing fingers sensed not the slightest depression.

Puzzled, Slade examined the brigtnesses. He brought them close to his eyes. Glitter, glitter, glitter, he thought. Wonder what—

Something caught at his eyes.

He jerked back, letting the machine drop.

It didn't drop. It hung a foot from his face, the wheel facing up, the three bright spots like tiny blazing fires poking at his three eyes.

He closed them, then blinked rapidly. The blaze points pierced through his eyelids. In a panic, Slade shoved at the box.

The machine glided a hundred feet through the air, and came to a stop. The three bright spots poured fire towards his eyes, as bright as if he was still a foot away. The extra distance made no difference.

Slade raced towards the machine. Have to turn it away from him, or the thing would destroy his vision. He caught it with trembling hands. And turned it upside down.

It spun around without resistance. And its mind-frightening connection with his eyes broken, it wafted gently, almost balloonlike, to the ground. Slade hid it in the brush beside the creek. Then, still shaking from his experience, lay down on the grassy bank. It was only slowly that he realized that nothing damaging had happened. His vision was as good as ever. His eyes felt cool and rested, and quite untensed.

He slept dreamlessly and without wakening all night. When he opened hi seyes, the sun was just coming up. He busied himself gathering fruit from nearby trees, and he had just finished eating when a thin whistling sound rent the air to one side of him.

Slade jumped a foot as something struck the grass where he had been.

IX.

He whirled, and stared at the object. A noose made of metal looking rope. It was alive in a mechanical fashion. It shuddered and narrowed, tightening as he watched it. Its two ends withdrew into a little metal box.

Before Slade could examine it further, there was another hissing sound. The second noose struck his shoulder, as he twisted aside. It bounded away like a rubber ball, almost hitting a nearby tree.

"What the—" said Slade. And dived behind a shrub. By the time he reached it, two more nooses were lying on the grass, writhing shut. Slade slid his gaze around the horizon—and saw their source.

Flying things! They were too far away to be clearly visible. They seemed to have legs but no wings. He caught a glint of scarlet, then dazzling silver, then green, and of humanlike arms clinging to something that shimmered above them. It was the shimmering objects that flew. The creatures merely hung on.

And every little while, though the motion that caused it was lost in the distance, one of the creatures would send a noose hissing towards Slade's head.

He felt a horrid thrill. What was this? With an absolutely gruesome fascination, he remembered the girl's letter. Geean and the hunters of the city.

But the hunters were keeping their distance.

A thousand yards, he estimated shakily. Even if they had worked, his automatics would have been useless at that distance. He looked around frantically for a way of escape. But the nearest forest was about ten miles behind him. There was brush, there were shrubs, and by heaven, there was no reason to lose hope until he was actually caught.

Five nooses sprang around him while he observed and had the thought. He began to gather them up frantically. They were probably accustomed to retrieving them, and they couldn't have too many.

He darted behind a shrub. From its shelter he flicked his gaze calculatingly towards every horizon, counting the creatures. One, two . . . seven.

Slade thought jerkily, "If I can keep them off till dark."

A glance towards the sun showed that it hadn't moved a fraction of an inch, seemingly, from its position low above the eastern horizon.

Night was a long, long way off.

His lips tightened. Some of the fever went out of him. His body grew calm with determination. Straight ahead. There was no reason why, with a show of bravado, he shouldn't be able to make it—straight ahead to that distant forest.

As he twisted towards a second shrub, a noose came down from the sky, ringed him, spun a little as it struck his shoulders. And then settled down over his arms, tightening with irresistible strength.

Slade grabbed for his sheathed knife. But his hands were pressed too tightly against his body. He jerked at the snare, and stumbled over a stone, fell hard, rolling over and over.

The noose was like a steel spring. It cut into his flesh with a strength that made Slade gasp. There must be a releasing catch— Have to release it.

He strained to get his fingers up to it, but its hold was too cunning for him. As he struggled, Slade caught a movement in the near sky. It was hard to see through the pain tears that had started into his eyes.

But he blinked the tears aside, and, after a moment, he saw the silver-clad hunters clearly. They were about a hundred feet away, and swooping closer.

He ceased his hopeless fight.

The seven hunters of the city dropped from their flying devices twenty feet away. Slade looked them over briefly, wondering if Geean was among them. It seemed unlikely. Swiftly, he forgot the men. It was the reddish flying instruments that snatched all his attention. They clung for a minute to the air above the men. And then, like slowly deflating balloons, they collapsed to the ground. One man carried a spare flyer.

Each instrument was a red-frosted, glasslike extrusion about three inches in diameter and three feet long. There was a sling attached to it, and at the end of the sling some handgrips.

Nothing else. No machinery, no apparent source of energy—Slade had an impulse to make it a closer examination. He repressed it, partly because the noose held him as tightly as ever. And partly because he had his first *close* look at the men.

The day he had seen the soldiers of Geean in Caldra's and Amor's apartment, he hadn't really had time to note character. Now, with these henchmen, he did.

They were intent faces, dissipated looking, very light in color. They bent over him, and two of them were smiling sardonically. One of the men said something, and there was a quick general laughter, that ended, and left the faces intent again. Slade didn't catch the words.

Slade felt the automatics taken from the holsters, and other articles removed from his pockets. Each item was swiftly scanned, then stuffed into a canvaslike bag. Before the search was finished, one of the men fumbled at the noose. It loosened promptly, and came up easily over his head.

And, again, there was speed. Even as Slade climbed to his feet and started to rub the numbness out of his arms, another man shoved the handgrips of the spare flier into his fingers, and pointed at a third, who was just picking one of the fliers off the ground.

"Watch him," he said curtly.

As Slade watched, the third man swung the bar up in front of him with an easy rhythmic swing. And, simultaneously, with dexterity, leaped into the air.

The glasslike bar caught at something. It stiffened, straightened, and pointed like an arrow from a bow. It began to glide forward with the man clinging to the handgrips—as the man beside Slade said curtly, "Now, you."

He expected the thing to come crashing down on his head. And, simultaneously, paradoxically, he expected his arms would be half torn out of their sockets when the device caught "onto" the air.

But it wasn't like that. It wasn't like that at all. It didn't fall. There was no tug, no jerk. Something, a current, a—lightness—saturated his body. And it was that current.

and not the machine, that lifted him. Lifted him like thistledown borne on a climbing breeze.

Strong as metal, the flying device rode above him. But it was only a catalytic agent, *affecting* his body not transporting it. His body flew with the machine, was of the machine. The two became one. He remembered how the bars had dropped a few minutes before, after the hunters let go, and it was clear that neither could remain airborne without the other.

A great basic force welded a union between his nervous system and the machine. And the dead weight of gravity let go of him. It was like the wheel machine, he recalled with a start. He glanced back towards where he had hidden the machine, but it was not visible from the air.

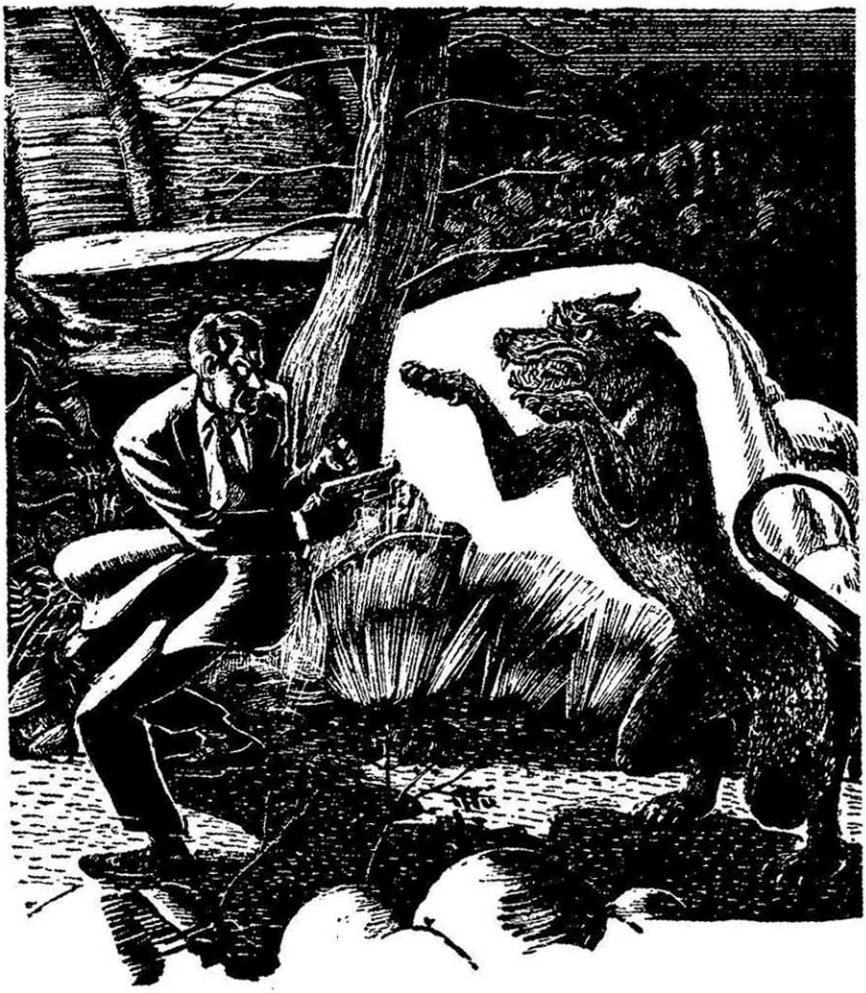
The relief that came had mixed in it a great wonder. What incredible secrets of the nervous system had these people discovered, both natural and mechanical? He saw that the other six hunters were swooping up to him. They clustered around him, clinging to their fliers effortlessly. And somehow the sweep of their machines became the direction and speed of his. It was as if his flier was guided by a sympathetic union with the other machines.

They soared low over the land and over a whole series of marshes, in and out along valleys and through forests. Slade noticed that the fliers had a tendency to remain near the ground. Not once was there a real attempt to climb high. They went around and between trees, not over them. They avoided the towering, snow-capped mountains that flanked their course. Like a river, they flowed along the easiest course, and in the end he decided that the motive power was derived from the magnetic currents of Earth. Nothing else, in view of what he knew, could explain the evenness of their course, and the *type* of transportation.

In a surprisingly short time, the clustered group of them came within sight of a city of shining spires. Slade stared at it with glistening eyes because it was one thing to have seen it from inside, quite another to view it like this. It was about four miles wide at the mouth of a widening valley. He couldn't see how long it was. The fliers were too low, and the city stood on a plateau.

Its towers and roofs glinted in the brilliant rising sun. Clearly now, its design was apparent. The whole city sloped up towards the central tower of Geean, that reared like a pylon into the lower heavens. The height of that pylon seemed greater than he remembered it. It rivaled the near mountain peaks, and from its silvery eminence, a hazy, violet glow spread like a mist covering the whole city. The color was remarkably sharp seen from this angle. It was a mist of light that curved like a carefully worn robe onto the grass a mile from every outskirt of the city.

The fliers poised before the barrier. For a moment only. A signal



flashed mirror-bright from the distant tower, and the red-frosted devices flowed forward and through the barrier like so many knives cutting through thin gauze.

They almost grazed the rooftops of low built homes. They evaded several spires, and then they began to swoop lower. They were twenty feet, then ten feet from the ground. A man reached over and grasped one handle of Slade's machine.

"Let go," he said curtly. "Drop."

Slade looked at him, amazed and uncomprehending. The surly face, so close to his own was venomous.

"Drop!"

Slade glanced down. A cobbled street was below. He hesitated,

then let go. The instant return of weight made a thrill in his nervous system. He struck the ground harder than he liked. Twice, he rolled over, and then he was up. The fliers were already disappearing around a nearby spire.

Abruptly, he was alone.

Statement to the Coroner's Jury By John Alden, Farmer, Smailes County

It is my custom to arise at 5 a.m. every morning. On the morning of the 19th I got up at my usual hour, and I was doing my chores when I observed what seemed to me a strange spectacle.

A woman and a large bearlike beast were walking in a westerly direction across my stubble field. Since bear are frequently dangerous, the fear came to me that the woman did not know she was being followed by so large and formidable an animal.

I ran and procured my gun, but though I was inside only a minute, and there was no place where anybody could have gone to in such a short time, when I came out of the house, there was no sign of either woman or beast. Almost literally they disappeared into thin air.

It was a little after noon that same day that the smashed body of Michael Slade was discovered in the high valley two miles from my place. According to the doctor, he had died about half an hour before he was found. So it is very likely his death had no connection with the woman and the bear, whom I saw earlier.

But I report the incident for what it is worth in clearing up the mystery of the three-eyed man.

Except for the foregoing, I had never seen Michael Slade until his dead body was brought to my farm by the doctor.

One more thing: When the police from Smailes County and I examined the tracks of the woman and the animal, we discovered that they ended abruptly in the middle of the field.

I am not prepared to offer an explanation for this.

X.

Slade walked slowly along, examining his position. His automatics were gone, but his knife was still in its holster. His handkerchief had been left in his pocket as well as a small case of fishing tackle and a box of morphine tablets, which he had brought along in the event of a violent accident befalling him.

Abruptly, he discovered that the side street he was on was not quite so deserted as it had first appeared. An old woman sidled hurriedly out of an alleyway, and muttered:

"Blood! or I'll murder you tonight." Slade brushed her aside, thinking: *Why had they released him? What did they expect him to do? Do! That was it of course. Geean thought he knew about the plotting that was going on, and somehow the great man of Naze expected him to lead his forces to the plotters.*

Slade laughed grimly. There was a great deal of cunning common sense in Geean's plan, but it had a basic fault. Geean was wrong in his belief that Slade knew anything.

But that didn't matter now. His purpose before the fall of night must be to find the apartment that had once been occupied by Caldra and Amor. And since Geean was aware of its location, he didn't have

to be the slightest bit stealthy about it.

He must assume for the moment that he couldn't escape from Naze, and that Geean would arrest him whenever it pleased him.

The sun was high in the heavens when he reached the fifth columnist part of the city. He recognized a street, then another, then he realized that he was near the apartment. As he hurried eagerly forward, a young woman's familiar voice whined:

"Your blood, mister."

Slade was walking on, when a gasp escaped the girl. He whirled, and stared at her. Her face was already stiffening to the encounter.

"Well," she said with a faint sneer, "if it isn't the man who was going to destroy Naze."

Slade said, "Amor!" Then he remembered Geean, and that his movements were probably being observed. "Quick," he said, "meet me at Caldra's apartment. I'll give you some blood then. But now—slap my face as if you're mad at me."

She *was* quick. Her hand came up and dealt him a stinging blow on the cheek. She swaggered away, and he walked on, for the first time beginning to realize the implications of what had happened. Amor—on the streets.

He had a sudden sense of personal degradation. Then anger against Leear. She was responsible for this.

He wondered bleakly if the girl would turn up at the apartment.

She was there ahead of him. She opened the door for him, and began to talk even as he crossed the threshold. She chattered with a mad speed. Her face was flushed, her eyes wide and staring. Her hands shook. She looked on the verge of a nervous breakdown.

She had escaped death the night Caldra was killed because she was not in the apartment. She had spent the night with a girl friend.

"I was afraid that I would go to your room if I stayed."

The feverish way in which the words were spoken reminded Slade. He climbed to his feet, and went into her bedroom. The syringe and the cup lay on the table beside her bed.

He thought sickly, *To such depths can the potential Homo Superior sink.*

He took the syringe into the kitchen, boiled some water on one of the curious energy elements, and then sterilized the syringe needle. He inserted the needle into a vein in his left arm. The blood glittered darkly as it flowed into the transparent syringe. When it was full, he squirted it into the cup. The liquid hissed a little as it touched the metal, but there was no other reaction. With a steady hand, he set the cup down on the table beside her.

The girl licked her lips, but she did not look at the cup. Her face was stiff, her body rigid. Her eyes were looking fixedly at the floor. She said in a monotone:

"Why have you come back to the city?"

So she was beginning to think things over. It was a good sign. Slade began to talk. He was completely frank, though brief. When he had finished, Amor's eyes were gleaming. She stood up. She was suddenly enormously excited.

"This is it," she said. *"This is it!"* She looked at him, wide-eyed. "Don't you see, it's not an accident, your being here. Everybody's being terribly clever but determined. Geean has let himself fall into the trap. Why? Because he feels safe behind his silver belt, but he's desperately anxious to find out how Leear thinks she can use you to destroy him. And in his bold fashion, he'll take risks now so that he'll know in the future."

She had started pacing the floor, as she talked. Now, she stopped, directly in front of Slade. She said in an intense voice:

"Go straight to him. That will baffle him. He's expecting you to do something. He's expecting somebody to tell you to do something. Very well, I'll tell you. Leear has said that only you can kill Geean. That means that nothing can happen until you are present.

"That means that you, under the present circumstances, have to seek him out. You can't escape it in the long run anyway. There is no escape from Naze except through Leear. And you may be sure that she'll keep you here now until you do what she wants. Besides, Geean will have you brought before him sooner or later anyway and—*Here!"*

She had raced off across the room. She came racing back carrying the cup of blood. She held it out to him. She said in a feverish tone:

"Take a sip of this. It will give you courage. The effect of a sip won't last longer than an hour."

Slade took the cup curiously. He felt overwhelmed. He had always intended to taste the stuff, though the idea of drinking his own blood was repellent. Nevertheless, he was not going to be rushed so swiftly into putting himself into the clutches of Geean. His impulse was to temporize.

He brought the cup to his lips, hesitated. And then he took a little swallow—

"Get in there," the officer of the tower guard said insolently. "If his excellency Geean decides to speak to you, he'll let you know."

The door shut with a bang.

Slade staggered as he moved farther into the room. The sense of ecstatic, almost unbearable pleasure that had burst along his nervous system within seconds of his swallowing the blood, was gone now. What remained was a blurred memory of mad pleasure-dreams, and a gathering fury.

That little wretch, he thought, *that scoundrel, Amor. She knew what would happen.*

A sort of hypnotism it had been, driving him resistlessly through a mist of streets on wings of joyous excitement straight to the central tower of Geean. Blood drinkers

must give their brains directional thoughts just before they drank. *His* directions had been to go to Geean, and here he was.

Still dizzy, Slade looked around the room. There was a bed in one corner, and a large window slashed across the opposite wall. Slade peered shakily out of the window, and blinked. He was looking down into a depth of distance. He estimated seventy stories, and he was leaning forward to verify the height when the realization struck into his brain that he was *able* to lean forward.

There was no glass in the window.

He retreated back into the room, shocked by his mental condition, that had made it possible, however briefly, for him to be unaware that the window was a hazard. Better lie down, he thought shakily.

He dreamed a miserable after-drug type dream. In the dream, his body was flung out of an open window, to fall seventy stories to the ground below. He awakened, shivering, and then grew rigid:

A nith was standing beside his bed, its long, powerful head projecting above him. Its three eyes staring down at him were pools of unnatural light. It saw that he was awake, but made no effort to move away. It said:

"Who told you to come here?"

It stood there waiting.

Vagueness. Slade's brain had

Statement of the Ownership, Management, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Astounding Science-Fiction published monthly, at New York, N. Y., for October 1, 1946.

State of New York, County of New York (ss.)

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared H. W. Ralston, who, having been duly sworn according to law, deposes and says that he is Vice President of Street & Smith Publications, Inc., publishers of Astounding Science-Fiction, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

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H. W. RALSTON, Vice President,
Of Street & Smith Publications, Inc.,
publishers.

Sworn to and subscribed before me this 30th day of September, 1946. Edward F. Kasmire, Notary Public No. 455, New York County. (My commission expires March 30, 1947.)

been tensed for almost anything. But not language, not speech. The surprise was too great for ordinary adjustment. Caught completely off guard, his conscious mind temporarily suspended function.

It was not funny. His metabolism was affected. There was a rush of loose nervous energy through his body. Nausea came, followed by an inability to perform certain normal releasing reflexes like swallowing and blinking. The blood seemed to congeal behind his eyes, and his vision blurred sharply.

He had an acute conviction, not a thought but a fear, that he was going to be precipitated back to the other earth. The fear grew so monstrous that his first thought was able to come through. His dream— He would fall seventy stories if he was knocked out of this plane. The picturization of that fall almost petrified his reason.

But the seconds passed, and nothing happened. His confidence returned. The nith's bear-cat head was only a foot away from his face, as it said:

"What is the plan to destroy Geean?"

There were several things about the speech that almost got Slade going again. It was not a speech. There was no sound at all. The creature was thinking at him. This was mental telepathy.

Slade lay stiff, striving to grasp the implications of a beast that had a better than human system of communication. Memory came of the wild animals that had watched him, and the wariness of the birds near the caves. Was it possible that they were all mind readers?

The thought ended. The nith was snarling threateningly. A great paw came up.

"What is the plan?"

In a synchronized jerk, Slade flung himself to the far side of the bed, and snatched his knife. Horribly afraid, he tumbled off the bed. Then he was on his feet, knife ready, backing towards the nearest wall.

"Careful," he said, "I'll sink this knife into you six inches at least."

Afterwards, Slade was not clear as to what happened then. He was partly facing the window when a second nith walked in from the empty air of seventy stories above ground. It carried a foot-thick transparent weapon, which cast a pale reddish radiance towards the first nith. The beast must have died instantly, but it took more than a minute for the radiance to dissolve its great body into nothingness. The newcomer looked at Slade. It thought at him urgently:

"A traitor. We've been waiting patiently for Leear to give the word to kill him. But now, there's no time to waste. First, I'd better get rid of this—" Slade didn't get the word it used to describe the weapon.

He watched as the animal dextrously split the instrument in two. Inside was a simple set-up built around a loose strip of metal about an inch by three inches by four.

The nith's paws clutched the small object.

"Quick," it said, "put this in your pocket. Like this."

It was not something about which Slade had any say. The animal bounded towards him. Before he could decide whether he was going to resist, it had slipped the metal strip into his left coat pocket. Slade watched as it jammed the two sections of what remained of the weapon under the bed.

It came erect with a jerk. "They're coming for you," it said tensely. "Remember; there's no victory yet. What we have done so far we could have done years ago.

"This is the crisis."

The door opened, and half a dozen soldiers came in. Without a word they led Slade out into a long, dim corridor and into an elevator. The nith followed. The elevator creaked upward about ten floors. Another corridor, then a door that opened into a spacious apartment.

A tall man with a powerful physique was standing looking out of a glassless window. He was dressed in the silver shining clothes of a hunter of Naze, and until he turned Slade had no sense of familiarity. It was that that made terrific the shock of recognition.

Geean was Malenkens.

XI.

It was a morning of devastating shocks for Slade. He was aware of the great man watching him with a faint smile, and it was the contemptuous texture of that smile that finally pulled Slade out of his desperate turmoil.

In a burst of thought, he saw the picture. Danbar's apology. Explained now. Geean's nith that night at Caldra's apartment must have read his mind, and on the basis of the information it secured. Geean had been enabled to lay in wait for him at the cave village. There, without asking any questions, he had learned from Slade the detailed story of what had happened.

Bloodthirsty threats must have been used to silence so completely men like Danbar.

The other's smile was more satiric. "You're quite right," Geean said, "that is what happened."

The words, so accurately reflecting his thoughts, startled Slade. He looked at the nith, and its mind touched his instantly:

"Naturally, I am giving Geean a censored version of your thoughts. That is why he used the traitor nith. He had to have somebody who could read minds, and I was selected as a substitute because of my overall resemblance to the dead-one. But now, you must be on the alert."

It went on with ill-concealed haste: "Geean is not as calm as he appears. He has a tremendous respect for Leear, and something has already happened to make him realize that this *is* the crisis. If he should suddenly become afraid, he will kill you instantly.

"You must accordingly be prepared to act on a flash thought from me."

"But what am I supposed to do?"

There was no answer to that intensely thought question. Slade licked dry lips, as the realization penetrated how completely he was involved in the moment by moment developments. He thought, "I've got to convince Geean, persuade him that I'm no danger." Before he could speak, Geean said:

"Slade, you are alive at this moment because I am undecided. A woman"—his voice grew savage—"named Leear, the only other silver belt immortal, has claimed that she can use you to kill me. I could murder you out of hand, but she would soon be able to produce another person like you with which to threaten me, and the next time perhaps I might not find out about it in advance. This is the time I must take any attendant risks. You are the man who benefits for the moment. Slade, I must find out what her method is. To me, nothing in the world matters as much."

It was impressive. Geean's face had changed as he talked. Earnestness was in every line. The man was fascinated to the core of his soul by the threat to himself. He, who was immortal, was suddenly menaced, and the startling thing must be the vagueness, the lack of detail of that all-embracing menace. Hundreds of years had probably passed since Geean had experienced such an excitement of interest.

Slade's private thoughts ended, for Geean was continuing, his voice harder, his manner more intent:

"Slade, it is clear to me that you are an unwilling pawn in this affair. But I can do nothing about that. Here you are. The issue has been forced despite all my warnings to Leear. At this moment, and there is no question that it is her doing, an atomic fire is raging on the fortieth level of the tower. It will not be long before it reaches us up here."

Briefly, Slade's attention wandered. He stood, startled. An atomic fire. Why, that meant the tower would be destroyed, the barrier would come down forever. Naze was already doomed.

In his mind's eye, he visualized that fire of fires. He began to tremble. The others undoubtedly had methods of escape, but what about him. The implacable voice of Geean went on:

"It has always been possible for Leear to start such an uncontrollable atomic reaction among the machinery of the barrier, but long ago"—his tone grew remote—*"long ago,* I warned her that if she ever did I would murder every human being on the planet."

His eyes, as cold as glass, fixed Slade. The change in the man absolutely astounded Slade. At the beginning, he had had something in him of the stern kindly appearance of Malenkens. All gone now. His face was trans-

formed. It was like a mask, so deadly, so cruel that Slade was taken aback. In the space of a few minutes Dr. Jekyll had become Mr. Hyde. Geean said in an infinitely savage voice:

"At all times Leear has known that if she destroyed the barrier I destroyed the race. She has made her choice. So it shall be."

The words were so ultimately meaningful that they did not immediately make sense. Slade was thinking that the spectacle of Geean changing had been like being in the presence of a man who was drinking himself into a piglike state, like having a sudden glimpse of sewer, like being compelled to watch an obscene picture. Slade shivered with repulsion, and then, abruptly, his absorption with physical things passed. In one jump, the immense meaning of the man's words penetrated.

He felt half paralyzed, and then, stronger than before the realization came that he must convince Geean, must persuade him that Michael Slade would do nothing to injure him. He parted his lips to speak—and closed them again.

A shape was walking into the window behind Geean. It was a woman's shape, momentarily insubstantial. The nith must have warned Geean, for he turned mustering a grimace of a smile. The smile became a broad sneer as Leear came into the room.

Slade looked at her stiffly. He had an idea that his life was hanging in the balance. Now that Leear had arrived, Geean must be tensing to the necessity of dealing swift death to the one man who was supposed to be able to kill him. The nith's tremendously anxious thought impinged upon his mind:

"Relax, man, for your sake and ours. Surely, you have enough experience now with the nature of the nervous system to realize that an unrelaxed man is at a terrible disadvantage. I assure you that I will give you some warning. So be calm, and face this deadly situation."

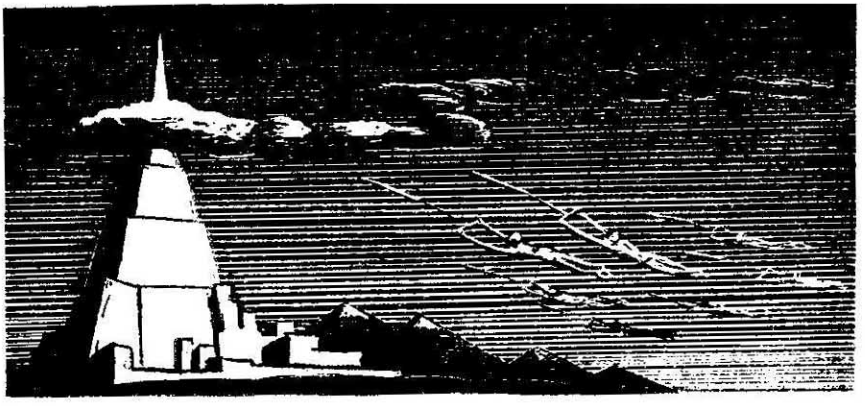
Relax! Slade clutched at the hope. Relaxation should be easy to him now. The hope went deeper, farther. What a tremendous and terrible joke on Geean was the presence of this nith.

Slade looked at the animal in a great wonder. There it sat on its haunches, a gigantic cat bear, reading everybody's thoughts, passing on to each person a censored version of what it saw. And Geean believed—stood there, cold and confident, and *believed*—that it was his nith.

If he was really unkillable, then that delusion meant nothing. But if Leear had a method of killing him, if there was a weakness in his impregnability, then Geean had made the mistake of his career.

Slade drew a long, deep breath, and let it out—long. Relaxation was as swift as that. Standing there, he had his first good look at Leear.

It was a different Leear than he remembered from his brief glimpses. She had been nude be-



side the marsh, and little more than a shadow inside the spaceship. Somehow, he had taken it for granted that she wore the rough and ready clothes of the cave dwellers.

He was mistaken. No cave-woman was here. Her hair was a braided marvel, not a loose fringe, not a straggling curl. And it glowed with a lacquer-like luster. She wore a silkish garment that seemed brand new. And it must have been designed for her. It showed off her figure with an almost demure good taste. Even her dominating attitude was softened, for she sent a quick, warm smile at Slade, and then, as she faced Geean squarely, the smile faded. If she intended to speak, she was too slow. Geean it was who broke the silence:

"All decked out in your bridal finery," he sneered. He began to laugh. It was a loud, insulting laughter. He stopped finally, and turned grinning to Slade. "You will be interested to know, my friend, that you are the last hope of this ten thousand year old spinster. It is a little difficult to explain, but the cavemen, by very reason of their type of nerve training, are adversely affected by the aura of a woman who gains her nerve power by mechanical means. Accordingly, she cannot get a husband for herself among them. That leaves my blood drinkers out there"—he waved a hand towards the window—"and you."

The grin was wider. "For reasons of morality, she is not interested in a man who has formed the blood drinking habit, which of course narrows the field down to you. Amusing, isn't it?"

The grin faded. Abruptly savage, the man whirled on Leear. "And you, my dear," he said scathingly, "will be interested to know that Slade is on my side, not yours. The nith has just informed me that he is desperately anxious to convince me that I have nothing to fear from him. Since it will inform me when and if he changes

his mind, I find myself in a unique bargaining situation."

He didn't realize. It was amazing, it was almost staggering to see him standing there accepting what the nith was telling him. Not that it had told a lie about Slade's intentions and desires, but the fact that it was quite coolly giving him real facts emphasized in a curious fashion how completely at its mercy he was for information.

For his own sake Geean had better be unkillable. Otherwise, he was right behind the eight ball.

"We want to show you," the nith's thought came. "If Geean will let us, we want to show you what is behind this fight of the ship and the city. That is why I told him about your determination not to kill him."

It went on swiftly, "It will be a postponement only. You cannot escape the necessity of choosing between the two worlds at war here, the two people standing before you. I can tell you this much. When the moment comes your choice will be free, but only in the sense that anything in this universe is free.

"But now, we must persuade Geean to let you hear a brief history of Naze."

Geean was quite willing. He looked genuinely amused. "So it's really come down to persuading Slade to do something. I think I ought to warn you that at the moment I am the one who is the most likely to win him over. I've just been remembering some of the things he told me about his country. Only a few years ago they dropped atomic bombs on major cities of some enemies of theirs. The parallel to our own case is most interesting, and augurs so ill for you that I would suggest you simply open your mind to the nith, and so get the whole affair over with as swiftly as possible. All I want to know is, how did you plan to use him to kill me?"

He smiled. "You won't do it? Very well, let's get it over with. It always amuses me to hear biased accounts of events in which I have participated."

He walked over to a couch, and sat down. And waited.

Leear turned towards Slade. "I shall be quick," she said.

It was not a long story that she told then. But it was the picture of the end of a civilization that had attained mechanical perfection. The immortal inhabitants of Naze were indestructible by virtue of their silver belts, which gave them nerve control. There were machines for every purpose, and all worked on the same principle—control of the human nervous system by means of inorganic energies.

As the slow years passed, the very perfection began to pall. It was discovered that individuals were beginning to commit suicide. Boredom settled like a vast doom over that ultimate materialistic civilization, and with each passing

day men and women sought surcease in voluntary death.

It became a mass tendency. In the beginning, the planet had been well-populated, almost overcrowded. At the end a handful of millions lived in eighteen cities. It was into this impasse that new discoveries about the human nervous system projected a whole new outlook on the future of man.

Experiments were performed on animals and birds. In an amazingly short time various breeds were able to read minds, something which man, with all his machines, had never been able to accomplish. They reacted marvelously in other ways also, and so a plebiscite was held, and it was decided by an overwhelming vote to put aside artificial immortality and give the new wonderful science a chance.

Leear paused and looked at Slade gravely. "There could be no half measures. It was all or nothing, no volunteer system could be permitted, no exceptions. The new discoveries proved that man, in his primitive simplicity, had followed the wrong road to civilization, and that he must retrace his steps and make a new beginning. He must go back and back away from the materialistic gods he had followed so long, away from his cities and his machines. You yourself have seen what men like Danbar can do, and he has attained only a part of the third or molecular phase of control. The final, electronic phase, impossible of attainment so long as the city of Naze exists, goes completely beyond anything that has ever been envisaged by man. With our mechanical belts, our silver belts, we have had tantalizing glimpses, but that is all. Men will be as gods, almost omnipotent, and naturally immortal.

"Do you hear me? *Naturally immortal!* In your world and my own, long ago, thousands of generations of human beings have died unnecessarily. All of them had within their own bodies the power of powers, the innate capacity to realize their every desire."

The picture had been growing on Slade, as she talked. The existence of the cavemen was explained. Odd pieces in the jigsaw puzzle of this world were beginning to fit into place, and he had a sudden dazzling vision of what she was getting at.

Leear was continuing, swiftly: "Think of your own experience," she said in an intense voice. "You came from one plane of existence into another because your mind suddenly accepted a new reality. And then there is a comparison that shows how completely wrong appearances can be. Light. The people of the two-eyed world must have a definition of light as something materialistic, something external."

She stared at him so demandingly that Slade nodded, and gave the wave and corpuscular theories of light.

"Light," said Leear triumphantly, "is a perception of the reactor, not an activity of the actor. Out there in space is a great body we know

as the sun. We and every object in this room, whether organic or inorganic, are aware of the presence of that sun. We all react to its presence, just as it reacts to ours. But it sends us no heat, no light, *nothing*. The awareness is inside ourselves, inside the molecules of this table and that chair. To us, that awareness manifests as a perception which we call light. Now, do you see, now do you realize that primitive man, unaided, followed the wrong course. He had no way of understanding the true nature of his world."

Slade hadn't expected to grasp her meaning. But he did. Only a few months before, he had attended a lecture by a disciple of Einstein. And in a distorted fashion, *this* was the famous scientist's latest theory of light. He had forgotten all about it.

He was frowning over the visualization, when he happened to glance at Geean. That brought him back with a start to an entirely different kind of reality. He said:

"Where does Geean fit into all this?"

Geean said dryly, "I was just going to ask that question myself."

Leear was silent for a moment. Then, in a low voice:

"There was opposition, of course, to the great plan. All silver belts had been destroyed except those of myself and my companion who had been chosen by lot to man the ship which you saw, to watch over the experiment, to chronicle its progress, and—"

She stopped. "There was opposition," she said, flatly. "A small, selfish minority led by Geean—"

Again, she stopped. This time Geean laughed, but the laughter ended abruptly. He said somberly:

"They had no idea how far I had decided to go."

Something of the remorselessness of the decision he had carried out then came into his face, and into his voice, as he went on:

"My forces struck one night at the seventeen cities, and wiped them out with atomic bombs. By a trick we secured the belt of Leear's companion, and killed him. That is the belt I now wear. We had planned also to destroy the ship, but by pure accident Leear had taken it from its berth."

He breathed heavily with the memory of what must have been the shock of shocks of his long, ruthless life. His eyes were narrowed to slits, his body tense.

"She attacked our storehouses in Naze. By the time we got the barrier up, she had destroyed all chance of our ever making more belts."

Geean gave a final reminiscent shudder, and then straightened slowly. He looked around belligerently. "Enough of this," he said. "I can't quite imagine a stranger to this world getting so heated over something that happened more than a thousand years ago, that he will risk his life to avenge it."

So quickly did the conversation sink to practical verities.

XII.

It was too long, Slade thought grayly. Too many centuries had passed since that colossal crime had been perpetrated. And yet, in spite of the vast time gap, something of the horror of it reached across the years and touched him.

For the problem was still here. *Here,* in this room. The struggle for ascendancy between the ship and the city. That collective entity the ship was going to defeat the entity that was the city. But Geean would survive; and, by that very survival, he would retain the power of death over all the defenseless people of this plane.

But life centered in the individual. A man must save himself..

"You are wrong," thought the nith. "Life is the race. The individual must sacrifice himself."

That was too deep for Slade. He grew aware that Geean was still speaking, at him now:

"My mind reading animal," he said, "has been keeping me in touch with your thoughts. I'm happy to note that you dismiss Leear's arguments as so much impractical metaphysics. It's possible," he went on, "that you and I are closer together mentally than I have suspected. The nith has also told me of the arguments you are marshaling to convince me that I ought to keep you alive. Frankly, I hadn't really thought about your ability to go to your earth as being valuable to me, but I can see how it might be."

Slade, who hadn't even thought of any arguments to save himself, stared at the nith in amazement. It was startling to realize that the beast had been using a skillful psychology to save his life.

"I told you," the nith thought into his mind, "that, when the moment came, your choice would be personally free. He has decided that, if no crisis occurs, he will let you live."

Slade's answering thought was grim. "But how am I going to get down to the ground?"

"That," flashed the nith, "comes under the heading of what I said before. No choice in this universe is absolutely free. You can trust yourself on our side, or you can make arrangements with Geean."

So that was it. They thought they were going to force him to take one risk to avoid another. And when you got right down to it, they pretty well had him. Slade thought savagely:

"What do you want me to do?"

"Geean must die. Only you can kill him."

"I've heard that all before." Impatiently. "What I mean is—"

He stopped. For weeks he had known that this was what would be required of him. The realization had lain there in the back of his mind, to be occasionally brought forward and pondered in an unreal fashion. It was altogether different to think suddenly, *"This* is the moment."

He who had never killed a man must now kill Geean.

How?

"Did you say... RUPTURE?

" .. That's what I thought you said! Well listen, my friend — just a minute, because I've got something mighty important to tell you.

"Lots of folks tell me their troubles . and whenever I hear the word 'RUPTURE' I just can't help puttin' in my 'two-cents' worth. Any questions? — O. K. — shoot!

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You have in your left hand pocket an instrument. Turn slowly until your left side is pointing at Geean. Put your hand surreptitiously into your pocket and press the button that you will find right at the top of the device.

That instrument has now had time to integrate itself to your nervous system, a nervous system which, as you know, is not yet completely stabilized in this plane. When you press the button, it will transmit to Geean in a very concentrated form your present instability. He will be instantly projected to the two-eyed plane of existence, and will fall eighty stories to the ground. Just as your bullets would not work when you first came here, so his silver belt will be valueless there.

Slade could feel himself changing color. He was vaguely aware that Leear and Geean were talking sharply to each other, but his mind couldn't begin to focus on them. *Do* that, he was thinking, to anybody.

He remembered his own fear of such a fall. And suddenly a horror came.

Just a minute. If I'm involved in this process of transferring from one plane to another, then I'll fall too.

No, you won't.

He didn't believe it. With a hot terror he saw the whole picture. This was what all that stuff about sacrificing the individual for the race had been leading up to. In his mind, he saw the bodies of Geean and himself hurtling down and down. And it built a curious kinship between himself and the man.

"I swear," said the nith, "that you will not die."

Utter disbelief came.

And utter dismay.

The nith was desperate. "You are forcing us to extremes. Leear has decided that either she or Geean dies here today. If you do not kill Geean, then, unless he wins a complete victory, he will carry out his threat to destroy every man and woman and child on the planet. You can see that Leear cannot permit that to happen. Accordingly, the choice is yours. What you do will determine finally whether the people of this planet shall become slaves of Geean or whether they will have the opportunity to realize their natural potentialities."

Slade thought hesitantly, "You mean Leear is going to kill herself."

The nith was satirical. "Please do not concern yourself about Leear. Concern about her is a moral characteristic, shall we say a racial as distinct from an individual, think-only-of-oneself characteristic. It is purely in your mind, having no external reality. What does it really matter if this woman and all that she stands for dies, provided you live?"

It must have despaired of convincing him in time. It must have projected a thought towards the woman. For she turned even

as Geean, narrow-eyed with suspicion, was saying, "Unless you leave here this minute, I shall have to revise my decision about not killing Slade." She turned, and she said to Slade:

"Please, my friend, think of the generations that have been imprisoned in this city. Think of Amor, of—"

She stopped hopelessly. "You force me," she said, "to the final sacrifice."

Her hands moved to her waist, and disappeared under her blouse. They came out again instantly dragging a thin belt. She flung it viciously. It flashed with a silvery metallic fire as it fell to the rug.

"Your silver belt!"

It was Geean who shouted the words, piercingly. Never in his life had Slade heard such a yell of mixed triumph and unbelief. The man literally staggered forward and snatched up the belt. His eyes were glassy and, briefly, quite myopic with ultimate pleasure. He began to run towards the wall to Slade's left. There was a cone-shaped gadget in the near corner. With trembling fingers Geean stuffed the belt into it. It flared with a vivid fire, and was consumed in one puff.

Slowly, then, the man's sanity came back. He shook himself. He faced the room, and looked from Leear to Slade, and his face showed a mounting consciousness of the extent of his victory.

"Ah," he said ecstatically, "I am at last in a position to decide what I'm really going to—"

Slade never learned what Geean was in a position to decide. He was shocked to the core of his being. Actually, Leear's appeal on Amor's behalf had convinced him. The memory of Amor's degradation had brought a vivid picture of a people held down by a devil-like egotist.

He had turned automatically to follow the man's movements. His hand was in his pocket, and his left side towards Geean. He was thinking that under certain circumstances a man's free choice must include the possibility of personal death.

With a tiny pressure, he pressed the activating button of the gadget in his pocket.

Statement to the Coroner's Jury By Detective Lieutenant Jim Murphy

When the body of Michael Slade was discovered last week in the foothills near the city of Smailes, I was dispatched to the scene. It was at my request that the inquest hearing was transferred to Mr. Slade's home city, where most of the witnesses lived.

About these witnesses, I wish to say that all of them, without exception, were doubtful about identifying the deceased as Michael Slade when they were first shown the body. Later, on the stand, they were more positive, having apparently resolved their earlier doubts on the basis of "The dead man is three-eyed. Therefore it must be Michael Slade."

One of my reasons for going to Smailes was to make some attempt to find out where Michael Slade had been during the past few months.

I have considerable experience at locating missing persons, but my usual methods produced no results whatever. While the time elapsed since Mr. Slade's death has been very short, I am almost prepared to say that further search will only emphasize the following fact:

Michael Slade walked out of his own back yard in this city several months ago, and his body was discovered last week near the city of Smailes. There is no record of his whereabouts during the interval.

They climbed towards the top of the spire ahead of the ominous hum and crackle of the fire. The direction worried Slade. How were they going to get down, with flames barring the lower levels? And suppose that the fire ate through the main walls, and the upper part of the immense building toppled to the ground far below.

There was a possibility, of course, that she and the nith could get down as easily as they had come in through the windows. But Leear shook her head when Slade asked if that was to be the way.

She had stopped near a window. "We came," she said, "by means of my silver belt. I've been hoping to run into a storeroom of fliers. If we don't find any, then you are our only hope."

"Me?" Slade was startled.

She said, "Tell me, can you visualize in your mind the wheel machine which you hid in the brush near where you were captured by the hunters of Naze?"

Slade gave her an astounded look. So she had known about that. At last, he said, "I think so."

She persisted, "Including the three bright spots?"

This time he merely nodded, for

he was beginning to remember what it could do.

"Then be quick," said Leear. "It's top speed is limited, something under two thousand miles an hour. It will take several minutes to get here."

Slade stared at her, and swallowed hard. But he walked with her to the window, closed his eyes, and pictured the wheel machine. The memory was blurred for a moment, then it came sharp and clear.

Standing beside him, Leear said softly, "Blink slowly, and don't strain to hold the picture of it. Let it wax and wane. All this is unimportant in a way, because, during the next six years, both you and I must learn the natural ways."

That pulled him. That caught at his brain. That tore him from his concentration. He pictured himself as he might be six years hence—it was her gentle, almost hypnotic voice that pressed him back.

"Hold it," she said quickly, "*hold* it! It will sink to Earth if you don't, and there is no time to waste. Any minute now the main barrier machinery will be reached, and then the barrier will go down. After that, even the tough materials of the spire will not stand long."

Her words steadied Slade. Away in the back of his mind was a memory of what Geean had said about bridal finery. An edge of worry shadowed his mind. Because, when you came right down to it, a man did not marry a woman ten thousand years older than him-

self. Amor, yes. Her failings were human, normal, forgivable. He had a feeling the girl would be willing to become his companion. He would certainly ask her.

He was so intent on the wheel machine that he missed entirely a little byplay beside him. The nith informed Leear of what Slade was thinking. The woman hesitated, then her features began to change. Her face was taking on a startling resemblance to the face of Amor when a fierce thought from the nith arrested the process:

"Don't be a fool," it said sharply. "At the moment he will not take kindly to the idea that you were Amor. You assumed that role in order to give him a sympathetic picture of a girl of Naze. He would have been shocked by the character of a real blood-drinking girl. At the moment he might blame you for the death of Caldra, even though you had gone away expecting that Caldra would try to take blood from him, and so precipitate him back to his own plane.

"Another thing," the nith went on, "I have noticed in your mind that you are responsible for his having been born a three-eyed mutation in a two-eyed world. Do not tell him that immediately either. Let him discover later that you have controlled his life from an early embryo stage. Let him find out later that you can be all woman—"

The woman was hesitating. Abruptly, she became Leear again. She saw the wavering of the purple carrier. She let out a very femininelike squeal. "The barrier," she cried, "it's down."

Her words were like a cue. There was a flash of metallic brightness in the distance. The wheel machine came through the open window, and jerked to a stop in front of Slade's eyes.

"The nith first," said Leear urgently. "Then me, then you. And don't worry. It floats swiftly."

It was almost not swift enough. The last time he brought it towards his eyes the roar of the fire was a hideous sound in his ears. He climbed into the flower-shaped wheel, shoved hard—and hung on.

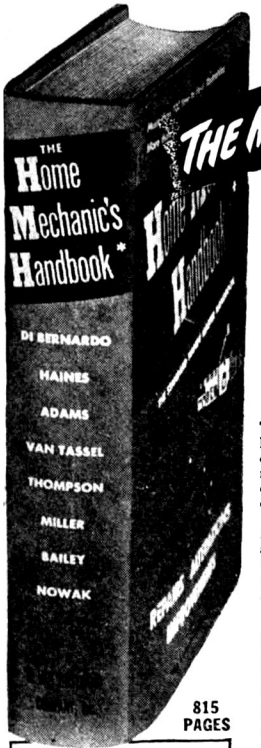
The sun was a bright glory almost directly overhead. There were many people below, but as Slade drew near to the ground, he could still see no sign of either Leear or the nith. A tall, slim young woman put up her arms towards him, and with a start Slade recognized Amor. He shouted at her, and she waved back, frantically.

He came down presently into a city that was already quaveringly conscious of its destiny.

The Verdict of the Coroner's Jury

It is the unanimous decision of the jury that there can be no doubt that the dead body is that of Michael Slade. The unusual clothes cannot be regarded as important, and the jury therefore finds that Michael Slade met his death as a result of a fall from a height, very possibly from an airplane. There is no evidence of foul play or murder.

THE END.



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