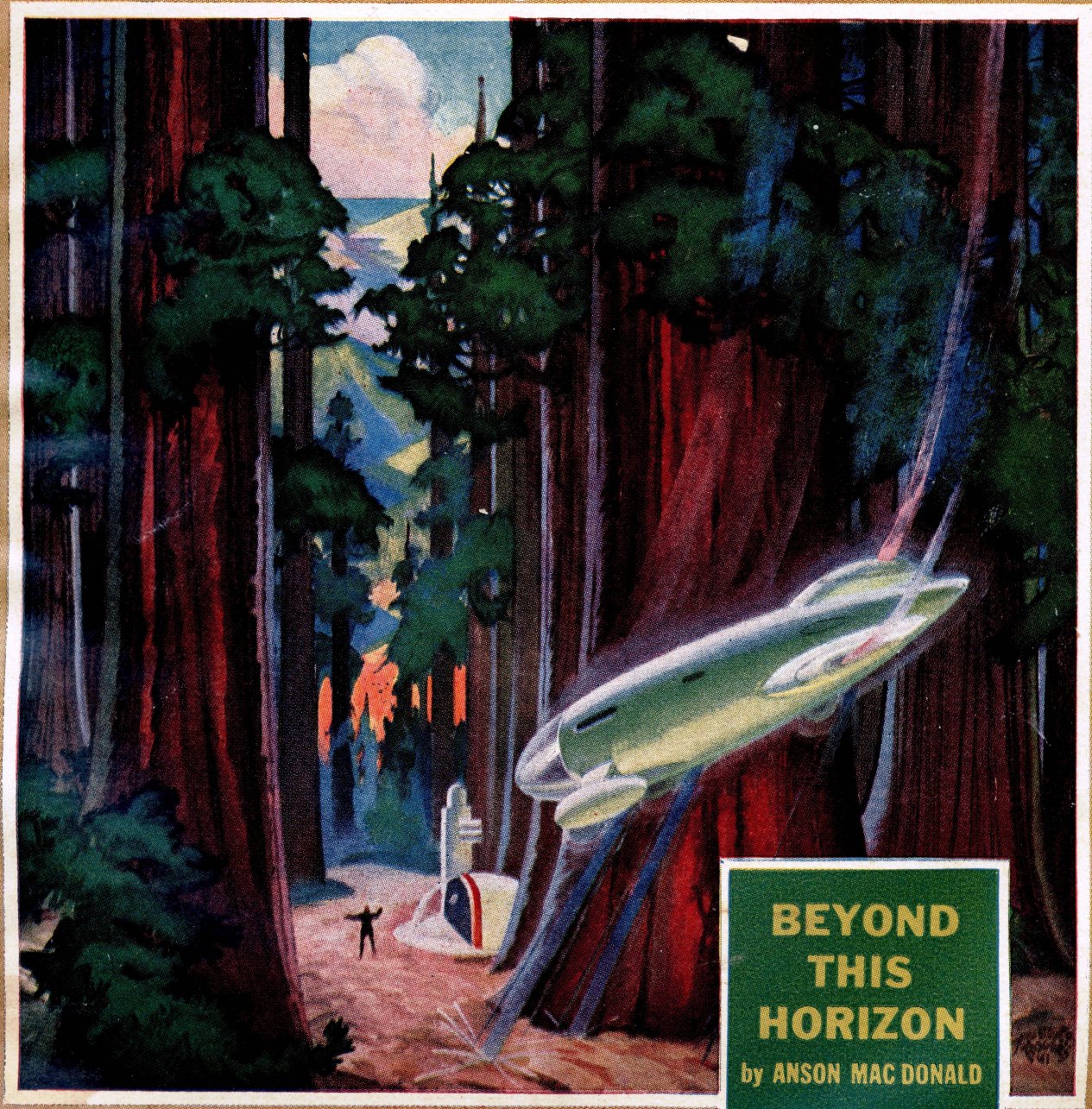
ASTOUNDING

APR. '42

Science·fiction 25c



BEYOND THIS HORIZON

by ANSON MAC DONALD

APRIL · 1942

A STREET AND SMITH PUBLICATION

AT THE FIRST SIGN OF A

COLD OR SORE THROAT

LISTERINE *Quick!*

This prompt and easy precaution, frequently repeated, may head off the trouble entirely or lessen the severity of the infection if it does develop.

If you don't think so we ask you to study Listerine's impressive test record in cold control. Carefully conducted clinical tests during the past 10 years showed these amazing results:

Fewer Colds—Milder Ones

That regular, twice-a-day users of Listerine Antiseptic had fewer colds, milder colds, colds of shorter duration, than non-users, and fewer sore throats due to colds in many cases.

You naturally want to know why this is so.

We believe that it is because Listerine reaches way back on the throat to kill literally millions of the threatening bacteria known to doctors as the "secondary invaders" which may set up infection when body resistance is lowered for any reason. In the opinion of many leading medical men these "secondary invaders" are the ones that so often complicate a cold . . . make it troublesome . . . result in distressing symptoms you know all too well.

Kills Germs By Millions

Actual tests showed bacterial reductions on mouth and throat surfaces ranging to 96.7%, even 15 minutes after the Listerine Antiseptic gargle . . . up to 80% an hour after. (See panel at left.)

In view of this compelling evidence isn't it wise to keep Listerine Antiseptic handy in home and office . . . to pack it when you travel . . . to gargle with it often and thoroughly at the first hint of trouble?

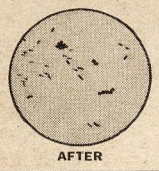
If your cold doesn't show signs of improvement, begins developing in earnest—don't be foolhardy and carry bravely on. The wise thing to do is to go to bed, keep warm, eat lightly and call your doctor.

LAMBERT PHARMACAL COMPANY
St. Louis, Mo.

NOTE HOW LISTERINE GARGLE REDUCED GERMS

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

BEFORE



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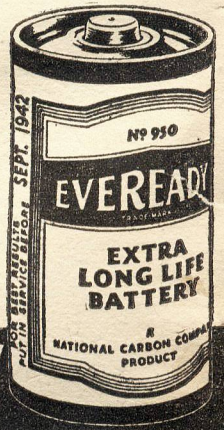

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Contents for April, 1942, Vol. XXIX, No. 2

John W. Campbell, Jr., Editor, Catherine Tarrant, Asst. Editor

Serial

BEYOND THIS HORIZON— . . . . . **Anson MacDonald** . **9**

First of two parts

A thoroughly unusual tale, with a hero who is a professional inventor of super-pinball games, in a world where men paint their fingernails, have elegant manners—or get shot down offhand!

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PROBABILITY ZERO **111**

Calling All Liars!

Illustrations by Kolliker, Rogers and Schneeman

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TOO GOOD AT GUESSING

The fundamental idea of science-fiction is that it is possible to predict inventions and mechanisms still to come, and to predict their effect on men, on society, and on the viewpoints of civilization. At various times our science-fictionists have done remarkably keen jobs of predicting. Given a good imagination, and a general understanding of how Man, an essentially lazy animal, will try to get out of hard work, discomfort and inconvenience, it should be reasonably easy to predict what he'll try to do. Sketching the general outline of *how* he'll try to do it requires the addition of a reasonably adequate technical background. Actually doing it, however, requires months, years, or even decades and centuries of experimentation.

But many a science-fiction writer has seen, one, two, ten or twenty years later the gadgets he described in stories. Jules Verne's description of the submarine periscope was so accurate—from pure imagination—that he rendered the device unpatentable.

The comment is apposite. The periscope was and is an important military instrument; if one of our current writers made an equally acute guess as to what was coming up in our immediate future, he would be doing a very real disservice to the nation in publishing his guess. That little problem is becoming a real worry to us, and to our authors. It is preventing several men who have stories they'd like to write, ideas to play with, from writing for us. As one man expressed it to me: "Good science-fiction is apt to contain some pretty accurate guesses. I'm doing research work of a restricted, confidential nature; other men in my lab are doing other secret work. If I write a story and, on the basis of my technical background, guess reasonably accurately, I may describe something one of those other men is actually developing. There would naturally be a feeling that it was a leakage of secret material. I'd like to write —but I'm afraid I might guess right. I'd better not."

There is, in consequence of that condition, a pretty good probability that a large portion of the material to be published in the near future will be laid in the far future. The devices of 7000 A.D. can reasonably be presumed to be based on principles so far extended from our known data that good guessing won't be interference with National Defense.

It's common knowledge that planes are located now by reflection of short radio waves; the device was described and used in science-fiction years ago. The radio-reflection altimeter was put into operation some years before the war—after being in science-fiction for years.

But why, if an ordinary science-fiction author can dream up the gadget, is there any reason to consider it as something secret? If the science-fiction author can think of it, surely a research scientist would think of it sooner, and in a more practical form, wouldn't he?

Nothing to date shows that is necessarily true. If anything, there's excellent reason for the reverse to hold—the science-fiction author is paid specifically to *imagine devices even if he can't think of a way to make them.* The industrial research scientist isn't paid to dream up super-doopers; he's supposed to devote his energy to designing things that can be made practically and profitably. The practical researcher does not normally devote much mental energy to thinking up applications of a device he doesn't know how to make; that is, on the other hand, the regular occupation of science-fiction authors.

Practical, hard-headed scientists of five years ago were not trying to work out applications of atomic power, the social-economic results of its applications, or its military possibilities. But many a science-fiction author spent his time trying to figure out just that problem. Well, we're pretty close to the real thing now—and science-fictionists have a genuine, practical lead over the non-dreamers.

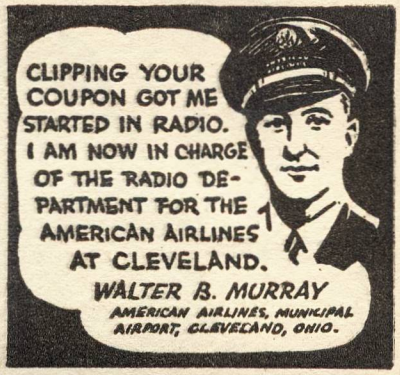
The consequence is that we will, in the future, try to be wilder guessers, place our stories further in the future, or base them on themes that can't lead to those too-good guesses.

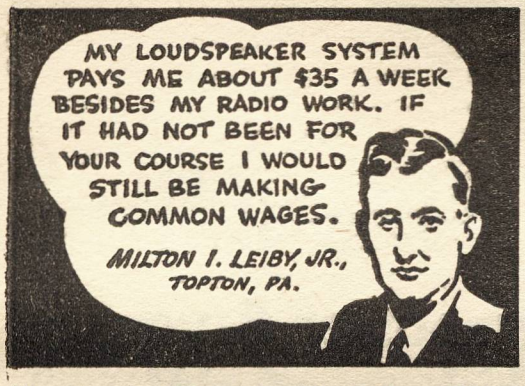
That leaves plenty of room, naturally. Most interplanetary stories are, for the duration of this war, at any rate, unlikely to be in the too-close-for-comfort class. Time travel is, certainly for the near future, pretty safe. (So long as the time-travel isn't just a way to get into a close-knit, well-thought-out picture of the near future.)

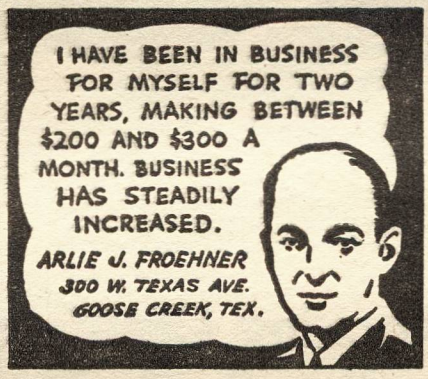
For once, we're in the position of finding it wiser to guess wrong!

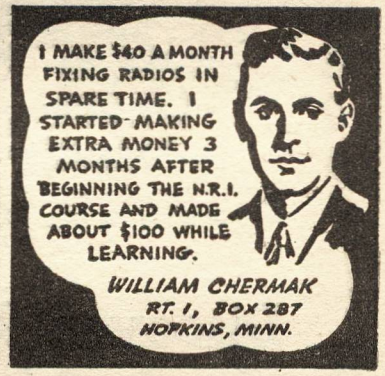
The Editor.

Do You Want Success Like This in RADIO









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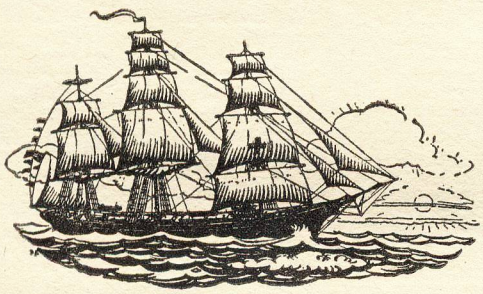

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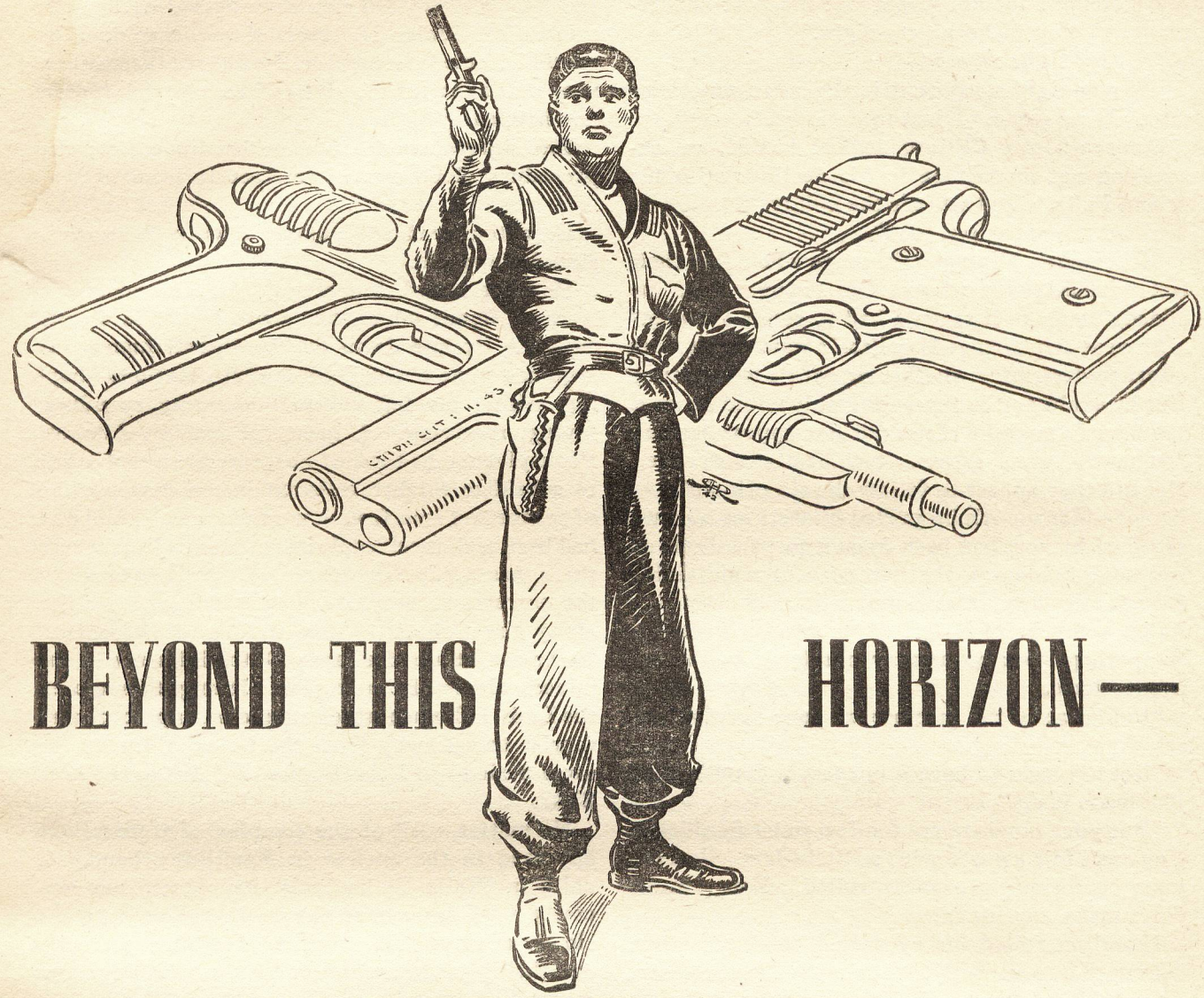

BEYOND THIS HORIZON—

By Anson MacDonald

● The theme is old—controlled heredity. But in a way only MacDonald could achieve, this two-part novel presents a full-view picture of the world that would result from such a change in human life!

Illustrated by Rogers

Their problems were solved: The poor they no no longer had with them; the sick, the lame, the halt, and the blind were historic memories; the ancient causes of war no longer obtained; they had more freedom than Man has ever enjoyed. All of them have been happy—

Hamilton Felix let himself off at the thirteenth level of the Department of Finance, mounted a slideway to the left, and stepped off the strip at a door marked:

BUREAU OF ECONOMIC STATISTICS

Office of Analysis and Prediction

Director

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He punched the door with a code combination, and awaited face check. It came promptly; the door dilated, and a voice inside said, "Come in, Felix."

He stepped inside, glanced at his host and remarked, "You make ninety-eight."

"Ninety-eight what?"

"Ninety-eight sourpusses in the last twenty minutes. It's a game. I just made it up."

Monroe-Alpha Clifford looked baffled, an expression not uncommon in his dealings with his friend Felix. "But what is the point? Surely you counted the opposites, too?"

"Of course. Ninety-eight mugs who'd lost their last friends, seven who looked happy. But," he added, "to make it seven I had to count one dog."

Monroe-Alpha gave Hamilton a quick look in an effort to determine whether or not he was jesting. But he could not be sure—he rarely could be sure. Hamilton's remarks often did not appear serious, frequently even seemed technically sense-free. Nor did they appear to follow the six principles of humor—Monroe-Alpha prided himself on his own sense of humor, had been known to pontificate to his subordinates on the necessity of maintaining a sense of humor. But Hamilton's mind seemed to follow some weird illogic of its own, self-consistent perhaps, but apparently unrelated to the existent world.

"But what is the purpose of your survey?" he asked.

"Does it have to have a purpose? I tell you, I just made it up."

"But your numbers are too few to be significant. You can't fair a curve with so little data. Besides, your conditions are uncontrolled. Your results don't mean anything."

Hamilton rolled his eyes up. "Elder Brother, hear me," he said softly. "Living Spirit of Reason, attend Thy servant. In Your greatest and most prosperous city I find vinegar phizzes to grins in a ratio of fourteen to one—and *he* says it's not significant!"

Monroe-Alpha looked annoyed. "Don't be irreverent," he advised. "And the proper ratio is sixteen and a third to one; you should not have counted the dog."

"Oh, forget it!" his friend answered. "How goes the tail chasing?" He wandered around the room, picking things up and putting them down again under Monroe-Alpha's watchful eye and finally stopping in front of the huge integrating accumulator. "It's about time for your quarterly prediction, isn't it?"

"Not about time—it *is* time. I had just completed the first inclusive run when you arrived. Want to see it?" He stepped to the machine, pressed a stud. A photostat popped out. Monroe-Alpha unclipped it and handed it to Hamilton without looking at it. He had no need to—the proper data had been fed into the computer; he knew with quiet certainty that the correct answer would come out. Tomorrow he would work the problem again, using a different procedure. If the two answers did not then agree, within the mechanical limits of error of the machine, he would become interested in the figures themselves, very much interested. But, of course, that would not happen.

The figures would interest his superiors; the procedure alone was of interest to him.

Hamilton eyed the answer from a nonprofessional viewpoint.

He appreciated, in part at least, the enormous mass of detail which had gone into this simple answer. Up and down two continents human beings had gone about their lawful occasions—buying, selling, making, consuming, saving, spending, giving, receiving. A group of men in Altoona, Pennsylvania, had issued unsecured aspirant-stock to subsidize further research into a new method of recovering iron from low-grade ores. The issue had been well received down in New Bolivar where there was a superabundance of credit because of the extreme success of the tropical garden cities along the Orinoco—"Buy a Slice of Paradise." Perhaps that was the canny Dutch influence in the mixed culture of that region. It might have been the Latin influence which caused an unprecedented tourist travel *away* from the Orinoco during the same period—to Lake Louise, and Patagonia, and Sitka.

No matter. All of the complex of transactions appeared in the answer in Hamilton's hand. A child in Walla Walla broke its piggy bank—secretly, with one eye on the door—gathered up the slowly accumulated slugs and bought a perfectly delightful gadget, which not only *did* things, but made the appropriate noises as well. Some place down in the innards of the auto-clerk who handled the sale for the Gadget Shoppe four holes were punched in a continuous roll of paper; the item appeared in the cost accounting of the owner, and was reflected in the accounting of the endless chain of middle distributors, transporters, processers, original producers, service companies, doctors, lawyers, merchants, chiefs—world without end.

The child—a rather bad-tempered little blond brat, and bound to prove a disappointment to his planners and developers—had a few slugs left over which he exchanged for a diet-negative confection ("Father Christmas' Pseudo-sweets—not a tummy-ache in a tankful"); the sale was lumped together with many others like it in the accounts of the Seattle Vending Machine Corp.

The broken piggy bank and its concatenations appeared in the figures in Hamilton's hand, as a sliver of a fragment of a supermicroscopic datum, invisible even in the fifth decimal place. Monroe-Alpha had not heard of this particular piggy bank when he set up the problem—nor would he, ever—but there are tens of thousands of piggy banks, a

large but countable number of entrepreneurs, lucky and unlucky, shrewd and stupid, millions of producers, millions of consumers, each with his draft book, each with printed symbols in his pouch, potent symbols—the stuff, the ready, the you-know-what, jack, kale, rocket juice, wampum, the shekels, the sugar, the dough.

All of these symbols, the kind that jingle and the kind that fold and, most certainly, the kind that are only abstractions from the signed promise of an honest man—or more nearly correctly, their reflected shadows—passed through the bottleneck formed by Monroe-Alpha's computer, and appeared there in terms of angular speeds, settings of three-dimensional cams, relative positions of interacting levers, et complex cetera. The manifold constituted a dynamic abstracted structural picture of the economic flow of a hemisphere.

Hamilton examined the photostat. The reinvestment of accumulated capital called for an increase in the subsidy on retail transfers of consumption goods of three point one percent and an increase in monthly citizens' allowances of twelve credits—unless the Council of Policy decided on another means of distributing the social increment.

"'Day by day, in every way, I'm getting richer and richer,'" Hamilton commented. "Say, Cliff, this money machine of yours is a wonderful little gadget. It's the goose that lays the golden egg."

"I understand your classical allusion," Monroe-Alpha conceded, "but the accumulator is in no sense a production machine. It is merely an accounting machine, combined with an integrating predictor."

"I know that," Hamilton answered absently. "Look, Cliff—what would happen if I took an ax and just smashed your little toy?"

"You would be examined for motive."

"Don't be obtuse. What would happen to the economic system?"

"I suppose," Monroe-Alpha told him, "that you want me to assume that no other machine was available for replacement. Any of the regional accumulators could—"

"Sure. Bust the hell out of all of them."

"Then we would have to use tedious methods of actuarial computation. A few weeks' delay would result, with accumulated errors which would have to be smoothed out in the next prediction. No important result."

"Not that. What I want to know is this: Suppose nobody computed the amount of new credit necessary to make the production-consumption cycle come out even—what would happen?"

"Your hypothetical question is too farfetched to be very meaningful," Monroe-Alpha stated, "but it would result in a series of panics and booms of the postnineteenth-century type. Carried to extreme, it could even result in warfare. But, of course, it would not be—the structural nature of finance is too deeply embedded in our culture for pseudo-capitalism to return. Any child understands the fundamentals of production accounting before he leaves his primary development center."

"I didn't."

Monroe-Alpha smiled tolerantly. "I find that a little difficult to believe. You know the Law of Stable Money."

"'In a stable economy, debt-free new currency must be equated to the net reinvestment,'" Hamilton quoted.

"Correct enough. But that is Reiser's formulation. Reiser was sound enough, but he had a positive talent for stating simple things obscurely. There is a much simpler way to look at it. The processes of an economic system are so multitudinous in detail and involve so many promises to be performed at later dates that it is a psychological impossibility for human beings to deal with the processes without the use of a symbol system. We call the system 'finance' and the symbol 'money.' The symbolic structure should bear a one-to-one relationship to the physical structure of production and consumption. It's my business to keep track of the actual growth of the physical processes and recommend to the policy board changes in the symbol structure to match the observed changes in the physical structure."

"I'm damned if you've made it any simpler," Hamilton complained. "Never mind—I didn't say I don't understand it; I said I didn't understand it as a kid. But, honestly—wouldn't it be simpler to set up a collective system and be done with it?"

Monroe-Alpha shook his head. "Finance structure is a general theory and applies equally to any type of state. A complete socialism would have as much need for structural appropriateness in its cost accounting as would a free entrepreneur. The degree of public ownership as compared with the degree of free enterprise is a cultural matter. For example, food is, of course, free, but—"

"Freeze it, pal. You've just reminded me of one of the two reasons I had for looking in on you. Busy for dinner tonight?"

"Not precisely. I've a tentative date with my ortho-wife for twenty-one hundred, but I'm free until then."

"Good. I've located a new pay-restaurant in Meridian Tower that will be a surprise to your G-I tract. Guaranteed to give you indigestion, or you have to fight the chef."

Monroe-Alpha looked dubious. He had had previous experience with Hamilton's gastronomic adventures. "Let's go to the refectory here. Why pay out hard cash for bad food when good food is included in your basic dividend?"

"Because one more balanced ration would unbalance me. Come on."

Monroe-Alpha shook his head. "I don't want to contend with the crowds. Honest, I don't."

"You don't really *like* people, do you?"

"I don't dislike them—not individually."

"But you don't like 'em. Me, I like 'em. People are funnier than anybody. Bless their silly little hearts. They do the craziest things."

Monroe-Alpha looked morose. "I suppose *you* are the only sane one in the lot."

"Me? Shucks, no. I'm one long joke on myself. Remind me to tell you about it sometime. But, look—the other thing I came to see you about. Notice my new side arm?"

Monroe-Alpha glanced at Hamilton's holster. In fact, he had not noticed that his friend was wearing anything new in the way of weapons—had he arrived unarmed, Monroe-Alpha would have noticed it, naturally, but he was not particularly observant about such matters, and could easily have spent two hours with a man and never notice whether he was wearing a Stokes coagulator or a common needlebeam.

But, now that his attention was directed to the matter, he saw at once that Hamilton was armed with something novel—novel and deucedly odd and uncouth. "What is it?" he inquired.

"Ah!" Hamilton drew the side arm clear and handed it to his host. "Woops! Wait a moment. You don't know how to handle it—you'll blow your head off." He pressed a stud on the side of the grip, and let a long, flat container slide out into his palm. "There—I've pulled its teeth. Ever see anything like it?"

Monroe-Alpha examined the machine. "Why, yes, I believe so. It's a museum piece, isn't it? An explosive-type hand weapon?"

"Right and wrong. It's mill new, but it's a facsimile of one in the Smithsonian Institution collection. It's called a .45 Colt automatic pistol."

"Forty-five what?"

"Inches."

"Inches—let me see, what does that come to in centimeters?"

"Huh? Let's see—three inches make a yard and a yard is about one meter. No, that can't be right. Never mind, it means the size of the slug it throws. Here—look at one." He slid a cartridge free of the clip. "Damn near as big as my thumb, isn't it?"

"Explodes on impact, I suppose?"

"No. It just drills its way in."

"That doesn't sound very efficient."

"Brother, you'd be amazed. It'll blast a hole in a man big enough to throw a dog through."

Monroe-Alpha handed it back. "And in the meantime your opponent has ended your troubles with a beam that acts a thousand times as fast. Chemical processes are slow, Felix."

"Not that slow. The real loss of time is in the operator. Half the gun fighters running around loose chop into their target with the beam already hot. They haven't the skill to make a fast sight. You can stop 'em with this thing, if you've a fast wrist. I'll show you. Got something around here we can shoot at?"

"Hm-m-m—this is hardly the place for target practice."

"Relax. I want something I can knock out of the way with the slug, while you try to burn it. How about this?" Hamilton picked up a large, ornamental plastic paper weight from Monroe-Alpha's desk.

"Well—I guess so."

"Fine." Hamilton took it, removed a vase of flowers from a stand on the far side of the room, and set the target in its place. "We'll face it, standing about the same distance away. I'll watch for you to start to draw, as if we really meant action. Then I'll try to knock it off the stand before you can burn it."

Monroe-Alpha took his place with lively interest. He fancied himself as a gunman, although he realized that his friend was faster. This might be, he thought, the split-second advantage he needed. "I'm ready."

"O. K."

Monroe-Alpha started his draw.

There followed a single *CRACK!* so violent that it could be felt through the skin and in the nostrils, as well as heard. Piled on top of it came the burbling *Whree-e-e-ee!* as the bullet ricocheted around the room, and then a ringing silence.

"Hell and breakfast!" remarked Hamilton. "Sorry, Cliff—I never fired it indoors before." He stepped forward to where the target had been. "Let's see how we made out."

The plastic was all over the room. It was difficult to find a shard large enough to show the outer polish. "It's going to be hard to tell whether you burned it, or not."

"I didn't."

"Huh?"

"That noise—it startled me. I never fired."

"Really? Say, that's great. I can see I hadn't half realized the advantages of this gadget. It's a psychological weapon, Cliff."

"It's noisy."

"It's more than that. It's a terror weapon. You wouldn't even have to hit with your first shot. Your man would be so startled you'd have time to get him with the second shot. And that isn't all. Think—the bravoes around town are used to putting a man to sleep with a bolt that doesn't even muss his hair. This thing's bloody. You saw what happened to that piece of vitrolith. Think what a man's face will look like after it stops one of those slugs. Why, a necrocosmetician would have to use a stereo-sculp to produce a reasonable facsimile for his friends to admire. Who wants to stand up to that kind of fire?"

"Maybe you're right. I still say it's noisy. Let's go to dinner."

"Good idea. Say—you've got a new nail tint, haven't you? I like it."

Monroe-Alpha spread his fingers. "It *is* smart, isn't it? 'Mauve Iridescent' it's called. Care to try some?"

"No, thank you. I'm too dark for it, I'm afraid. But it goes well with your skin."

They ate in the pay-restaurant Hamilton had discovered. Monroe-Alpha automatically asked for a private room when they entered; Hamilton at the same moment, demanded a table in the ring. They compromised on a balcony booth, semi-private, from which Hamilton could amuse himself by staring down at the crowd in the ring.

Hamilton had ordered the meal earlier in the day, which was the point which had caused his friend to consent to venture out. It was served promptly. "What is it?" Monroe-Alpha demanded suspiciously.

"Bouillabaisse—it's halfway between a soup and a stew. More than a dozen kinds of fish, white wine, and the Great Egg alone knows how many sorts of herbs and spices. All natural foods."

"It must be terribly expensive."

"It's creative art and it's a pleasure to pay for it. Don't worry your head about it. You know I can't help making money."

"Yes, I know. I never could understand why you take so much interest in games. Of course, it pays well."

"You don't understand me. I'm not interested in games. Have you ever seen me waste a slug or a credit on one of my own gadgets—or any other? I haven't played a game since I was a baby. For me, it is already well established that one horse can run faster than another, that the ball falls either on red or on black, and that three of a kind beats two pair. It's just that I can't see the silly toys that people play with without thinking of one a little more complicated and mysterious. If I am bored and have nothing better to do, I may sketch one and dispatch it to my agent. Presently in comes some more money." He shrugged.

"What *are* you interested in?"

"People. Eat your soup."

Monroe-Alpha tasted the mess cautiously, looked surprised, and really went to work on it. Hamilton looked pleased, and undertook to catch up.

"Felix—"

"Yes, Cliff."

"Why did you group me in the ninety-eight?"

"The ninety-eight? Oh, you mean the sourpuss survey. Shucks, pal, you rated it. If you are gay and merry-merry-be behind that death mask, you conceal it well."

"I've nothing to be unhappy about."

"No, not to my knowledge. But you don't look happy."

They ate in silence for a few minutes more. Monroe-Alpha spoke again. "It's true, you know. I'm not."

"Not what?"

"Not happy."

"So? Hm-m-m—why not?"

"I don't know. If I did, I could do something about it. My family psychiatrist doesn't seem to be able to get at the reason."

"You're on the wrong frequency. A psychiatrist is the last man to see about a thing like that. They know everything about a man, except what he is and what makes him tick. Besides, did you ever see a worry-doctor that was sane himself? There aren't two in the country who can count their own fingers and get the same answer twice running."

"It's true that he hasn't been able to help me much."

"Of course not. Why? Because he will start with the assumption that there is something wrong with you. He can't find it, so he's stuck. It doesn't occur to him that there might be nothing wrong with you and that might be what is wrong."

The other man looked weary. "I don't understand you. But he does claim to be following a clue."

"What sort?"

"Well—I'm a deviant, you know."

"Yes, I know," Hamilton answered shortly. He was reasonably familiar with his friend's genetic background, but disliked to hear him mention it. Some contrary strain in Hamilton rebelled against the idea that a man was necessarily and irrevocably the gene pattern handed to him by his genetic planners. Furthermore he was not convinced that Monroe-Alpha should be considered a deviant.

"Deviant" is a question-begging term. When the human zygote resulting from the combination of two carefully selected gametes is different from what the geneticists had predicted, but not so different as to be classified with certainty as a mutation, that zygote is termed a deviant. It is not, as is generally believed, a specific term for a recognized phenomenon, but a catch-all to cover a lack of complete knowledge.

Monroe-Alpha (this particular Monroe-Alpha—Clifford, 32-847-106-B62) had been an attempt to converge two lines of the original Monroe-Alpha to recapture and reinforce the mathematical genius of his famous ancestor. But mathematical genius is not one gene, nor does it appear to be anything as simple as a particular group of genes. Rather, it is thought to be a complex of genes *arranged in a particular order.*

Unfortunately, this gene complex appears to be close-linked in the Monroe-Alpha line to a neurotic contra-survival characteristic, exact na-

ture undetermined and not assigned to any set of genes. That it is not necessarily so linked appears to be established, and the genetic technicians who had selected the particular gametes which were to produce Monroe-Alpha Clifford believed that they had eliminated the undesired strain.

Monroe-Alpha Clifford did not think so.

Hamilton fixed him with a finger. "The trouble with you, my fine foolish friend, is that you are bothering your head with things you don't understand. Your planners told you that they had done their level best to eliminate from you the thing that caused your great-grandfather Whiffenpoof to raise garter snakes in his hat. There is a long chance that they failed, but why assume that they did?"

"My great-grandfather did nothing of the sort. A slight strain of anhedonism, a tendency to—"

"Then why act like he had to be walked on a leash? You make me tired. You've got a cleaner pedigree than ninety-nine out of a hundred, and a chromosome chart that's as neat and orderly as a checkerboard. Yet you're yipping about it. How would you like to be a control natural? How would you like to have to wear lenses against your eyeballs? How would you like to be subject to a doz-dozen filthy diseases? Or have your teeth get rotten and fall out, and have to chew your meals with a set of false choppers?"

"Of course, nobody would *want* to be a control natural," Monroe-Alpha said reflectively, "but the ones I've known seemed to be happy enough."

"All the more reason for you to snap out of your funk. What do you know of pain and sickness? You can't appreciate your advantages any more than a fish appreciates water. You have three times the income you can spend, a respected position, and work of your own choosing. What more do you want out of life?"

"I don't know, Cliff. I don't know, but I know I'm not getting it. Don't ride me about it."

"Sorry. Eat your dinner."

The fish stew contained several large crab legs; Hamilton ladled one into his guest's trencher. Monroe-Alpha stared at it uneasily.

"Don't be so suspicious," Hamilton advised. "Go ahead. Eat it."

"How?"

"Pick it up in your fingers, and crack the shell."

Monroe-Alpha attempted to comply, somewhat clumsily, but the greasy, hard surface skidded between his fingers. He attempted to recover and knocked it over the edge of the balcony rail at his elbow.

He started to rise; Hamilton put a hand on his forearm. "My fault," he said. "I will repair it." He stood up and looked down at the table directly beneath their booth.

He did not see the stray bit of sea food at once, but he had no difficulty in telling approximately where it had landed. Seated at the table was a party of eight. Two of them were elderly men who wore the brassards of peace. Four women alternated with the males around the table. One of them, quite young and pretty, was dabbing at something which seemed to have stained her gown. The wayward crab leg was floating in a crystal bell of purple liquid directly in front of her; cause and effect were easy to infer.

The two remaining men were both armed, both standing, and staring up at the balcony. The younger, a slender youth in bright-scarlet promenade dress, was resting his right hand on the grip of his side arm, and seemed about to speak. The older man turned coldly dangerous eyes from Hamilton to his youthful companion. "My privilege, Cyril," he said quietly, "if you please."

The young brave was clearly annoyed and reluctant to comply; nevertheless he bowed stiffly and sat down. His elder returned the bow punctiliously and turned back to Hamilton. The lace of his cuff brushed his holster, but he had not touched his weapon—yet.

Hamilton leaned over the balcony, both his hands spread and plainly visible on the rail. "Sir, my clumsiness has disturbed the pleasure of your meal and invaded your privacy. I am deeply sorry."

"I have your assurance that it was accidental, sir?" The man's eyes were still frosty, but he made no move to draw. But he did not sit down.

"You have indeed, sir, and with it my humble apology. Will you graciously permit me to make reparation?"

The other glanced down, not at the youth, but at the girl whose gown had been splashed. She shrugged. He answered Hamilton, "The thought is taken for the deed, sir."

"Sir, you leave me indebted."

"Not at all, sir."

They were exchanging bows and were about to resume their seats, when a shouted remark from the balcony booth directly opposite interrupted them. "Where's your brassard?"

They both looked toward the source of the disturbance; one of a party of men—armed citizens all, apparently, for no brassards were to be seen—was leaning out of the booth and staring with deliberate rudeness. Hamilton spoke to the man at the table below. "My privilege, is it not, sir?"

"Your privilege. I wish you well." He sat down and turned his attention back to his guests.

"You spoke to me?" asked Hamilton of the man across the ring.

"I did. You were let off lightly. You should eat at home—if you have a home. Not in the presence of gentlefolk."

Monroe-Alpha touched Hamilton's arm. "He's drunk," he whispered. "Take it easy."

"I know," his friend answered in a barely audible aside, "but he gives me no choice."

"Perhaps his friends will take care of him."

"We'll see."

Indeed his friends were attempting to. One of them placed a restraining hand on his weapon arm, but he shook him off. He was playing to a gallery now—the entire restaurant was quiet, the diners ostentatiously paying no attention, a pose contrary to fact. "Answer me!" he demanded.

"I will," Hamilton stated quietly. "You have been drinking and are not responsible. Your friends should disarm you and place a brassard on *you*. Else some short-tempered gentleman may fail to note that your manners were poured from a bottle."

There was a stir and a whispered consultation in the party behind the other man, as if some agreed with Hamilton's estimate of the situation. One of them spoke urgently to the belligerent one, but he ignored it.

"What's that about my manners, you misplanned mistake?"

"Your manners," Hamilton stated, "are as thick as your tongue. You are a disgrace to the gun you wear."

The other man drew fast, but he drew high, apparently with the intention of chopping down.

The terrific explosion of the Colt .45 brought every armed man in the place to his feet, side arm clear, eyes wary, ready for action. But the action was all over. A woman laughed, shortly and shrilly. The sound broke the tension for everyone. Men relaxed, weapons went back to belts, seats were resumed with apologetic shrugs. The diners went back to their own affairs with the careful indifference to other people's business of the urbane sophisticate.

Hamilton's antagonist was half supported by the arms of his friends. He seemed utterly surprised and completely sobered. There was a hole in his chemise near his right shoulder from which a wet, dark stain was spreading. One of the men holding him up waved to Hamilton with his free arm, palm out. Hamilton acknowledged the capitulation with the same gesture. Someone drew the curtains of the booth opposite.

Hamilton sank back into the cushions with a relieved sigh. "We lose more crabs that way," he observed. "Have some more, Cliff?"

"Thanks, no," Monroe-Alpha answered. "I'll stick to spoon foods. I hate interruptions at meal times, Felix. He might have cooled you."

"And left you to pay the check. Such slug pinching ill becomes you, Cliff."

Monroe-Alpha looked annoyed. "You know it's not that. I have few enough friends to wish not to lose them in casual brawls. We should have taken a private room, as I requested." He reached out and touched a stud under the railing; the curtains waved across the arch, shutting them off from the public room.

Hamilton laughed. "A little excitement gives savor to the food."

In the booth opposite the man who had waved capitulation spoke savagely to one who had been wounded. "You fool! You clumsy fool! You muffed it!"

"I couldn't help it," the injured man protested. "After he waved privilege, there was nothing to do but play drunk and pretend I meant the other one." He dabbed futilely at his freely bleeding shoulder. "In the Name of the Egg, what did he burn me with?"

"No matter."

"Maybe not to you, but it is to me. I'll look him up."

"You will not. One mistake is one too many."

"But I thought he was one of us. I thought it was part of the set-up."

"Humph! Had it been, you would have been told."

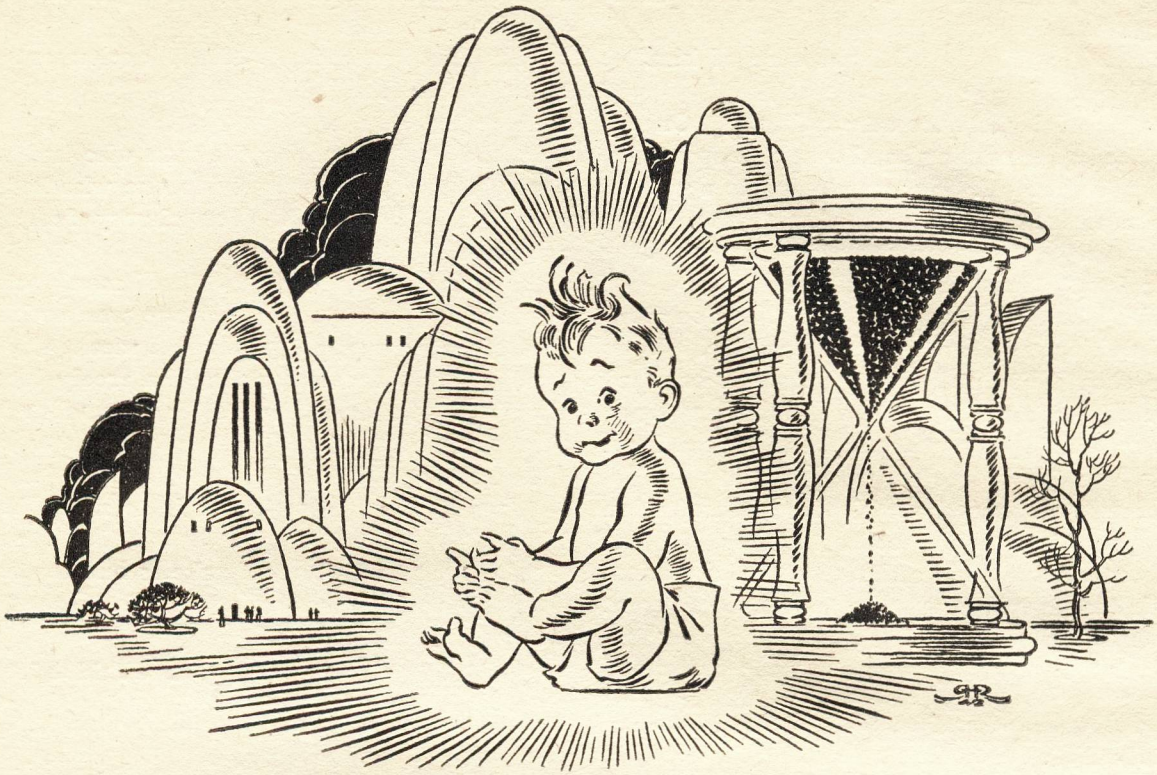
After Monroe-Alpha left to keep his date, Hamilton found himself at loose ends. The night life of the capital offered plenty of opportunity for a man to divest himself of surplus credit, but it was not new to him. He tried, in a desultory fashion, to find professional entertainment which could divert, then gave up and let the city itself amuse him. The corridors were thronged as always, the lifts packed; the Great Square under the port surged with people. Where were they all going? What was the hurry? What did they expect to find when they got there?

The presence of some types held obvious explanations. The occasional man with a brassard was almost certainly out at this hour because his business required him to be. The same rule applied without exception to the few armed men who also wore brassards—proclaiming thereby their unique status as police monitors, armed but immune to attack.

But the others, the armed and richly costumed men and their almost as gaudy women—why did they stir about so?

He realized, consciously and sardonically, that he himself was part of the throng, present because it amused him. He knew that he had no reason to feel that his own sense of detached amusement was unique. Perhaps they all came there to keep from being bored with themselves, to observe their mutual folly and to laugh.

He found himself, later, the last customer in a small bar. The collection of empty cups at his elbow was impressive. "Herbert," he said at last, to the owner back of the bar, "why do you run this joint?"



"The best of all possible babies—in the best world we can work out—"

Herbert paused in his tidying up. "To make money."

"That's a good answer, Herbert. Money and children—what other objectives are there? I've too much of one and none of the other. Set 'em up, Herbert. Let's drink to your kids."

Herbert set out two cups, but shook his head. "Make it something else. I've no kids."

"Huh? Sorry—none of my business. We'll drink to the kids I haven't got, instead."

Herbert poured drinks, from separate bottles.

"What's that private stock of yours, Herbert? Let me try it once."

"You wouldn't like it."

"Why not?"

"Well, to tell the truth, it's flavored water."

"You drink a toast in *that?* Why, Herbert!"

"You don't understand. My kidneys—"

Hamilton looked at him in sharp surprise. His host looked pleased. "You wouldn't guess, would you? Yes, I'm a natural. But it's my own hair I'm wearing. And my own teeth—mostly. Keep myself fit. Good a man as the next." He dumped out the liquid from his own cup, and refilled it from the bottle he had used for Hamilton's drink. "Shucks! One won't hurt me." He raised his drink. "Long life!"

"And children," Hamilton added mechanically.

They tossed them down. Herbert filled them up again. "Take children," he began. "Any man wants to see his kids do better than he did. Now I've been married for twenty-five years to the same woman. My wife and I are both First Truthers and we don't hold with these modern arrangements. But children—we settled that a long time ago. 'Clara,' I said to her, 'it don't matter what the brethren think. What's right is right. Our kids are going to have every advantage that other kids have.' And after a while she came around to my way of thinking. So we went to the Eugenics Board—"

Hamilton tried to think of some way to stop this flow of confidences.

"I must say that they were very kind and very polite. First they told us to think it over. 'If you practice gene selection,' they said, 'your children won't receive the control benefit.' As if we didn't know that! Money wasn't the object. We wanted our kids to grow up fine and strong and smarter than we were. So we insisted and they made a chromosome chart on each of us.

"It was two, three weeks before they called us back. 'Well, doc,' I said, soon as we were inside, 'what's the answer? What had we better select for?' 'Are you sure you want to do this?' he says. 'You're both good, sound types and the state needs controls like you. I'm willing to recommend an increase in benefit, if you'll drop it.' 'No,' I said, 'I know my rights. Any citizen, even a control natural, can practice gene selection if he wants to.' Then he let me have it, full charge."

"Well?"

"There wasn't anything to select for, in either of us."

"Huh?"

"'S truth. Little things, maybe. We could have arranged to leave out my wife's hay fever, by using her father's genes at that point in the chart, but that was about all. But as for planning a child that could compete on even terms with the general run of planned children, it just wasn't in the cards. The material wasn't there. They had made up an ideal chart of the best that could be combined from my genes and my wife's and it still wasn't good enough. It showed a maximum of a little over four percent over me and my wife in the general rating scale. 'Furthermore,' he told us, 'you couldn't plan on that score. We might search your germ plasm throughout your entire fertile period and never come across two gametes that could be combined to make this combination.'

"'How about mutations?' I asked him. He just shrugged it off. 'In the first place,' he said, 'it's damned hard to pick out a mutation in the gene pattern of a gamete itself. You generally have to wait for the new characteristic to show up in the adult zygote, then try to locate the variation in the gene pattern. And you need at least thirty mutations, happening all at once, to get the kind of a child you want. It's not mathematically possible.'"

"So you gave up the idea of planned children?"

"So we gave up the idea of children, period. Clara offered to be host-mother to any child I could get, but I said, 'No, if it ain't for us, it ain't for us.'"

"Hm-m-m. I suppose so. Look—if you and your wife are both naturals, why do you bother to run this place? Two citizens' allowances plus two control benefits add up to quite a tidy income. You don't look like a man with extravagant tastes."

"I'm not. To tell you the truth we tried it, after our disappointment. But it didn't work out. We got uneasy and fretful. Clara comes to me and says, 'Herbert, please yourself, but *I'm* going to start my hairdressing studio again.' And I agreed with her. So here we are."

"Yes, so we are," Hamilton concurred. "It's a queer world. Let's have another drink."

Herbert polished the bar before replying. "Mister, I wouldn't feel right about selling you another unless you checked that gun with me and let me loan you a brassard."

"So? Well, in that case I guess I've had enough. Good night."

"G'night."

II.

Rich man, poor man, beggar man, thief,
Doctor, lawyer, merchant, chief—
(Nursery Rhyme, circa XIXth century)

His telephone started to yammer as soon as he was home. "Nuts to you," said Hamilton. "I'm going to get some sleep." The first three words were the code sentence cut-off to which he had set the instrument; it stopped mournfully in the middle of its demand.

Hamilton swallowed eight hundred units of thiamin as a precautionary measure, set his bed for an ample five hours of sleep, threw his clothes in the general direction of the service valet, and settled down on the sheet. The water rose gently under the skin of the mattress until he floated, dry and warm and snug. The lullaby softened as his breathing became regular. When his respiration and heart action gave positive proof of deep sleep, the music faded out unobtrusively, shut off without so much as a click.

"It's like this," Monroe-Alpha was telling him, "we're faced with a surplusage of genes. Next quarter every citizen gets ninety-six chromosomes—" "But I don't like it," Hamilton protested. Monroe-Alpha grinned gleefully. "You have to like it," he proclaimed. "Figures don't lie. Everything comes out even. I'll show you." He stepped to his master accumulator and started it. The music swelled up, got louder. "See," he said. "That proves it." The music got louder.

And louder.

Hamilton became aware that the water had drained out of his bed, and that he lay with nothing between him and the spongy bottom but the sheet and the waterproof skin. He reached up and toned down the reveille, whereupon the insistent voice of his telephone cut through to him. "Better look at me, boss. I got troubles. Better look at me, boss. I got troubles. Better look at me, boss. I got troubles—"

"So have I. Thirty minutes!" The instrument shut off obediently. He punched for breakfast and stepped into the shower, eyed the dial, and decided against the luxury of a long workout. Besides, he wanted breakfast. Four minutes would do.

Warm soapy emulsion sprayed over his body, was scrubbed in by air blast, was replaced at the end of the first minute by water of the same temperature in needle jets. The temperature dropped, the needle jets persisted for a few seconds, then changed to gentle, full streams which left him cool and tingling. The combination was his own; he did not care what the physiotherapists thought of it.

The air blast dried him with a full minute to spare for the massage. He rolled and stretched against the insistent yielding pressure of a thousand mechanical fingers and decided that it was worth while to get up, after all. The pseudodactyls retreated from him. He pushed his face for a

moment into the capillotomer. Shave completed, the booth sprayed him with scent and dusted him off. He was beginning to feel himself again.

He tucked away a quarter liter of sweet-lemon juice and went to work seriously on the coffee before turning on the news roundup.

The news contained nothing fit to be recorded permanently. No news, he thought, makes a happy country but a dull breakfast. The machine called out the plugs for a dozen stories while the accompanying flash pictures zipped past without Hamilton disturbing the setting. When he did so, it was not because the story was important, but because it concerned him. The announcer proclaimed, "Diana's Playground Opened to the Public"; the flash panned from a crescent moon down to the brutal mountain surface and below to a gayly lighted artificial dream of paradise. Hamilton slapped the tell-me-more.

"Leyburg, Luna. Diana's Playground, long touted by its promoters as the greatest amusement enterprise ever to be undertaken off Earth or on, was invaded by the first shipload of tourists at exactly twelve thirty-two, Earth Prime. These old eyes have seen many a pleasure city, but I was surprised! Biographers relate that Ley himself was fond of the gay spots—I'm going to keep one eye on his tomb while I'm here! He might show up—" Hamilton gave half an ear to the discourse, one eye to the accompanying stereos, most of his attention to a half kilo of steak, rare.

"—bewilderingly beautiful, weirdly sensuous low-gravity dancing.

"The gaming rooms are thronged; the management may have to open annexes. Particularly popular are the machines offered by Lady Luck, Incorporated—Hamilton's Hazards they are called by the trade. In fact—" The picture that went with the spiel did not show a throng in Hamilton's estimation; he could almost feel the trouble the pickup man had gone to in order to shoot favorable angles.

"—round-trip excursion tickets which entitle the holder to visit every place of amusement in the Playground, with three days' hotel accommodations, strictly high-gravity, every room centrifuged."

He switched it off and turned to the telephone. "Connection—one one one zero."

"Special service," a husky contralto answered him presently.

"Gimme the Moon, please."

"Certainly. To whom do you wish to speak, Mr. . . . uh, Hamilton?"

"Hamilton is correct. I would like to talk to Blumenthal Peter. Try the manager's office at Diana's Playground."

There was a delay of several seconds before an image appeared on the screen. "Blumenthal speaking. That you, Felix? The image at this end is lousy. All streaked up with incidentals."

"Yeah, it's me. I called to ask about the play, Pete— What's the matter? Can't you hear me?"

The face of the image remained quiet for a long three seconds, then said suddenly, "Of course I can hear you. Don't forget the lag."

Hamilton looked sheepish. He *had* forgotten the lag—he always did. He found it difficult to remember, when staring right into a man's live features, that there would be a second and a half delay before that man—if on the Moon—could hear, another second and a half for his voice to travel back, three seconds' lag in all. Three seconds' lag seems inconsiderable, but it is long enough to stride six paces, or fall forty-one meters.

He was glad there was no phone service to the minor planets; it would be maddening to wait ten minutes or so between sentences—easier to stat a letter. "Sorry," he said. "My mistake. How was the play? The crowds didn't look so good."

"Naturally the crowd was light. One shipload isn't Noah's ark. But the play was O. K. They had plenty of scrip and were anxious to spend. We reported to your agent."

"Sure. I'll get the report, but I wanted to know what gadgets were popular."

"'Lost Comet' went strong. And so did 'Eclipses.'"

"How about 'Claiming Race' and 'Who's-Your-Baby?'"

"O. K., but not too heavy. Astronomy is the angle for this dive. I told you that."

"Yes, I should have listened to you. Well, I'll figure out a revamp. You could change 'Claiming Race' right now. Call it 'High Trajectory' and rename the mobies after some of the asteroids. Get it?"

"Right. We'll redecorate it in midnight blue and silver."

"That's right. I'll send a stat to confirm. That's all, I guess. I'm clearing."

"Wait a minute. I took a whirl at 'Lost Comet' myself, Felix. That's a great game."

"How much did you drop?"

Blumenthal looked suspicious. "Why, about eight hundred and fifty, if you must know. Why do you assume I lost? Isn't the game level?"

"Certainly it's level. But I designed that game myself, Pete. Don't forget that. It's strictly for suckers. You stay away from it."

"But look—I've figured out a way to beat it. I thought you ought to know."

"That's what you think. I know. *There is no way to beat the game.*"

"Well—O. K."

"O. K. Long life!"

"And kids."

As soon as the circuit was clear the phone resumed its ubiquitous demand. "Thirty minutes.

Better look at me, boss. I got troubles. Better—"

He removed a stat from the receiver; it shut up. "To Citizen Hamilton Felix 65-305-243 B47," it read. "Greetings. The District Moderator for Genetics presents his compliments and requests that Citizen Hamilton visit him at his office at ten hundred tomorrow." It was dated the previous evening and had an added notation requesting him to notify the moderator's office if it were not convenient to keep the appointment, refer to number such-and-so.

It lacked thirty minutes of ten hundred. He decided to comply with the request.

The moderator's suite struck Hamilton as being rather less mechanized than most places of business, or perhaps more subtly so. It was staffed with humans where one expects autogadgets—the receptionist, for example. The staff was mostly female, some grave, some merry, but all were beautiful, very much alive, and obviously intelligent.

"The moderator will see you now."

Hamilton stood up, chucked his cigarette into the nearest oubliette, and looked at her. "Do I disarm?"

"Not unless you wish. Come with me, please."

She ushered him as far as the door to the moderator's private office, dilated it, and left him as he stepped through.

"Good morning, sir!" a pleasant voice called out.

Hamilton found himself staring at the moderator. "Good morning to you," he answered mechanically, then, "For the love o'—" His right hand slid of its own volition toward his side arm, hesitated, changed its mind, and stopped.

The moderator was the gentleman whose dinner party had been disturbed by the incident of the wayward crab leg.

Hamilton recovered some of his poise. "Sir," he said stiffly, "this is not proper procedure. If you were not satisfied, you should have sent your next friend to wait on me."

The moderator stared at him, then laughed in a fashion that would have been rude in another man —but from him it was simply Jovian. "Believe me, sir, this is as much of a surprise to me as it is to you. I had no idea that the gentleman who exchanged courtesies with me yesterday evening was the one I wished to see this morning. As for the little contretemps in the restaurant—frankly, I would not have made an issue of the matter, unless you had forced me to the limit. I have not drawn my tickler in public for many years. But I am forgetting my manners—sit down, sir. Make yourself comfortable. Will you smoke? May I pour you a drink?"

Hamilton settled himself. "If the moderator pleases."

"My name is Mordan"—which Hamilton knew. "My friends call me Claude. And I would speak with you in friendship."

"You are most gentle—Claude."

"Not at all, Felix. Perhaps I have an ulterior motive. But tell me: What was that devil's toy you used on the cocky young brave? It amazed me."

Hamilton looked pleased and displayed his new weapon. Mordan looked it over. "Oh, yes," he said, "a simple heat engine burning a nitrate fuel to expel its piston. I think I have seen its pattern, have I not, on display at the Institution?"

Felix acknowledged the fact, a little crestfallen that Mordan was so little surprised at his toy. But Mordan made up for it by discussing in detail with, apparently, lively interest the characteristics and mechanisms of the machine. "If I were a fighting man, I would like to have one like it," he concluded.

"I'll have one fashioned for you."

"No, no. You are kind, but I would have no use for it."

Hamilton chewed his lip. "I say—you'll pardon me—but isn't it indiscreet for a man who does no fighting to appear in public armed?"

Mordan smiled. "You misconstrue me. Watch." He indicated the far wall. It was partly covered with a geometrical pattern, consisting of small circles, all the same size and set close together. Each circle had a small dot exactly in the center.

Mordan drew his weapon with easy swiftness, coming *up*, not down, on his target. His gun seemed simply to check itself at the top of its swing, before he returned it to his holster.

A light puff of smoke drifted up the face of the wall. There were three new circles, arranged in tangent trefoil. In the center of each was a small dot.

Hamilton said nothing.

"Well?" inquired Mordan.

"I was thinking," Hamilton answered slowly, "that it is well for me that I was polite to you yesterday evening."

Mordan chuckled.

"Although we have never met," said Mordan, "you and the gene pattern you carry have naturally been of interest to me."

"I suppose so. I fall within the jurisdiction of your office."

"You misunderstand me. I cannot possibly take a personal interest in every one of the myriad zygotes in this district. But it is my duty to conserve the best strains. I have been hoping for the past ten years that you would show up at the clinic, and ask for help in planning children."

Hamilton's face became completely expressionless. Mordan ignored it and went on. "Since you did not come in voluntarily for advice, I was forced to ask you to visit me. I want to ask you

a question: Do you intend to have children any time soon?"

Hamilton stood up. "This subject is distasteful to me. May I have your leave, sir?"

Mordan came to him and placed a hand on his arm. "Please, Felix. No harm can be done by listening to me. Believe me, I do not wish to invade your private sphere—but I am no casual busybody. I am your moderator, representing the interests of all of your own kind. Yours among them."

Hamilton sat down without relaxing. "I will listen."

"Thank you. Felix, the responsibility of improving the race under the doctrines of our republic is not a simple one. We can advise but not coerce. The private life and free action of every individual must be scrupulously respected. We have no weapon but cool reason and the appeal to every man's wish that the next generation be better than the last. Even with co-operation there is little enough we can do—in most cases, the elimination of one or two bad characteristics, the preservation of the good ones present. But your case is different."

"How?"

"You know how. You represent the careful knitting together of favorable lines over four generations. Literally tens of thousands of gametes were examined and rejected before the thirty gametes were picked which constitute the linkage of your ancestral zygotes. It would be a shame to waste all that painstaking work."

"Why pick on me? I am not the only result of that selection. There must be at least a hundred citizens descended from my great gross grandparents. You don't want me—I'm a cull. I'm the plan that didn't pan out. I'm a disappointment."

"No," Mordan said softly, "no, Felix, you are not a cull. You are the star line."

"Huh?"

"I mean it. It is contrary to public policy to discuss these things, but rules were made to be broken. Step by step, back to the beginning of this particular experiment, your line has the highest general rating. You are the only zygote in the line who combines every one of the favorable mutations with which my predecessors started. Three other favorable mutations showed up after the original combinations; all of them are conserved in you."

Hamilton smiled wryly. "That must make me still more of a disappointment to you. I haven't done very much with the talents you attribute to me, have I?"

Mordan shook his head. "I have no criticism to make of your record."

"But you don't think much of it, do you? I've frittered away my time, done nothing more important than design silly games for idle people. Perhaps you geneticists are mistaken in what you call 'favorable characteristics.'"

"Possibly. I think not."

"What do you call a favorable characteristic?"

"A survival factor, considered in a broad sense. This inventiveness of yours, which you disparage, is a very strong survival factor. In you it lies almost latent, or applied to matters of no importance. You don't need it, because you find yourself in a social matrix in which you do not need to exert yourself to stay alive. But that quality of inventiveness can be of crucial importance to your descendants. It can mean the difference between life and death."

"But—"

"I mean it. Easy times for individuals are bad times for the race. Adversity is a strainer which refuses to pass the ill equipped. But we have no adversity nowadays. To keep the race as strong as it is and to make it stronger requires careful planning. The genetic technician eliminates in the laboratory the strains which formerly were eliminated by simple natural selection."

"But how do you know that the things you select for are actually survival factors? I've had my doubts about a lot of them."

"Ah! There's the rub. You know the history of the First Genetic War."

"I know the usual things about it, I suppose."

"It won't do any harm to recapitulate. The problem those early planners were up against is typical—"

The problems faced by the earliest experimenters in genetic control are typical of all problems of planned genetics. Natural selection works automatically to preserve survival values in a race by the simple, brutal killing off of those strains poor in survival characteristics. But natural selection is slow, a statistical process. A weak strain may persist—for a time—under favorable conditions. A potentially desirable mutation may be lost—for a time—because of exceptionally unfavorable conditions. Or it may be lost through the sheer blind wastefulness of the reproductive method of this animal world. Each individual animal represents only half—exactly half—of the characteristics potential in his two parents.

The half which is thrown away may be more desirable than the half which is perpetuated. Pure random chance.

Natural selection is slow—it took eight hundred thousand generations to produce a new genus of horse. But artificial selection is fast, *if* we have the wisdom to know *what* to select for.

The wisdom— But we do not have the wisdom. It would take a superman to plan a superman. The race acquired the techniques of artificial selection without any real conception of what should be

selected for—in the interests of coming generations.

It is, perhaps, unfortunate, that the basic techniques for gene selection should have been released to the world immediately after the conclusion of the neo-nationalistic wars. The two centuries of pseudo-capitalism, from the First Napoleon to the Madagascar Directorate, do not appear to be, superficially, a period in which contra-survival pacifism would take hold. Nevertheless, even during the Continuous War of 1910-70 there were resurgent mass movements of this nature, under many different names—philosophical anarchism, primitive Christianism—not to be confused with the so-called Wotan Christians—passive non-co-operation, et cetera. All of them spoke of the abolition of war about as one might speak of the abolition of solar energy.

(It must be remembered that the Continuous War was in fact a series of guerrilla campaigns with long periods of comparative peace for large areas of the globe. These movements were invariably suppressed in the face of open hostilities.)

It would be interesting, if not productive, to speculate on whether or not the instituting of modern finance structure after the downfall of the Madagascar System would have been sufficient to maintain peace if no genetic experiments had been undertaken. But pacifist reaction was at its highest point at this time; the technique of paraectogenesis was seized on as a God-given opportunity to get rid of war by stamping it out of the human spirit.

The wave of fanatic reaction to war swept the world. The survivors instituted drastic genetic regulations intended for one purpose alone—to conserve the Parmalee-Hitchcock recessive of the ninth chromosome and to eliminate the dominent which usually masks it, to breed sheep rather than wolves.

It is sardonically amusing that most of the "wolves" of the period—the Parmalee-Hitchcock island *is* recessive; there are few natural sheep—were caught by the same hysteria and co-operated in the attempt to eliminate themselves. But some refused. The Northwest Colony eventually resulted.

That the Northwest Union should eventually fight the rest of the world was a biological necessity. The outcome was equally a necessity and the details are unimportant. The "wolves" ate the "sheep."

Not physically in the sense of complete extermination, but, genetically speaking, we are descended from "wolves," not "sheep."

"They tried to breed the fighting spirit out of men," Mordan went on, "without any conception of its biological usefulness. The rationalization involved stems from the concept of Original Sin. Violence was 'bad'; nonviolence was 'good.'"

"But why," protested Hamilton, "do you assume that combativeness is a survival characteristic? Sure—I've got it; you've got it; we've all got it. So what?"

Mordan smiled. *"The fighters survived.* That is the final test. Natural selection goes on always, regardless of conscious selection."

"Wait a minute," demanded Hamilton. "That doesn't check. According to that, we should have lost the Second Genetic War. Their 'mules' were certainly willing to fight. At least, so I have always been taught."

"Yes, yes," Mordan agreed, "but I did not say that combativeness was the *only* survival characteristic. If it were, the Pekingese dog would rule the Earth. The fighting instinct should be dominated by cool self-interest. Why didn't you shoot it out with me last night?"

"Because there was nothing worth fighting about."

"Exactly. The geneticists of the Great Khan made essentially the same mistake that was made three hundred years earlier; they thought they could monkey with the balance of human characteristics resulting from a billion years of natural selection and produce a race of supermen. They had a formula for it—efficient specialization. But they neglected the most obvious of human characteristics.

"Man is an unspecialized animal. His body, except for its enormous brain case, is primitive. He can't dig; he can't run very fast; he can't fly. But he can eat anything and he can stay alive where a goat would starve, a lizard would fry, a bird freeze. Instead of special adaptations he has general adaptability—"

The Empire of the Great Khans was, historically, a reversion to an obsolete form—totalitarianism. Only under such absolutism could the genetic experiments which led up to *homo proteus* have been performed. For they required a total indifference to the welfare of individuals as such.

Gene selection was simply an adjunct to the other practices of the imperial geneticists. They made use also of artificial mutation, both by means of radiation and through the use of gene-selective dyes. If the result of their manipulation of the gametes did not measure up to specifications, they practiced endocrine therapy and surgery on the immature zygote. They tailored human beings—if you could call them human beings!—as casually as we construct buildings.

At their height, just before the Second Genetic War, they bred over three thousand types of—well call them people, including the hyperbrains—thirteen sorts of those—the almost brainless matrons, the clever and repulsively beautiful

pseudo-feminine freemartins, and the neuter "mules."

We are predisposed to identify the term "mule" with fighters, since the fighters were in direct contact with our own culture. In fact, there was a type of mule for every type of routine job necessary to the Empire. The fighters were simply those specialized for fighting.

And what fighters! They needed no sleep. They had three times the strength of ordinary men. There is no way of comparing their endurance with that of men, since they simply kept on going, like well-designed machines, until disabled. Each one carried enough fuel—"fuel" seems more appropriate than "food"—to last it for a couple of weeks, and could continue to function beyond that time for at least another week.

Nor were they stupid. For the purposes of their specialization their minds were keen. Even their officers were mules—possibly their field marshals as well—and their grasp of strategy and tactics and use of military machines left nothing to be desired. Their only weakness lay in military psychology; they did not understand their opponents—but men did not understand *them;* the disadvantage worked both ways.

The basic nature of their motivation is still debated. It is termed a "substitute for sex sublimation," which it undoubtedly was. But the tag does not explain it, nor did we ever understand it. It is best described negatively by saying that captured mules became insane and suicided in not over ten days' time, even though fed on captured rations. Before insanity set in they would beg for something called *vepratoga* in their tongue, but our semanticists could discover no process referent for the term.

They needed some spark that their masters could give them, and which we could not. Without it they died. There the matter ended.

The hordes of mules defeated men in every engagement. Our social structure was destroyed completely—yet the true men won. Won because they fought and continued to fight, as individuals and guerrilla groups. The Empire had one vulnerable point: its co-ordinators, the Khan: his satraps and administrators. Biologically the Empire was a single organism and could be killed at the top, like a hive with a single queen bee. A few score assassinations accomplished a collapse which could not be achieved in battle.

There is no need to dwell on the terror that followed the collapse. It is not pretty—let it suffice that no single representative of *homo proteus* is believed to be alive today. He joined the ranks of the great dinosaurs and the saber-toothed cats—evolutionary experiments which failed to work out.

He lacked adaptability.

"The Genetic Wars were brutal lessons to us," Mordan added, "but they taught us not to tamper too casually with human characteristics. If a characteristic is not already present in the germ plasm of the race, we don't attempt to put it in. When natural mutations show up, we leave them on trial for a long time before we attempt to spread them around through the race. Most mutations are either worthless or definitely disadvantageous, in the long run. We eliminate obvious disadvantages, conserve obvious advantages; that is about all. I note that the backs of your hands are rather hairy, whereas mine are smooth. Does that suggest anything to you?"

"No."

"Nor to me. There appears to be no advantage, one way or the other, to the wide variations in hair patterns of the human race. Therefore we leave them alone. On the other hand—have you ever had a toothache?"

"Of course not."

"Of course not. But do you know why?" He waited, indicating that the question was not rhetorical.

"Well—it's a matter of selection. My ancestors had sound teeth."

"Not all of your ancestors. Theoretically it would have been enough for one of your ancestors to have naturally sound teeth, provided his dominant characteristic were conserved in each generation. But each gamete of that ancestor contains only half of his chromosomes; if he inherited his sound teeth from just one of his ancestors, the dominant will be present in only half of his gametes.

"We selected—our predecessors, I mean—for sound teeth. We used gametes which contained the dominant. Today, aside from the control naturals, it would be hard to find a citizen who does not have that dominant from both his parents. We no longer have to select for sound teeth. It's the same with color blindness, with cancer, with hemophilia, with a great many other heritable defects—we selected and eliminated them, without disturbing in any way the ordinary, normal, biologically commendable tendency for human beings to fall in love with other human beings and produce children. We simply enabled each couple to have the best children of which they were potentially capable by combining their gametes through selection instead of blind chance."

"You didn't do that in my case," Hamilton said bitterly. "I'm a breeding experiment."

"That's true. But yours is a special case, Felix. *Yours is a star line.* Every one of your last thirty ancestors entered voluntarily into the creation of your line, not because Cupid had been out with his bow and arrow, but because they had a vision of a race better than they were. Every cell in your body contains in its chromosomes the blue-

print of a stronger, sounder, more adaptable, more resistant race. I'm asking you not to waste it."

Hamilton squirmed uncomfortably. "What do you expect me to do? Play Adam to a whole new race?"

"Not at all. I want you to perpetuate your line."

Hamilton leaned forward. "Gotcha!" he said. "You're trying to do what the Great Khans did. You're trying to separate out one line and make it different from the rest—as different as we are from the control naturals. It's no good. I won't have it."

Mordan shook his head slowly. "Both of your ideas are false, and there is some truth in each of them. We intend to follow a process similar to that used to get sound teeth. Have you ever heard of Deaf Smith County?"

"No."

"Deaf Smith County, Texas, was a political subdivision of the old United States. Its natives had sound teeth, not by inheritance, but because of the soil. It gave them a diet rich in phosphorus and calcium carbonate. You can hardly appreciate the tragic importance of dental caries in those days. Teeth actually rotted in the head, and were the cause of a large part of the continual sicknesses of the time. There were nearly a hundred thousand technicians in North America alone who did nothing but remove and repair diseased teeth —even at that, four fifths of the population had no such help. They simply suffered and died, with their rotten teeth poisoning their whole bodies."

"What has this to do with me?"

"It will have. The data from Deaf Smith County was seized on by the contemporary technicians—medicine men, they called them—as a solution for the problem. Duplicate the diet of the Deaf Smithians—no more caries. They were perfectly right and biologically quite wrong, for an advantage is no good to a *race* unless it can be inherited. The clue was there, but they used it the wrong way. What we looked for finally were men and women who had perfect teeth despite poor diet and lack of attention. In time it was proved that all such cases had a group of three genes, previously uncharted. Call it a favorable mutation. Or call the susceptibility to tooth decay an unfavorable mutation which didn't quite kill off the race. We don't know which is true.

"But my predecessors made certain that this particular gene group was conserved in their descendants. You know how inheritance fans out; go back enough generations and all of us are descended from the whole population. Genetically, our teeth are descended from that one small group —because we selected to preserve that dominant. What we want to do with you, Felix, is to conserve the favorable variations present in you until the whole race has your advantages. You won't be the only ancestor of coming generations—oh, no!—but you will be, genetically, the ancestor of them all in the respects in which you are superior to the majority."

"You've picked the wrong man. I'm a failure."

"Don't tell me that, Felix. I know your chart. I know you better than you know yourself. You are a survivor type. I could set you down on an island peopled by howling savages and dangerous animals—in two weeks you would own the place."

Hamilton grudged a smile. "Maybe I would. I'd like to try it."

"We don't need to try it. *I know!* You've got the physique and the mentality and the temperament. What's your sleep ration?"

"Around four hours."

"Fatigue index?"

"It runs about a hundred and twenty-five hours, maybe more."

"Reflex?"

Hamilton shrugged. Mordan suddenly whipped his side arm clear, aimed it at Hamilton. Hamilton had his own out and had Mordan covered at appreciably the same instant. He returned it at once. Mordan laughed and replaced his own. "I was in no danger," he declared. "I knew that you could draw, evaluate the situation, and decide not to fire, before a slower man would perceive that anything was going on."

"You took a long chance," Hamilton complained.

"Not at all. *I know your chart.* I counted not only on your motor reactions, but your intelligence. Felix, your intelligence rating entitles you to the term 'genius' even in these days."

There followed a fairly long silence. Mordan broke it. "Well?"

"You've said all you have to say?"

"For the moment."

"Very well, then, I'll speak my piece. You haven't said anything that convinces me. I wasn't aware that you planners took such an intense interest in my germ plasm, but you didn't tell me anything else that I did not already know. My answer is 'no'—"

"But—"

"My turn—Claude. I'll tell you why. Conceding that I am a superior survival type—I don't argue that; it's true. I'm smart and I'm able and I know it. Even so, I know of no reason why the human race *should* survive—other than the fact that their make-up insures that they will. But there's no sense to the whole bloody show. There's no point to being alive at all. I'm damned if I'll contribute to continuing the comedy."

He paused. Mordan waited, then said slowly, "Don't you enjoy life, Felix?"

"I certainly do," Hamilton answered emphati-

cally. "I've got a cockeyed sense of humor, and everything amuses me."

"Then isn't life worth living for itself alone?"

"It is for me. I intend to live as long as I can and I expect to enjoy most of it. But do most people enjoy life? I doubt it. As near as I can tell from outward appearances it's about fourteen to one against it."

"Outward appearances may be deceiving. I am inclined to think that most people are happy."

"Prove it!"

Mordan smiled. "You've got me. We can measure most things about the make-up of a man, but we've never been able to measure that. However—don't you expect your own descendants to inherit your zest for living?"

"Is it inheritable?" Hamilton asked suspiciously.

"Well, truthfully, we don't know. I can't point to a particular spot on a particular chromosome and say, 'There lies happiness.' It's more subtle than blue eyes versus brown eyes. But I want to delve into this more deeply. Felix, when did you begin to suspect that life was not worth living?"

Hamilton stood up and paced nervously. He knew the answer to that question. He knew it well. But did he wish to bare it to this stranger?

No one speaks to a little child of chromosome charts. There was nothing to mark him out from other infants in the first development center he could remember. He was a nobody, kindly and intelligently treated, but of importance to no one but himself. It had dawned on him slowly that his abilities were superior. A bright child is dominated in its early years by other, duller children, simply because they are older, larger, better informed. And there are always those remote omniscient creatures, the grown-ups.

He was ten—or was it eleven?—when he began to realize that in activity in which his teachers were unable to mask the fact of competition he usually excelled. After that he tried to excel, to be conspicuously superior, cock-o'-the-walk. He began to feel the strongest of social motivations, the desire to be appreciated. He knew now what he wanted to be when he "grew up."

The other fellows talked about what they wanted to do. ("I'm going to be a rocket pilot when *I* grow up." "So am I." *"I'm* not. My father says a businessman can hire all the rocket pilots he wants." "He couldn't hire *me.*" "He could *so.*")

Let them talk. Young Felix knew what he wanted to do. He would be an encyclopedic synthesist. All the really great men were synthesists. The whole world was their oyster. Who stood a chance of being elected to the Policy Board but a synthesist? What specialist was there who did not, in the long run, take his orders from a synthesist? They were the leaders, the men who knew everything, the philosopher-kings whom the ancients had dreamed of.

He kept his dream to himself. He appeared to be pulling out of his preadolescent narcissist period nicely and to be undergoing the social integration of adolescence with no marked trouble. His developers were unaware that he was headed for an insuperable obstacle. Youths seldom plan to generalize their talents; it takes more subtle imagination than they usually possess to see romance in being a policy former.

Hamilton looked at Mordan. The man's face invited confidence. "You're a synthesist, aren't you? You aren't a geneticist."

"Naturally. I couldn't specialize in the actual techniques. That takes a lifetime."

"The best geneticist on your staff can't hope to sit where you are sitting."

"Of course not. They wouldn't wish to."

"Could I become your successor? Go ahead—answer me. You know my chart."

"No, you couldn't."

"Why not?"

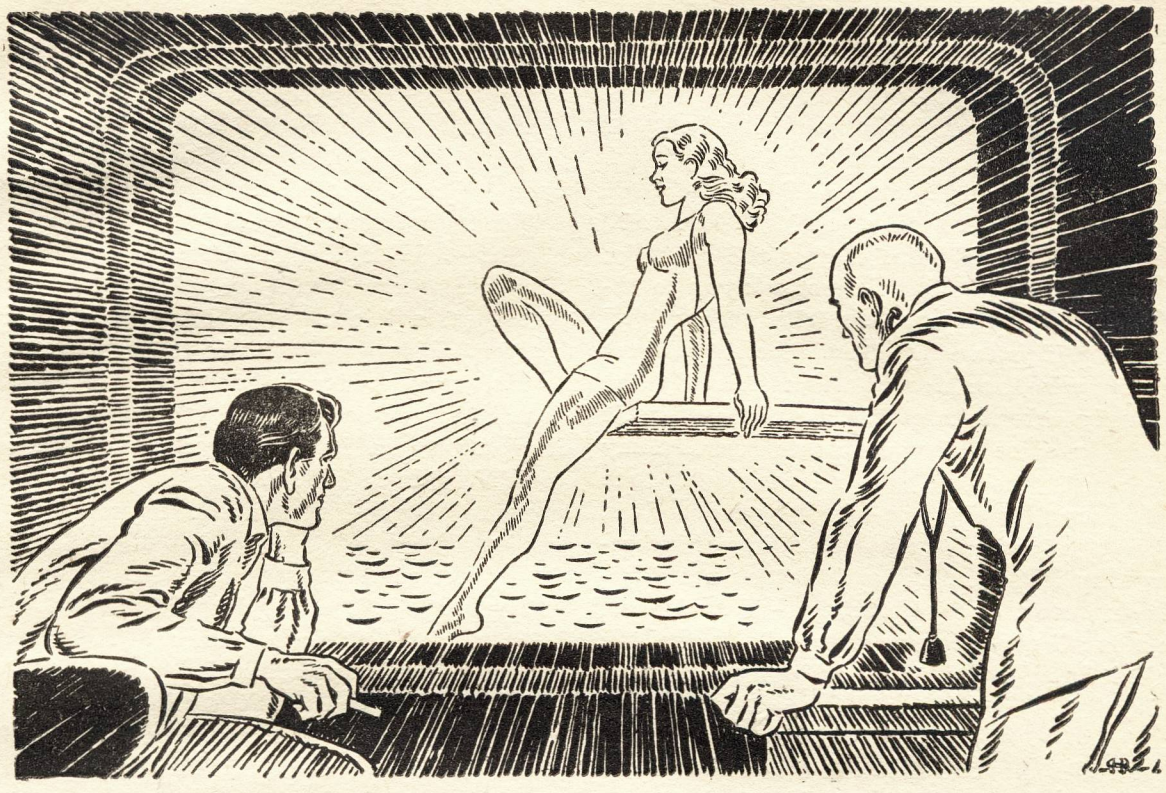
"You know why. You have an excellent memory, more than adequate for any other purpose, but it's not an eidetic memory. A synthesist must have complete memory in order to be able to cover the ground he must cover."

"And without it," Hamilton added, "a man can never be recognized as a synthesist. He just isn't one, any more than a man can claim to be an engineer who can't solve fourth-degree equations in his head. I wanted to be a synthesist and I wasn't equipped for it. When it was finally pounded into my head that I couldn't take first prize, I wasn't interested in second prize."

"Your son could be a synthesist."

Hamilton shook his head. "It doesn't matter any more. I still have the encyclopedic viewpoint, but I wouldn't want to trade places with you. You asked me when and how it was that I first came to the conclusion that life doesn't mean anything. I've told you how I first began to have my doubts, but the point is: I still have 'em."

"Wait," Mordan put in. "You still have not heard the whole story. It was planned that eidetic memory would be incorporated in your line either in your generation or in your father's. Your children will have it, if you co-operate. There is still another thing lacking which needs to be added and will be added. I said you were a survival type. You are—except for one thing. You don't want children. From a biological standpoint that is as contra-survival as a compulsion to suicide. You got that tendency from your hyperdexter great-grandfather. The tendency had to be accepted at the time as he was dead before his germ plasm was used and we hadn't much supply in the bank to choose from. But it will be corrected at this linkage. Your children will be anxious to have children—I can assure you of that."



"What's that to me?" Hamilton demanded. "Oh, I don't doubt that you can do it. You can wind 'em up and make 'em run. You can probably eliminate my misgivings and produce a line that will go on happily breeding for the next ten million years. That still doesn't make it make sense. Survival! What for? Until you can give me some convincing explanation why the human race should go on at all, my answer is 'no.'" He stood up.

"Leaving?" asked Mordan.

"If you will excuse me."

"Aren't you interested in knowing something about the woman who we believe is suitable for your line?"

"Not particularly."

"I choose to interpret that as permission," Mordan answered affably. "Look over there." He touched a control on his desk; Hamilton looked where he had been directed to. A section of the wall faded away and gave place to a stereo scene. It was as if they were looking out through an open window. Before them lay a garden swimming pool, its surface freshly agitated—by diving, apparently, for a head broke the surface of the water. The swimmer took three easy strokes toward the pickup, and climbed out on the bank with effortless graceful strength. She rolled to her knees, stood up, stretched and laughed, apparently from sheer animal good spirits, and glided out of the picture. "Well?" asked Mordan.

"She's comely, but I've seen others."

"It's not necessary that you ever lay eyes on her," the moderator added hastily. "She's your fifth cousin, by the way. The combination of your charts will be simple." He snapped off the scene, replaced it with a static picture. "Your chart is on the right; hers is on the left." Two additional diagrams then appeared, one under his, one under hers. "Those are the optimum haploid charts for your respective gametes. They combine so—" He touched another control; a fifth chart, diploid, formed itself in the center of the square formed by the four others.

The charts were not pictures of chromosomes, but were made up of the subtle and ingenious shorthand used by genetic technicians to represent the extremely microscopic bits of living matter which are the arbiters of human make-up. Each chromosome was represented by a pattern which more nearly resembled a spectrogram than any other familiar structure. But the language was a language of experts; to a layman the charts were meaningless.

Even Mordan could not read the charts unassisted. He depended on his technicians to explain them to him when necessary. Thereafter his unfailing memory enabled him to recall the significance of the details.

One thing alone was evident to the uninstructed eye: The two upper charts, Hamilton's and the girl's, contained twice as many chromosome patterns—forty-eight to be exact—as the charts of the gametes underneath them. But the chart of the proposed offspring contained forty-eight rep-

resentations of chromosomes—twenty-four from each of its parents.

Hamilton ran his eye over the charts with interest, an interest he carefully repressed. "Very interesting, I'm sure," he said indifferently. "Of course, I don't understand it."

"I'd be glad to explain it to you."

"Don't bother. It's hardly worth while, is it?"

"I suppose not." Mordan cleared the controls; the pictures snapped off. "I must ask you to excuse me, Felix. Perhaps we can talk another day."

"Certainly, if you wish." He glanced at his host in some surprise, but Mordan was as friendly and as smilingly urbane as ever. He found himself in the outer office a few moments later. They had exchanged good-bys with all the appropriate intimate formality of name-friends; nevertheless, he felt a vague dissatisfaction, a feeling of incompleteness, as if the interview had terminated before it was over. To be sure, he had said "no," which was all the meeting required, but he had not said it in all the circumstantial detail he had wished to.

Mordan went back to his desk and switched the charts on again, all five of them. He studied them, recalling all that he had been taught about them and dwelling with loving interest on the one in the middle.

A chime at his desk played the phrase announcing his chief technical assistant. "Come in, Martha," he invited without looking around.

"I'm in, chief," she replied almost at once.

"Ah—so you are," he answered, turning to her. "Got a cigarette?"

"Help yourself." She did so from the jeweled container on his desk, inhaled it into life, and settled down comfortably. She was older than he, iron-gray, and looked as competent as she was. Her somber laboratory coveralls were in marked contrast to the dignified dandyism of his costume, but they fitted her character.

"Hamilton 243 just left, didn't he?"

"Yes."

"When do we start?"

"Mm-m-m. How would the second Tuesday of next week do?"

She raised her brows. "As bad as that?"

"I'm afraid so. He said 'no.' I kicked him out—gently—before he had time to rationalize himself into a position from which he would not care to back down later."

"Why did he refuse? Is he in love?"

"No."

"Then what's the catch?" She got up, went to the screen and stared at Hamilton's chart, as if she might detect the answer there.

"Mm-m-m. He posed me a question which I must answer correctly—else he will not co-operate."

"Huh? What was the question?"

"I'll ask you. Martha, what is the meaning of life?"

"What! Why, what a stupid question!"

"He did not ask it stupidly."

"It's a psychopathic question, unlimited, unanswerable, and, in all probability, sense-free."

"I'm not so sure, Martha."

"But— Well, I won't attempt to argue with you outside my own field. But it seems to me that 'meaning' is a purely anthropomorphic conception. Life simply *is*. It exists."

"He used the idea anthropomorphically. What does life mean to men, and why should he, Hamilton, assist in its continuance? Of course, I couldn't answer him. He had me. And he proposes to play Sphinx and not let us proceed until I solve his riddle."

"Fiddlesticks!" She snapped the cigarette away savagely. "What does he think this clinic is—a place to play word games? A man should not be allowed to stand in the way of racial progress. He doesn't own the life in his body. It belongs to all of us—to the race. He's a fool."

"You know he's not, Martha." He pointed to the chart.

"No," she admitted, "he's not a fool. Nevertheless, he should be required to co-operate. It's not as if it would hurt him or inconvenience him in any way."

"*Tut, tut,* Martha. There's a little matter of constitutional law."

"I know. I know. I abide by it, but I don't have to worship it. Granted, it's a wise law, but this is a special case."

"They are all special cases."

She did not answer him but turned back to the charts. "My, oh, my," she said half to herself, "what a chart! What a *beautiful* chart, chief!"

III.

To this we pledge our lives and sacred honor:
To destroy no fertile life,
To hold as solemn secret that which may be divulged to us, directly or indirectly, through the techniques of our art, concerning the private matters of our clients,
To practice our art only with the full and uninfluenced consent of our client zygotes,
To hold ourselves, moreover, guardian in full trust for the future welfare of infant zygotes and to do only that which we soberly and earnestly believe to be in their interests,
To respect meticulously the laws and customs of the group social in which we practice.
This we covenant in the Name of Life Immortal.

Extract from the Mendelian Oath,
Circa 2075 A. D. (Old Style)

Sweet peas, four-o'clocks, the evening primrose, the ugly little fruit fly *Drosophila*—as far back as the nineteenth and twentieth centuries the monk Gregor Mendel and Dr. Morgan of the ancient University of Columbia had used these humble tools to establish the basic laws of genetics. Simple laws; simple but subtle.

Lodged in the nucleus of every cell of every adult zygote, whether man or fruit fly, sweet pea or race horse, is a group of threadlike bodies—chromosomes. Arranged along the threads, like beads on a string, are incredibly tiny somethings, on the order of ten times the size of the largest protein molecules. They are the genes, each one of which controls some aspect of the entire structure, man, animal, or plant, in which the cell is lodged. In gross terms every living cell contains within it the blueprint and specifications for the entire organism.

A man's cells contain forty-eight chromosomes —twenty-four pairs. Half of them he derived from his mother, half from his father. In each one of a pair of chromosomes, one from the mother, one from the father, there are genes, thousands of them, in one-to-one correspondence with the genes from the chromosome of the other parent. Thus each parent "casts a vote" on each characteristic. But some "votes" carry more weight than others. Such "votes" are called dominant; the weaker, recessive. If one parent supplies the gene for albinism, while the other parent supplies the gene for coloration, the child will have normal color—normal color is "dominant." If both parents supply the gene for normal coloration, the vote is unanimous, but the result is the same—for that generation. But it always requires "unanimous vote" to produce an albino.

Nevertheless, the gene for albinism may be passed on from generation to generation, unnoticed but *unchanged*. The potentialities of a race are passed on unchanged—except for mutation—from parent to child. They may be shuffled and dealt and shuffled again, producing an inconceivable number of unique individuals, but the gene units are unchanged by the ordinary process of reproduction.

The thirty-two men of chess may be arranged on the board in many varied combinations, but the unit men do not vary. Fifty-two playing cards maybe dealt almost endlessly to produce an enormous number of hands, but the cards are the original fifty-two. One hand may be full of trumps in favorable combination; another may be worthless —pure chance.

But suppose the cards were dealt face up and selected. Suppose you were permitted to make up the best hand of five cards possible out of the first ten cards dealt. The chances of getting the best possible hand have been increased two hundred and fifty-two times! Check it.

Such is the method of racial improvement by gene selection.

A life-producing cell in the gonads of a male is ready to divide to form gametes. It contains forty-eight chromosomes, like every other cell in his body. The chromosomes intertwine frantically, each with its opposite number. So close is this conjugation that genes or groups of genes may even trade places with their opposites from the other chromosomes. Presently this dance ceases. Each member of a pair of chromosomes withdraws from its partner as far as possible, until there is a cluster of twenty-four chromosomes at each end of the cell. The cell splits, forming two new cells, each with only twenty-four chromosomes, each containing exactly half of the potentialities of the parent cell and parent zygote.

One of these cells contains a chromosome—the X-chromosome—which declares that any zygote formed with its help will be a female.

The two cells divide again. But in this fission the chromosomes themselves divide, endwise, thereby conserving every gene and every one of the twenty-four chromosomes. The end product is four tiny wigglers—male gametes, spermatozoa —half of whom can produce females; half, males. The male producers are exactly alike in their gene assortments *and are the exact complements of the female producers.* Take note of this—it is the key point in the practical technique of gene selection.

The heads of the male producers average 4*u* in length; the heads of the female producers average 5*u* in length. These are key facts as well.

In the female gonad the evolution of the life-giving female gamete—ovum—is similar to that described for the male gametes, with two important exceptions. After the reduction-division in which the number of chromosomes per cell is reduced from forty-eight to twenty-four the result is not two ova, as might be expected, but one ovum and one polar body. The polar body is a pseudo egg, containing a chromosome pattern complementary to that of the true gamete, but lacking the power to become a living zygote. It's a nobody that never will be anybody.

The ovum divides again, throwing off another polar body which has the *same* pattern as the ovum. The original polar body divides again, producing two more polar bodies of *complementary* pattern. It will be seen that the polar bodies of complementary pattern to the ovum always exceed in number those of identical pattern two to one. This is a key fact.

All ova contain the X-chromosome and may become either male or female. Sex of the infant zygote is determined by the life-giving cell provided by the father; the other has no part in it.

All of the above is a very rough picture indeed. It is necessary to compress, to exaggerate, to omit detail, to use oversimplified analogy. For example, the terms "dominant" and "recessive" are relative terms, not absolutes; and characteristics are rarely determined by one gene alone. Furthermore, mutations—spontaneous changes in the genes themselves—occur with greater frequency than this account has emphasized. But, bearing these things in mind, the picture is reasonably correct in its broad outlines.

How can the above facts be used to produce the sort of man or woman one wishes to produce? Offhand the question appears to be simple. We do not have the opportunity to do anything as simple as selecting the best possible hand of five out of ten cards, but the hands are dealt over and over again. An adult male produces hundreds of billions of gametes. Ova are produced on no such wholesale scale, but in quite adequate numbers nevertheless. It would appear to be a simple matter to determine what combination you want and then wait for it to show up—or at least to wait for a combination near enough to ideal to be satisfactory.

But it is necessary to recognize the combination wanted when it shows up. And that can be done only by examining the gene patterns in the chromosomes.

Well, what of that? We have the means to keep gametes alive outside the bodies of the zygotes—and genes, while infinitesimally small, are large enough to be seen and recognized under our electron ultramicroscopes. Go ahead. Take a look. Is it the gamete we want, or is it one of its lesser brothers? If the latter, then reject it, and look again.

Easy, now, easy! We are dealing with the incredibly small. Genes are such tiny things that, like the elusive atom, to examine one is to disturb it. The radiations used to see a gamete closely enough to tell anything about its chromosomes will produce a perfect storm of mutations. Sorry—the thing you were looking for isn't there any more. Looking at it changed it. You can't see the change, it's true, but it will show up later if you attempt to use this gamete. Furthermore, you probably could not use it anyhow. Examination may have killed it.

We fall back on the most subtle and most powerful tool of research—inference. You will remember that a single male gonad cell produces two equal groups of gametes, equal in number and complementary in their chromosome patterns. One group produces male zygotes; the other, females. The female producers have the larger heads; the males are more agile. We can separate them easily.

If given a group of gametes from one male cell, then we may examine in minute detail the group producing the sex we do *not* want in this genetic problem. From the chromosome-gene pattern of the group examined we can infer the pattern of the group kept free of the perils of examination.

With female gametes the problem is similar. The ovum is not examined at all. It need not leave its natural environment in the body of the female. The polar bodies, worthless and nonviable in themselves, are examined. Their patterns are either identical with that of their sister cell or complementary. Those that are complementary are more numerous than those identical. The pattern of the ovum may be inferred with exactness.

Half the cards are face up. Therefore, we *know* the value of the cards face down. We can bet—or wait for a better hand.

Romantic writers of the first brave days of genetics dreamed of many fantastic possibilities—test-tube babies, monsters formed by artificial mutation, fatherless babies, babies assembled piece by bit from a hundred different parents. All these horrors are possible, as the geneticists of the Great Khans taught us to our sorrow, but we citizens of this republic have rejected such blind tampering with our life stream. Infants born with the assistance of the neo-Ortega-Martin gene selection technique are normal babies, stemming from normal germ plasm, born of normal women, in the usual fashion.

They differ in one respect only from their racial predecessors: They are the *best* babies their parents can produce!

IV.

Monroe-Alpha called for his ortho-wife again the next evening. She looked up and smiled as he came into her apartment. "Two nights running," she said. "Clifford, you'll have me thinking you are courting me."

"I thought you wanted to go to this party," he said woodenly.

"I do, my dear. And I appreciate your taking me. Half a minute, while I gown." She got up and slipped out of the room with a slow-seeming, easy glide. Larsen Hazel had been a popular dancing star in her day, both record and beamcast. She had wisely decided to retire rather than fight it out with younger women. She was now just thirty, two years younger than her spouse.

"All ready," she announced after an interval hardly longer than her promise mentioned.

He could have commented on her costume at that moment. It deserved comment. Not only did it do things with respect to her laudable figure, but its color, a live mermaid green, harmonized

with her hair and with her sandals, her hair ornaments and her costume clips. They all were of the same dull gold as the skin-tight metallic habit he had chosen.

He should at least have noticed that she had considered what he was wearing in selecting her apparel. Instead he answered: "Fine. We'll be right on time."

"It's a new gown, Clifford."

"It's very pretty," he answered agreeably. "Shall we go?"

"Yes, surely."

He said very little during the ride, but watched the traffic as if the little car were not perfectly capable of finding its way through the swarming traffic without his supervision. When the car finally growled to a stop at the top floor of an outlying residence warren he started to raise the shell, but she put a hand on his arm. "Let it be, for a moment, Clifford. Can we talk for a little before we get lost in a swarm of people?"

"Why, surely. Is something the matter?"

"Nothing—and everything. Clifford my dear—there's no need for us to go on as we have been going."

"Huh? What do you mean?"

"You know what I mean if you stop to think about it. I'm not necessary to you any more—am I?"

"Why . . . uh . . . Hazel, I don't know why you should say a thing like that. You've been swell. You're a swell girl, Hazel. Nobody could ask for anything more."

"Mm-m-m— That's as may be. I don't have any secret vices and I've never done you any harm that I know of. But that's not what I mean. You don't get any pleasure out of my company any more—any *lift.*"

"Uh . . . that's not so. I couldn't ask for any better pal than you've been. We've never had any argu—"

She checked him with her hand. "You still don't understand me. It might be better if we did quarrel a little. I'd have a better idea of what goes on behind those big solemn eyes of yours. You don't dislike me. In fact, I think you like me as well as you like anybody. You even like to be with me, sometimes, if you're tired and I happen to fit your mood. But that isn't enough. And I'm fond enough of you to be concerned about you, darling. You need something more than I've been able to give you."

"I don't know how any woman could do any more than you've done for me."

"I do. I do, because I was once able to do it. Do you remember when we first registered? I gave you a lift then. You were happy. It made me happy, too. You were so pathetically pleased with me and with everything about me that sometimes I could cry, just to look at you."

"I haven't stopped being pleased with you."

"Not consciously. But I think I know what has happened."

"What?"

"I was still dancing then. I was the great Hazel, *première danseuse.* I was everything you had never been. Glamour and bright lights and music. I remember how you used to call for me after a performance, looking so proud and so glad to see me. And I was so impressed by your intellect—I still am, dear—and I was so flattered that you paid attention to me."

"Why, you could have had your pick of all the braves in the country."

"They didn't look at me the way you did. But that isn't the point. I'm not really glamorous and never was. I was just a workinggirl, doing the job she could do best. Now the lights are out and the music has stopped and I'm no longer any help to you."

"Don't say that, kid."

She placed a hand on his arm. "Be honest with yourself, Cliff. My feelings aren't hurt. I'm not a romantic person. My feelings have always been maternal, rather than anything else. You're my baby. You aren't happy and I want you to be happy."

He shrugged helplessly. "What is there to do about it? Even if everything you say is true, what is there to do?"

"I could make a guess. Somewhere there is a girl who is everything you thought I was. Someone who can do for you what I once did, by just being herself."

"Hunnh! I don't know where I'd find her. There isn't any such person. No, kid, the trouble is with me, not with you. I'm a skeleton at the feast. I'm morose by nature. That's that."

"Hunnh right back at you. You haven't found her because you haven't been looking for her. You've fallen into a rut, Cliff. Tuesdays and Fridays, dinner with Hazel. Mondays and Thursdays, work out at the gymnasium. Week ends, go to the country and soak up some natural vitamin-D. You need to be shaken out of that. I'm going down tomorrow and register a consent."

"You wouldn't really!"

"I certainly shall. Then, if you find someone who pleases your fancy, you can confirm it without any delay."

"But Hazel, I don't *want* you to turn me loose."

"I'm not turning you loose. I'm just trying to encourage you to have a roving eye. You can come to see me whenever you like, even if you remarry. But no more of this Tuesday-and-Friday stuff. That's out. Try phoning me in the middle of the night, or duck out of your sacred office during working hours."

"Hazel, you really don't *want* me to go chasing after other women, do you?"

She took his chin in her hand. "Clifford, you are a big, sweet dope. You know all there is to know about mathematics, but what you don't know about women would fill reels." She kissed him. "Relax. Mamma knows best."

"But—"

"The party waits."

He raised the shell of the car. They got out and went on in.

The town house of Johnson-Smith Estaire occupied the entire top platform of the warren. It was a conspicuous example of conspicuous waste. The living quarters—that great pile of curiously assembled building materials could hardly be called a home—occupied perhaps a third of the space, the rest was given over to gardens, both open and covered. Her husband's ridiculously large income was derived from automatic furniture; it was her fancy to have her house display no apparent evidence of machine domination.

So it was that real, live servants offered to take their wraps—they had none—and escorted them to the foot of the broad flight of stairs at the top of which the hostess was greeting her guests. She extended both arms as Clifford and Hazel approached.

"My dear!" she bubbled to Hazel. "So gentle of you to come! And your brilliant husband." She turned to her guest of honor, standing at her side. "Dr. Thorgsen, these are two of my *dearest* friends. Larsen Hazel—such a clever little person, really. And Master Monroe-Alpha Clifford. He does things about money at the Department of Finance. Dreadfully intricate. I'm sure you would understand it—I don't."

Thorgsen managed to frown and smile simultaneously. "*The* Larsen Hazel? But you are—I recognize you. Will you be dancing for us tonight?"

"I no longer dance."

"What a pity! That is the first unfavorable change I've found on Earth. I've been away ten years."

"You've been on Pluto. How fares it there, doctor?"

"Chilly." He repeated his somewhat frightening mixed expression. Clifford caught his eye and bowed deeply. "I am honored, learned sir."

"Don't let it— I mean, not at all. Or something like that. Damn it, sir. I'm not used to all this fancy politeness. Forgotten how to do it. We have a communal colony, you know. No weapons."

Monroe-Alpha had noticed with surprise that Thorgsen was unarmed and brassarded, yet he carried himself with the easy arrogance of an armed citizen, sure of his position. "The life must be quite different," he offered.

"It is. It is. Nothing like this. Work, a little gossip, bed, and back to work again. You're in finance, eh? What sort of thing?"

"I compute the reinvestment problem."

"That? Now I know who you are. We heard of your refinement of the general solution—even out on Pluto. High computation, that. Makes our little stereo-parallax puzzles look fiddlin'."

"I would hardly say so."

"I would. Perhaps we can find a chance to talk later. You could give me some advice."

"I would be honored."

Several late comers were waiting in line. Hazel could see that their hostess was becoming impatient. They moved on. "Enjoy yourselves, my dears," she invited them. "There are, well, things—" She waved vaguely.

There were indeed "things." Two theaters were available, one of which was giving a continuous performance of all the latest and smartest stereo-reels, the other provided the current spot news for anyone who could not relax without knowing what was going on out of his sight. There were gaming rooms, of course, and dozens of little snuggeries where small groups or couples could enjoy each other's company *tête-à-tête*. A currently popular deceiver circulated through the crowd, displaying his jests and deceptions and sophisticated legerdemain to any who cared to watch.

Food and drink in lavish variety, quality and quantity were available everywhere.

The sweeping tesselated ballroom floor was lightly filled. Pattern dancing would come later. The huge room faced, with no wall intervening, into one of the covered gardens, unlighted save for lights below the surface of numerous rocky little pools. The other side of the ballroom was limited by the transparent wall of the swimming bath, the surface of which was on the floor above. In addition to ornate decoration and moving, colored lights on the water side of the crystal wall, the swimmers themselves, by virtue of the inescapable gracefulness of underwater movement, gave life and harmony to that side of the room.

Clifford and Hazel seated themselves at that wall and leaned against the glass. "Shall we dance?" he asked.

"No, not just yet." A girl, swimming on the other side of the wall, glided down toward them and blew bubbles against the glass. Hazel followed the girl's nose with her forefinger, tracing against the glass. The swimmer grinned, she smiled back. "I think I'd like a dip, if you don't mind."

"Not at all."

"Join me?"

"No, thanks."

After she had gone he wandered around aimlessly for a few minutes. The recreations at hand

left him cold; he was searching half-heartedly for a niche in which he could be alone to nurse his melancholy and, perhaps, a drink as well. But couples—not melancholy!—had had the same idea; the smaller hideaways were populated. He gave up and entered a medium-sized lounge, already occupied by a stag group of half a dozen or so. They were engaged in the ancient sport of liquidating world problems in liquid.

He hesitated at the door, elevated his brows in query, received casual gracious consent from one who caught his eye, came on in and found a seat. The hot-air session went on.

"Suppose they do release the field?" one of the men present was saying. "What will it amount to? What will it contain? Some artifacts possibly, perhaps some records of the period in which it was set up. But nothing more than that. The notion that life could be preserved in it, unchanged, in absolute stasis, for several centuries, is preposterous."

"How do you know? It's certain that they thought they had found a way of suspending, uh, shall we say *freezing* entropy. The instructions with the field are perfectly plain."

Monroe-Alpha began to understand what they were talking about. It was the so-called Adirondack stasis field. It had been a three-day wonder when it was discovered, a generation earlier, in a remote part of the mountains from which it got its name. Not that the field itself was spectacular —it was simply an impenetrable area of total reflection, a cubical mirror. Perhaps not impenetrable, for no real effort had been made to penetrate it—because of the plaque of instructions found with it.

The plaque stated quite simply that the field contained living specimens of the year 1926—old style, of course—which could be released by the means given below—but there was nothing below.

Since the field had not been passed down in the custody of recognized institutions, there was a strong tendency to regard the whole matter as a hoax. Nevertheless, attempts had been made to guess the secret of that blank plaque.

Monroe-Alpha had heard that it had at last been read, but he had not paid much attention. The newscasts were always full of wonders which amounted to little in the long run. He did not even recall how the inscription had been read—a reflected image, using polarized light, or something equally trivial.

"That isn't the matter of real interest," spoke up a third man. "Let us consider the purely intellectual problem of the hypothetical man who might thus be passed down to us, out of the Dark Ages." He was a slender, youngish man—in his late twenties, Clifford judged—and dressed in a turquoise blue satin which brought out the pallor of his face. He spoke with slow intensity. "What would he think of this world in which he suddenly finds himself? What have we to offer him in exchange for that which he has left behind?"

"What have we to offer him? Everything! Look around you."

The young man answered with a superior smile. "Yes—look around you. Gadgets—but what need has he for gadgets? He comes from an earlier, braver world. A world of independence and dignity. Each man tilled his own plot of ground with his woman by his side. He raised his own children, straight and strong, and taught them to wrest their food from Mother Earth. He had no artificial lights, but he had no need for them. He was up with the dawn and busy with his serious, fundamental affairs. At sundown he was tired and welcomed the rest of night. If his body was sweaty and dusty with honest labor, he took a dip in his own brook. He needed no fancy swimming baths. He was based, rock solid, on primitive essentials."

"And you think he actually *liked* that better than modern comforts."

"I certainly do. Those men were happy. They lived naturally, as the Great Egg intended they should."

Monroe-Alpha turned the idea over in his mind. There was something devilishly appealing about it. He felt, quite sincerely, that he cared nothing for gadgets. Not even for his master accumulator. It was not the machine he cared about, but the mathematical principles involved. And since when did a mathematician need any tools but his own head? Pythagoras had done well enough with a stick and a stretch of sand. As for other matters, if he and Hazel were partners in the old, old fight to win a living from the eternal soil, would they have drifted apart?

He closed his eyes and visualized himself back in the simple, golden days of 1926. He was dressed in homespun, woven by his wife's capable hands—or even in the skins of animals, cured on their cabin door. There would be children somewhere about—three he thought. When the day's work was over, he would walk to the top of the hill with his oldest son, and show him the beauty of the sunset. When the stars came out he would explain to him the intricate wonders of astronomy. Wisdom would be passed down from father to son, as it had been.

There would be neighbors—strong, silent men, whose curt nod and hard handclasp meant more than the casual associations of modern "civilization."

There were others present who did not accept the thesis as readily as Monroe-Alpha. The argument was batted back and forth until it grew somewhat acrimonious. The young man who had started it—Gerald seemed to be his name—got up

and asked the company to excuse him. He seemed slightly miffed at the reception his ideas had gotten.

Monroe-Alpha arose quickly and followed him out of the room. "Excuse me, gentle sir."

Gerald paused. "Yes?"

"Your ideas interest me. Will you grant me the boon of further conversation?"

"Gladly. You do me honor, sir."

"The benefit is mine. Shall we find a spot and sit?"

"With pleasure."

Hamilton Felix showed up at the party somewhat late. His credit account was such that he rated an invitation to any of Johnson-Smith Estaire's grand levees, although she did not like him—his remarks confused her; she more than half suspected the amused contempt he had for her.

Hamilton was troubled by no gentlemanly scruples which might have kept him from accepting hospitality under the circumstances. Estaire's parties swarmed with people in amusing combinations. Possessing no special talents of her own, she nevertheless had the knack of inducing brilliant and interesting persons to come to her functions. Hamilton liked that.

In any case there were always swarms of people present. People were always funny—the more, the merrier!

He ran across his friend Monroe-Alpha almost at once, walking in company with some young fellow dressed in a blue that did not suit his skin. He touched his shoulder. "Hi, Cliff."

"Oh—hello, Felix."

"Busy?"

"At the moment, yes. A little later?"

"Spare me a second. Do you see that bucko leaning against a pillar over there? Now—he's looking this way."

"What about him?"

"I think I should recognize him, but I don't."

"I do. Unless I am misled by a close resemblance, he was in the party of the man you burned last night."

"Sooo! Now that's interesting."

"Try to stay out of trouble, Felix."

"Don't worry. I wouldn't stain my hostess' pretty floors. Thanks, Cliff."

"Not at all."

They moved on, left Hamilton watching the chap he had inquired about. The man evidently became aware that he was being watched, for he left his place and came directly to Hamilton. He paused a ceremonious three paces away and said, "I come in friendship, gentle sir."

"'The House of Hospitality incloses none but friends,'" Hamilton quoted formally.

"You are kind, sir. My name is McFee Norbert."

"Thank you. I hight Hamilton Felix."

"Yes, I know."

Hamilton suddenly changed his manner. "Ah! Did your friend know that when he chopped at me?"

McFee glanced quickly to the right and left, as if to see whether or not the remark had been overheard. It was obvious that he did not like the tack. "Softly, sir. Softly," he protested. "I tell you I come in friendship. That was a mistake, a regrettable mistake. His quarrel was with another."

"So? Then why did he challenge *me?*"

"It was a mistake, I tell you. I am deeply sorry."

"See here," said Hamilton. "Is this procedure? If he made an honest error, why does he not come to me like a man? I'll receive him in peace."

"He is not able to."

"Why? I did no more than wing him."

"Nevertheless, he is not able to. I assure you he has been—disciplined."

Hamilton looked at him sharply. "You say 'disciplined'—and he is not able to meet with me. Is he—perhaps—so 'disciplined' that he must tryst with a mortician instead?"

The other hesitated a moment. "May we speak privately—under the rose?"

"There is more here than shows above water. I don't like the rose, my friend Norbert."

McFee shrugged. "I am sorry."

Hamilton considered the matter. After all, why not? The set-up looked amusing. He hooked an arm in McFee's. "Let it be under the rose, then. Where shall we talk?"

McFee filled his glass again. "You have admitted, Friend Felix, that you are not wholly in sympathy with the ridiculous genetic policy of our so-called culture. We knew that."

"How?"

"Does it matter? We have our—ways. I know you to be a man of courage and ability, ready for anything. Would you like to put your resources to work on a really worth-while project, worthy of a man?"

"I would need to know what the project is."

"Naturally. Let me say—no, perhaps it is just as well not to say anything. Why should I burden you with secrets?"

Hamilton refused the gambit. He just sat. McFee waited, then added, "Can I trust you, my friend?"

"If you can't, then what is my assurance worth?"

The intensity of McFee's deep-set eyes relaxed a little for the first time. He almost smiled. "You have me. Well—I fancy myself a good judge of men. I choose to trust you. Remember, this is still under the rose. Can you conceive of a program, scientifically planned to give us the utmost from the knowledge we have, which would not be

inhibited by the silly rules under which our official geneticists work?"

"I can conceive of such a program, yes."

"Backed by tough-minded men, men capable of thinking for themselves?"

Hamilton nodded. He still wondered what this brave was driving at, but he had decided to see the game through.

"There isn't much more I can say—here," McFee concluded. "You know where the Hall of the Wolf is?"

"Certainly."

"You are a member?"

Hamilton nodded. Everybody, or almost everybody, belonged to the Ancient Benevolent and Fraternal Order of the Wolf. He did not enter the portals once in six months, but it was convenient to have a place to rendezvous in a strange city. The order was about as exclusive as a rainstorm.

"Good. Can you meet me there, later tonight?"

"I could."

"There's a room there where some of my friends sometimes gather. Don't bother to inquire at the desk—it's in the Hall of Romulus and Remus, directly opposite the escalator. Shall we say at two hundred?"

"Make it half past two."

"As you wish."

Monroe-Alpha Clifford saw her first during the grand promenade. He could not have told truthfully why she caught his eye. She was beautiful, no doubt, but beauty alone is, of course, no special mark of distinction among girls. They cannot help being beautiful, any more than can a Persian cat, or a Luna moth, or a fine race horse.

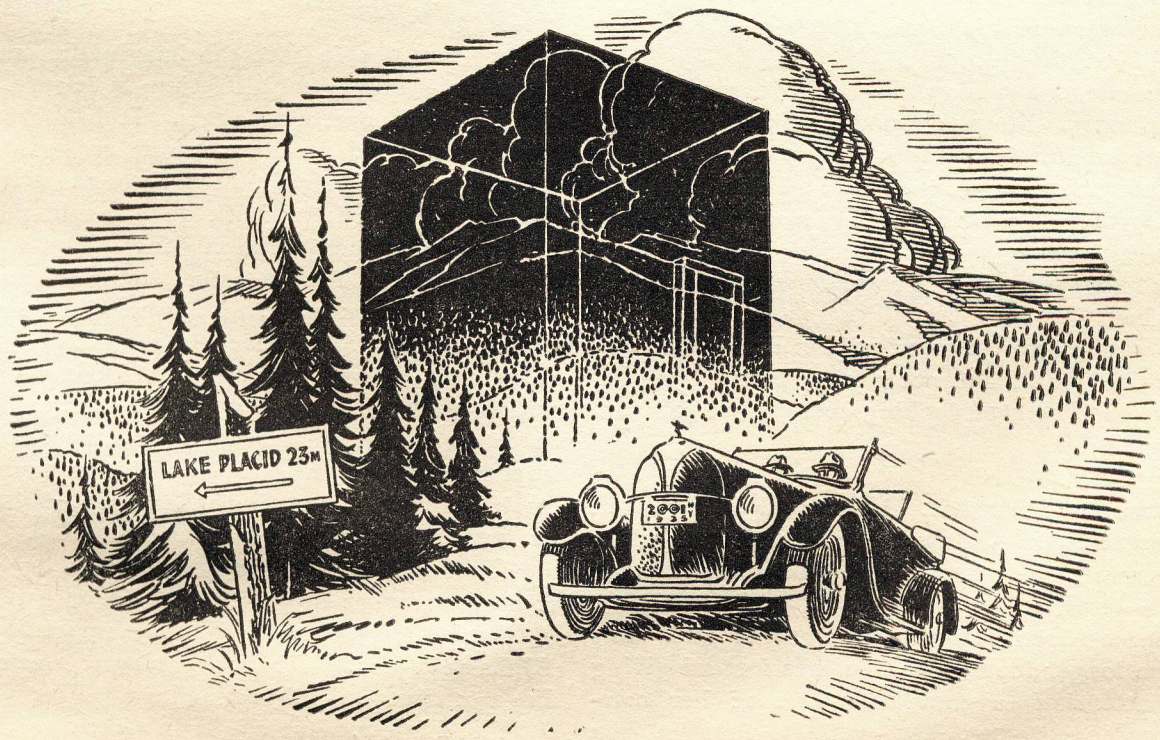
What she did possess is less easy to tag. Perhaps it will do to state simply but inadequately that, when Monroe-Alpha caught sight of her, he forgot about the delightful and intriguing conversation he had been having with Gerald, he forgot that he did not care much for dancing and had been roped into taking part in the promenade only through his inadvertent presence in the ballroom when the figure was announced, he forgot his own consuming melancholy.

He was not fully aware of all this. He was only aware that he had taken a second look and that he thereafter spent the entire dance trying to keep track of her. As a result of which he danced even more badly than usual. He was forced to apologize to his temporary partners more than once for his awkwardness.

But he continued to be awkward, for he was trying to work out in his head the problem of whether or not the figures of the dance would bring them together, make them partners for an interval. If he had been confronted with the question as an abstract problem— Given: The choreographic score of the dance. Required: Will Unit A and Unit B ever come in contact?—had it been stated thus, he could have worked out the answer almost intuitively, had he considered it worthy of his talents.

To attempt to solve it after the dynamic had commenced, when he himself was one of the variables, was another matter. Had he been in the second couple? Or the ninth?

He had decided that the dance would *not* bring



them together, and was trying to figure out some way to fudge—to exchange positions with another male dancer—when the dance did bring them together.

He felt her fingertips in his. Then her weight was cradled against his hand as he swung her by the waist. He was dancing lightly, beautifully, ecstatically. He was outdoing himself—he could feel it.

Fortunately, she landed on top.

Because of that fact he could not even help her to her feet. She scrambled up and attempted to help *him*. He started laboriously to frame his apology in the most abjectly formal terms he could manage when he realized that she was laughing. "Forget it," she interrupted him. "It was fun. We'll practice that step on the quiet. It will be a sensation."

"Most gracious madame—" he began again.

"The dance—" she said. "We'll be lost." She slipped away through the crowd, found her place.

Monroe-Alpha was too demoralized by the incident to attempt to find his proper place. He slunk away, too concerned with his own thalamic whirlwind to worry over the gaucherie he was committing in leaving a figure dance before the finale.

He located her again, after the dance, but she was in the midst of a group of people, all strangers to him. A dextrous young gallant could have improvised a dozen dodges on the spot whereby the lady could have been approached. He had no such talent. He wished fervently that his friend Hamilton would show up in the crowd—Hamilton would know what to do. Hamilton was resourceful in such matters. People never scared him.

She was laughing about something. Two or three of the braves around her laughed, too. One of them glanced his way. Damn it—were they laughing at *him?*

Then *she* looked his way. Her eyes were warm and friendly. No, she was not laughing at him. He felt for an instant that he knew her, that he had known her for a long time, and that she was inviting him, as plain as speech, to come join her. There was nothing coquettish about her gaze. Nor was it tomboyish. It was easy, honest and entirely feminine.

He might have screwed up his courage to approach her then, had not a hand been placed on his arm. "I've been looking everywhere for you, young fellow."

It was Dr. Thorgsen. Monroe-Alpha managed to stammer, "Uh— How do you fare, learned sir?"

"As usual. You aren't busy, are you? Can we have a gab?"

Monroe-Alpha glanced back at the girl. She was no longer looking at him, was instead giving rapt attention to something one of her companions was saying. Oh, well, he thought, you can't expect a girl to regard being tumbled on a dance floor as the equivalent of a formal introduction. He would look up his hostess later and get her to introduce them. "I'm not busy," he acknowledged. "Where shall we go?"

"Let's find some place where we can distribute the strain equally on all parts," Thorgsen boomed. "I'll snag a pitcher of drinks.

"I see by this morning's news that your department announces another increase in the dividend," he commenced.

"Yes," Monroe-Alpha agreed, a little mystified. There was nothing startling in an increase in the productivity of the culture. The reverse would have been news; an increase was routine.

"I suppose there is an undistributed surplus?"

"Of course. There always is." It was a truism that the principal routine activity of the Policy Board was to find suitable means to distribute the new currency made necessary by the ever-increasing productive capital investment. The simplest way was by the direct issue of debt-free credit—fiat money—to the citizens directly, or indirectly in the form of a subsidized discount on retail sales. The indirect method permitted a non-coercive control against inflation of price symbols. The direct method raised wages by decreasing the incentive to work for wages. Both methods helped to insure that goods produced would be bought and consumed and thereby helped to balance the books of every businessman in the hemisphere.

But man is a working animal. He *likes* to work. And his work is infernally productive. Even if he is bribed to stay out of the labor market and out of production by a fat monthly dividend check, he is quite likely to spend his spare time working out some gadget which will displace labor and increase productivity.

Very few people have the imagination and the temperament to spend a lifetime in leisure. The itch to work overtakes them. It behooved the planners to find as many means as possible to distribute purchasing power through wages in spheres in which the work done would not add to the flood of consumption goods. But there is a reasonable, if not an actual, limit to the construction, for example, of nonproductive public works. Subsidizing scientific research is an obvious way to use up credit, but one, however, which only postpones the problem, for scientific research, no matter how "pure" and useless it may appear to be, has an annoying habit of paying for itself many times over, in the long run, in the form of greatly increased productivity.

"The surplus," Thorgsen went on, "have they figured out what they intend to do with it?"

"Not entirely, I am reasonably sure," Monroe-Alpha told him. "I haven't given it much heed. I'm a computer, you know, not a planner."

"Yes, I know. But you're in closer touch with

these planning chappies than I am. Now I've got a little project in my mind which I'd like the Policy Board to pay for. If you'll listen, I'd like to tell you about it and, I hope, get your help in putting it over."

"Why don't you take it up with the Board directly?" Monroe-Alpha suggested. "I have no vote in the matter."

"No, but you know the ins and outs of the Board and I don't. Besides, I think you can appreciate the beauty of the project. Offhand, it's pretty expensive and quite useless."

"That's no handicap."

"Huh? I thought a project had to be useful?"

"Not at all. It has to be worth while and that generally means that it has to be of benefit to the whole population. But it should not be useful in an economic sense."

"Hm-m-m. I'm afraid this one won't benefit anybody."

"That is not necessarily a drawback. 'Worth while' is an elastic term. But what is it?"

Thorgsen hesitated a moment before replying. "You've seen the ballistic planetarium at Buenos Aires?"

"No, I haven't. I know about it, of course."

"It's a beautiful thing! Think of it, man—a machine which will calculate the position of any body in the Solar System, at any time, past or future, and give results accurate to seven places."

"It's nice," Monroe-Alpha agreed. "The basic problem is elementary, of course." It was—to him. To a man who dealt in the maddeningly erratic variables of socio-economic problems, in which an unpredictable whim of fashion could upset a carefully estimated prediction, a little problem involving a primary, nine planets, a couple of dozen satellites, and a few hundred major planetoids, all operating under a single invariable rule, was just that—elementary. It might be a little complex to set up, but it involved no real mental labor.

"Elementary!" Thorgsen seemed almost offended. "Oh, well, have it your own way. But what would you think of a machine to do the same thing for the entire physical universe?"

"Eh? I'd think it was fantastic."

"So it would be—now. But suppose we attempted to do it for this galactic island only."

"Still fantastic. The variables would be of the order of three times ten to the tenth, would they not?"

"Yes. But why not? If we had time enough—and money enough. Here is all I propose," he said earnestly. "Suppose we start with the few thousand masses on which we now have accurate vector values. We would assume straight-line motion for the original set-up. With the stations we now have on Pluto, Neptune and Titan, we could start checking at once. Later on, as the machine was revised, we could include some sort of empirical treatment of the edge effect—the limit of our field, I mean. The field would be approximately a prolate ellipsoid."

"Double prolation, wouldn't it be, including parallax shown by our own stellar drift?"

"Yes, yes. That would become important."

"I suppose you will include the Solar Phoenix devolution?"

"Huh?"

"Why, I should think that was obvious. You'll type the stars, won't you? The progression of the hydrogen-helium transformation in each body is certainly a key datum."

"Brother, you're way ahead of me. I was thinking only of master ballistic solution?"

"Why stop with that? When setting up a structural analogue why not make the symbolic mechanism as similar to the process as possible?"

"Sure, sure. You're right. I just wasn't that ambitious. I was willing to sell out for less. Tell me—d'you think the Board would go for it?"

"Why not? It's worth while, it's very expensive, it will run on for years, and it doesn't show any prospect of being economically productive. I would say it was tailor-made for subsidy."

"It does me good to hear you say so."

They made a date for the following day.

As soon as he could gracefully do so, Monroe-Alpha excused himself from Thorgsen and went back to where he had last seen the girl. She was no longer there. He spent more than an hour looking for her, and was finally forced to the conclusion that she had left the party, or had hidden herself very cleverly. She was not in the swimming bath, or, if she were, she was capable of remaining under water longer than ten minutes. She was not in any of the accessible rooms—he had risked his life quite unconscious, so thoroughly had he searched the dark corners.

He intended to tell Hazel of the incident on the way to her home, but could not find the words. What was there to tell, really? He had seen an attractive girl, and had managed to trip her by his clumsiness. What was there in that? He did not even know her name. And it did not, somehow, seem like just the evening to speak to Hazel of other women. Good old Hazel!

She noticed his preoccupation, noticed that it differed in character from his earlier glumness. "Enjoy yourself, Clifford?"

"I think so. Yes."

"Meet any attractive girls?"

"Why, uh, yes. Several."

"That's nice."

"See here, Hazel—you don't intend to go through with this silly divorce business, do you?"

"I do."

One might think that he lay awake that night,

filled with romantic thoughts of the nameless beauty. One would be wrong. He did think of her, but only for long enough to work out a suitable face-rehabilitating daydream, one in which he made killingly witty remarks anent his own awkwardness to which she responded with proper appreciation. It had not even been necessary to bulldoze any of the braves who surrounded her. They, too, had applauded his wit.

Nor did he think long of Hazel. If she saw fit to break the contract, that was her business. Not that there was any sense to it—it did not occur to him that anything could greatly change their relationship. But he would stop this twice-a-week dine-and-visit. A woman appreciated a few surprises, he supposed.

All this was simply to clear the circuits for the serious getting-to-sleep thoughts. Thorgsen's proposal. A really pretty problem, that. A nice problem—

Hamilton Felix had a much busier night. So busy that he had much on his mind at breakfast the next morning. Decisions to make, matters to evaluate. He did not even turn on the news, and, when the annunciator informed him that a visitor waited outside his door, he punched the "welcome" key absent-mindedly, without stopping to consider whether he really wished to see anyone. Some woman, he had noticed, from the mug plate. His thoughts went no further.

She came in and perched herself on the arm of a chair, one leg swinging. "Well," she said, "good morning, Hamilton Felix!"

He looked at her in puzzlement. "Do we know each other?"

"Noooo," she said calmly, "but we will. I thought it was about time I looked you over."

"I know!" He stabbed the air with a forefinger. "You are the woman Mordan picked for me!"

"That's right. Of course."

"Why, damn your impudence! What the devil do you mean by invading my privacy like this?"

"Tut! Tut! Tut! Mamma spank. Is that any way to talk to the future mother of your children?"

"Mother of my fiddlesticks! If I needed anything to convince me that I want to have nothing to do with the scheme, you have given it to me. If I ever do have children, it won't be by you!"

She was dressed in shorts and a boyish corselet. In defiance of usual custom for her sex she wore, belted to her side, a hand weapon, small but deadly. She stood up at his words, and rested her hands on her hips. "What's wrong with me?" she said slowly.

"Hunh! What's wrong with you! What isn't wrong with you? I know your type. You're one of these 'independent' women, anxious to claim all the privileges of men, but none of the responsibilities. I can just see you, swaggering around town with that damned little spit gun at your side, demanding all the rights of an armed citizen, picking fights in the serene knowledge that no brave will call your bluff. *Arrgh!* You make me sick!"

She remained still, but her face was cold. "You are a shrewd judge of character, aren't you? Now you listen to me for a while. I haven't drawn this gun, except in practice, for years. I don't go around insisting on privileges and I am just as punctiliously polite as the next brave."

"Then why do you wear it?"

"Is there anything wrong with a woman prefering the dignity of an armed citizen? I don't like to be coddled and I don't like to be treated like a minor child. So I waive immunity and claim my right—I go armed. What's wrong with that?"

"Nothing—if that were really the case. Which it isn't. You give the lie to your own words by the fashion in which you broke in on me. A man couldn't get away with it."

"So! So? Let me remind you, you ill-mannered oaf, that you signaled 'welcome' and let me in. You did not have to. Once inside, before I could say yes, no or maybe, you started to snarl at me."

"But—"

"Never mind! You think you have a grievance. I said I hadn't drawn this gun in years—that doesn't mean I'm not ready to! I'm going to give you a chance, my fine bucko boy, to work out that grievance. Belt on your gun."

"Don't be silly."

"Strap on your gun! Or, so help me, I'll take it away from you and hang it in the Square."

Instead of answering he moved toward her. She gripped her weapon, half drew it. "Stand back! Stand back, or I'll burn you."

He checked himself and looked at her face. "Great Egg!" he said delightedly. "I believe you would. I honestly believe you would."

"Of course I would."

"That," he admitted, "puts a different face on things, doesn't it?" He eased back a step, as if to parley. She relaxed a trifle, and removed her fist from the grip of the weapon.

He lunged forward, low, tackling her around the knees. They rolled on the floor, tussled briefly. When events slowed down a little, it could be seen that he had her right wrist grasped firmly, as firmly, indeed, as her right hand gripped her gun.

He banged her knuckles hard against the polished floor, grabbed the shank of the weapon with his other hand and broke it out of her grasp. Still grasping her wrist, he struggled to his knees and moved away from the spot, half dragging her behind him. He ignored the minor violences that were happening to his person in the process. When he was within reach he chucked her gun in the oubliette and turned his attention back to her.

Heedless of her struggles he picked her up and carried her to a large chair where he seated himself with her on his lap. He pinned her legs between his knees, forced her arms behind her back until he managed to get both her wrists in one of his fists.

She bit him in the process.

With her thus effectively immobilized, he settled back, holding her away from him, and looked at her face. "Now we can talk," he said cheerily. He measured her face with his eye, and slapped her once, not too hard, but with plenty of sting in it. "That's for biting. Don't do it again."

"Let me go."

"Be reasonable. If you look closely, you will see that I am nearly forty kilos heavier than you are, and a lot taller. You are tough and strong—I've got to hand it to you—but I'm a hell of a sight stronger and tougher. What you want doesn't matter."

"What do you intend to do with me?"

"Talk to you. Yes, and I think I'll kiss you."

She answered this by giving a brief but entirely futile imitation of a small cyclone, with wild-cat overtones. When it was over he said, "Put your face up."

She did not. He took a handful of hair and snapped her head back. "No biting," he warned, "or I'll beat the holy hell out of you."

She did not bite him, but she did not help with the kiss, either. "That," he observed conversationally, "was practically a waste of time. You 'independent' girls don't know anything about the art."

"What's wrong with the way I kiss?" she said darkly.

"Everything. I'd as leave kiss a twelve-year-old."

"I can kiss all right if I want to."

"I doubt it. I doubt if you've ever been kissed before. Men seldom make passes at girls that wear guns."

"That's not true."

"Caught you on the raw, didn't I? But it is true and you know it. See here—I'll give you a chance to prove I'm wrong, and then we'll talk about letting you go."

"You're hurting my arm."

"Well—"

This kiss was longer than the first one, about eight times as long. Hamilton released her, drew his breath, and said nothing.

"Well?"

"Young lady," he said slowly, "I've misjudged you. Twice, I've misjudged you."

"Will you let me go now?"

"Let you go? That last deserves an encore."

"That's not fair."

"My lady," he said quite seriously, "'fair' is a purely abstract concept. By the way, what is your name?"

"Longcourt Phyllis. You're changing the subject."

"How about the encore?"

"Oh, well!" He relaxed his hold on her completely. None the less, it was as long and as breath-consuming as the last. At its conclusion she had a hand through his hair, mussing it. "You heel," she said. "You dirty heel!"

"From you, Phyllis, that's a compliment. How about a drink?"

"I could use one."

He made a ceremony of selecting the liquor, fetching glasses, and pouring. He paused with his glass in the air. "Shall we pledge peace?"

She checked her own glass before it reached her mouth. "At this point? I think not. I want to catch you armed."

"Oh, come now. You fought valiantly and were licked with honor. To be sure I slapped you, but you bit me. It's even."

"How about the kisses?"

He grinned. "That was an even exchange. Don't be stuffy. I don't want you hunting me down. Come on. Peace, and let bygones be bygones." He raised his glass a trifle.

He caught her eye and she smiled in spite of herself. "All right—peace."

"Have another drink?"

"No, thanks. I've got to go."

"What's the hurry?"

"I really must go. May I have my blazer now?"

He opened the oubliette, reached it, recovered it, and dusted it off. "It's mine, you know. I won it."

"You wouldn't keep it, would you?"

"That's what I mean," he said, "about you armed women just pretending to take a man's part. A man would never ask for his gun back. He would wear a brassard first."

"Are you going to keep it?"

"No, but I wish you wouldn't wear it."

"Why not?"

"Because I want to take you to dinner tonight. I'd feel a fool, escorting an armed woman."

She looked at him. "You're an odd one, Hamilton Felix. Slap a girl around, then ask her to dinner."

"You'll come?"

"Yes, I'll come." She unsnapped her gun belt and tossed it to him. "Tube them back to me. The address is on the name plate."

"Twenty hundred?"

"Or a few minutes after."

"Do you know, Phyllis," he said as he dilated the door for her, "I have a feeling that you and I are going to have lots and lots of fun."

She gave him a slow, sidelong look. "You'll find out!"

V.

I myself am but indifferent honest.
Old folk play.

Hamilton turned away from the door purposefully. There were things to be done, urgent things. That little she-cat Phyllis was diverting, but time's awasting. He stepped to his phone and called Monroe-Alpha. "Cliff? In your office, I see. Stay there." He clicked off without offering explanation.

"Good morning, Felix," Monroe-Alpha said with his usual formality as he ushered him in. "You seemed perturbed. Anything wrong?"

"Not exactly. I want you to do me a favor. Say—what's gotten into you?"

"Me? What do you mean?"

"Yesterday you looked like a six-day corpse. Today you sparkle, you glow. There's a song on your lips and a 'hey, nonny, nonny.' How come?"

"I didn't know that it showed in my face, but it is true that I am feeling somewhat elated."

"Why? Did the money machine declare another dividend?"

"Didn't you see the news this morning?"

"As a matter of fact, no. Why?"

"They opened the Adirondack Stasis?"

"Well?"

"It had a man in it, a live man."

Hamilton's eyebrows crawled up. "That's interesting, if true. But do you mean to tell me the discovery of this human fossil is the cause of your childlike glee?"

"But don't you see it, Felix? Don't you *feel* the significance of it? He's an actual representative out of the golden days when the race was young—back when life was simple and good, before we messed it up with a lot of meaningless complications. Think what he can tell us!"

"Maybe. What year is he from?"

"Uh . . . 1926, on the old scale."

"1926 . . . let's see— I'm no historian, but I didn't know that that period was such glowing Utopia. I had a notion it was pretty primitive."

"That's just what I mean—simple and beautiful. I'm not a historian, either, but I met a chap last night who told me a lot about it. He's made quite a study of it." He launched into an enthusiastic description of Frisby Gerald's concept of life in the early twentieth century.

Hamilton waited for him to run out of breath, then said, "I don't know. I wouldn't know, but it seems to me your gears don't mesh."

"Why?"

"Well, I don't think this present day is everything it might be, but I will say I think it is probably the best set-up the human race has ever managed. No, Cliff, this 'Back-to-the-good-old-days' stuff is the bunk. We get more for less, with less trouble, nowadays, than ever before in history."

"Well, of course," Monroe-Alpha answered tartly, "if you have to have an automaton to rock you to sleep at night—"

"Save it. I can sleep on a pile of rock, if necessary, but I think it foolish to go out of your way to seek discomforts."

Monroe-Alpha did not answer. Hamilton saw that his words had rankled and added, "That was strictly a personal opinion. Maybe you're right. Let's forget it."

"What was the favor you wanted?"

"Oh, yes! Cliff, you know Mordan?"

"The district moderator?"

"The same. I want you to call him up and make a date for him to meet me—I mean, to meet you."

"Why should I want to see him?"

"You don't. I'll keep the date."

"Why all the fancy business?"

"Cliff, don't ask me questions. Do it for me."

Monroe-Alpha still hesitated. "You ask me to do this blind. Is it—everything it should be?"

"Cliff!"

Monroe-Alpha flushed. "Sorry, Felix. I know it's all right if you want it. How shall I get him to agree?"

"Make it insistent enough and he'll be there."

"Where, by the way?"

"At my . . . no, that won't do. Let me use your flat."

"Certainly. What time?"

"Noon."

Mordan came into the flat looking slightly puzzled. He looked still more puzzled and surprised when he saw Hamilton. "Felix! What brings you here?"

"To see you, uh, Claude."

"So? Where is our host?"

"He won't be here. Claude, I arranged this. I had to see you and I couldn't do it openly."

"Really? Why not?"

"Because," Hamilton said succinctly, "there is a spy in your office."

Mordan simply waited.

"Before we go into that," Hamilton went on, "I want to ask you one question: Did you sick Longcourt Phyllis on me?"

Mordan looked apprehensive. "Decidedly not. Have you seen her?"

"Decidedly yes. A sweet little hellcat you picked for me, Claude."

"Don't be too hasty in your judgment, Felix. I admit she is a bit startling, but she is sound, absolutely sound. Her chart is admirable."

"O. K., O. K. To tell the truth I rather enjoyed the encounter. But I wanted to make sure you had not been trying to maneuver me."

"Not at all, Felix."

"Fine. I didn't get you up here just to ask you

that. I said there was a spy in your office. I know that because our private conversation the other day leaked and leaked badly." He plunged into an account of his encounter with McFee Norbert, and his subsequent visit to the Hall of the Wolf. "They call themselves the 'Survivors Club,'" he went on. "Superficially it's a drinking club within the lodge. As a matter of fact, it's the front for a revolutionary clique."

"Go on."

"They picked me as likely material, and I played along with them, more out of curiosity, at first. Presently I found myself in too deep to back out." He paused.

"Yes?"

"I joined up. It seemed healthy to do so. I don't know for sure, but I suspect that I wouldn't have lived very long if I hadn't taken their oath. They are playing for keeps, Claude." He paused for a moment, then continued, "You know that little shooting scrape I got into the other night?"

"Yes, surely."

"I can't prove this, but it's the only explanation that makes sense. They weren't gunning for me; they were gunning for you. You are one of the persons they have to rub out in order to put over their plans."

"What are their plans?"

"I don't know in detail—yet. But the sense of it is this: They've got no use at all for the present genetic policy. Nor for democratic freedom. They want to set up what they call a 'scientific' state, with the 'natural' leaders running things. They are the 'natural' leaders, self-appointed. They have a great contempt for guys like you—synthesists—who help to maintain the present 'backward' state. When they are in control they intend to go all out for biological experimentation. They say that a culture should be an organic whole, with the parts specialized according to function. True men—supermen—sitting on top—that's themselves—and the rest of the population bred to fit requirements."

Mordan smiled slowly. "I seem to have seen all this before."

"Yeah, I know what you mean. The Empire of the Great Khans. They've got an answer for that one. The Khans were fools and did not know what they were up to. These boys know how. This is strictly one-hundred-percent home-grown and any resemblance between it and the policies of the Khans is purely due to your lack of appreciation."

"So—" Mordan said nothing more for a long time. Hamilton became impatient.

"Well?"

"Felix, why do you tell me this?"

"Why? So you can do something about it!"

"Why should you want anything done about it? Wait a moment—please! You told me the other day that life is not worth living, as it is. If you go along with these people, you could make of life anything you want it to be. You could redesign the world to a pattern of your own choosing."

"Hm-m-m! I'd have some opposition. They already have their own plans."

"You could change them. I know you, Felix. In any group, it's a forgone conclusion that you will dominate if you choose to. Not in the first ten minutes, but in the course of time. You must have known that. Why didn't you seize the opportunity?"

"What makes you think I could do anything of the sort?"

"Now, Felix!"

"All right! All right! Suppose I could. But I didn't. Call it patriotism. Call it anything you like."

"As a matter of fact it's because you approve of our culture as it is. Isn't that true?"

"Maybe. In a way. I never did say that I disliked the way things were being run. I just said that I couldn't see any sense to any manner of life, in any final absolute terms." Hamilton was feeling slightly bewildered. He had approached this interview feeling romantically heroic and expecting to be patted on the back for having unmasked the villains. But Mordan failed to get excited at the proper places, and insisted on discussing purely philosophical matters. It threw him off stride. "In any case, I don't want to see those conceited young punks running things. I can't see them building a Utopia."

"I see. Have you any more to tell me? Very well, then—" Mordan began to stir in the fashion of one about to leave.

"Hey, wait a minute!"

"Yes?"

"Look, I— The fact is, since I am already on the inside, I thought I might do a little amateur sleuthing. We could arrange some way for me to report to you, or to someone."

"Oh, so that's it. No, Felix, I could not approve that."

"Why not?"

"Too dangerous for you."

"I don't mind."

"I do. Your life is very valuable, from my professional point of view."

"That? Hell's delight—I thought I made it clear that there is no chance, simply none at all, of me co-operating in the genetic program."

"You did. But as long as you are alive and fertile, I am bound to take into account the possibility that you might change your mind. I can't let you risk your life, therefore."

"Well! How are you going to stop me? You can't coerce me—I know the law."

"No . . . no, it's true that I can't prevent you from risking your valuable life, but I can remove the danger, and shall. The members of the Survivors Club will be picked up at once."

"But, but—look, Claude. If you do that today, you haven't a full case against them. The proper thing to do is to wait until we know all about them. Arresting this one group might mean that a hundred or a thousand others would simply take cover more thoroughly."

"I know that. It's the chance the government will have to take. But we won't risk your germ plasm."

Hamilton stood up, threw out his hands. "Damn it, Claude. This is blackmail. That's what it is—blackmail! It's sheer coercion."

"Not at all. I do not plan to do a thing—to you."

"But it is, just the same."

"Suppose we compromise."

"How?"

"Your life is your own. If you want to lose it, playing Fearless Frank, you may. My interest is in your potentialities as an ancestor. My professional interest, that is. Personally, I like you and prefer that you live a long and happy life. But that's beside the point. If you would deposit in the plasm bank a few million of your gametes, then I would be willing not to interfere."

"But that's just what I was saying! You are trying to blackmail me into co-operating."

"Not so hasty. The life cells you leave with me would not be stirred into being without your consent. They would remain in escrow and you could break the escrow at will—unless you are killed in this adventure. In that case, I will use them to continue the genetic policy."

Hamilton sat down again. "Let's get this straight. You wouldn't touch them, if I don't get knocked over. No tricks?"

"No tricks."

"When it's over, I can withdraw them from deposit. Still no tricks?"

"Still no tricks."

"You wouldn't frame me into a position where I would be darned near certain to be killed, I suppose? No, you wouldn't do that. All right, I agree! I'll bet my own ability to stay alive when the shooting starts against your chance to use my deposit."

When Mordan returned to his office, he sent for his chief technician. He caused her to leave the building with him, found a suitable place where there was no chance of being overheard—a bench in a deserted corner of North Roofpark—and told her of his talk with Hamilton.

"I suppose you told him that all this about the Survivors Club was no news to us."

"No," Mordan said judicially, "no, I can't say that I did. He didn't ask me."

"Hm-m-m. You know, chief, you are as crooked as random incidence curve. A sophist."

"Why, Martha!" Nevertheless his eyes twinkled.

"Oh, I'm not criticizing. You've talked him into a position whereby we stand a much better chance of getting on with the work. Just the same, you did it by letting him think that we didn't already know all about this pipsqueak conspiracy."

"We don't know 'all about it,' Martha. He'll be useful. He has already dug up one significant fact. There is a leak in our own office."

"Um, yes. That's why you dragged me away from the clinic. Well, there'll be some changes made."

"Not too hastily. We'll assume that you can trust any of the women. This scheme, by its nature, is masculine. Women are not a part of it and their interests aren't considered. But be wary of the men on the staff, and don't trust even the women, when you can avoid it. I think you had better handle the deposit of Hamilton's plasm yourself—today."

"I shall. Honest, chief, don't you think you should have told him what he was getting into?"

"You forget that it's not my secret."

"No, I suppose not. Just the same, he's much too good stock to risk in such games. Why do you suppose they recruited him?"

"*He* thinks it's because he's a handy man with a gun and rich as well. But I think you have answered your own question—he's star-line stock. He's good breeding material. The 'Survivors' aren't entirely fools."

"Oh-ho! I hadn't thought of that. Well, I still say it's a shame to risk him in such business."

"Public custodians must not permit themselves the luxury of personal sentimentality, Martha. They have to take the long view."

"Hm-m-m. There is something a little terrifying about a man with too long a view."

VI.

Hamilton Felix discovered that a conspirator can be a busy person, especially if he is also engaged in counter-conspiracy. He tried to present a convincing picture to McFee Norbert and his other associates in the Survivors Club of an enthusiastic neophyte, anxious in every way to promote the cause. Indoctrination classes, dull in themselves but required before advancement in the organization could be expected, took up a good deal of time. He endured these patiently, trying his best to maintain actually the frame of mind of romantic acceptance during instructions, in order that his questions and reactions in general would arouse no suspicion.

In addition to lessons in the principles of the New Order new members were assigned tasks to perform. Since the organization was ruled with an absolute from-the-top-down discipline, the reasons for the tasks were never explained nor were questions permitted. The assigned job might actually have significance to the conspiracy, or it might simply be a test, with every person concerned in the matter actually a brother club member. The recruit had no way of knowing.

Hamilton saw what happened to one candidate who neglected to take the instruction seriously.

He was tried in the presence of the chapter. Attendance on the part of junior members was compulsory. McFee Norbert acted as prosecutor and judge. The accused was not represented by spokesman, but was permitted to explain his actions.

He had been directed to deliver in person a specific message to a specific person. This he had done, but, recognizing the man to whom he had been sent as one he had seen at the club, he had revealed himself. "You had not been told that this man was one in whom you could confide?" McFee persisted.

"No, but he—"

"Answer me?"

"No, I had not been told that."

McFee turned to the company present and smiled thinly. "You will note," he stated, "that the accused had no means whatsoever of knowing the exact status of the man he was to contact. He might have been a brother we suspected and wished to test; he might have been a government operative we had unmasked; the accused might have been misled by a chance resemblance. The accused had no way of knowing. Fortunately the other man was none of these things, but was a loyal brother of superior rank."

He turned back to the accused. "Brother Hornby Willem, stand up." The accused did so. He was unarmed.

"What is the first principle of our doctrines?"

"'The Whole is greater than the parts.'"

"Correct. You will understand, then, why I find it necessary to dispense with you."

"But I didn't—" He got no further. McFee burned him down where he stood.

Hamilton was part of the task group which took the body and spirited it to a deserted corridor, then disposed it so that it would appear to have become deceased in an ordinary private duel, a matter of only statistical interest to the police monitors. McFee commanded the group himself and earned Hamilton's reluctant admiration for the skill with which he handled the ticklish matter. Hamilton won McFee's approval by the intelligent alacrity which he showed in carrying out his orders.

"You are getting ahead fast, Hamilton," he said to him when they had returned to the clubroom. "You'll be up with me soon. By the way, what did you think of the object lesson?"

"I don't see what else you could have done," Hamilton declared. "You can't make an omelet without breaking eggs."

"'You can't make an—' Say, that's a good one!" McFee laughed and dug him in the ribs. "Did you make it up, or hear it somewhere?"

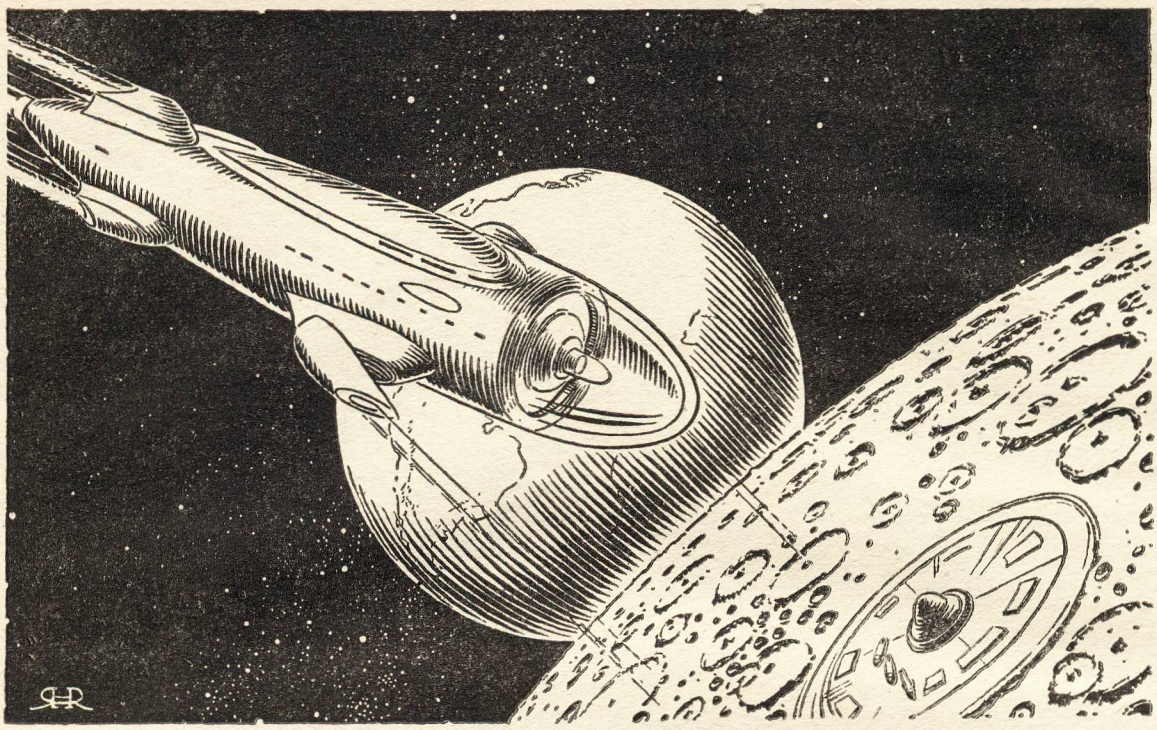
Hamilton shrugged. He promised himself that he would cut off McFee's ears for that dig in the ribs—after all this was over.

He reported the matter in detail, through devious channels, to Mordan, including his own part as an accessory before and after the fact. Getting his reports to Mordan occupied a good portion of his time and thoughts. Neither of his secret lives could be permitted to show above water. His daily conduct had to conform, superficially, with his public *persona;* it was necessary to continue his social life as usual, see his agent when his affairs required it, be seen in public in his habitual manner. It is not necessary to enumerate the varied means by which he found safe channels of communication to Mordan in the midst of this pattern; the methods of intrigue have varied little through the millennia. One example will suffice; Mordan had provided him with a tube address to which—he maintained—messages might be safely sent. Hamilton dared not assume that it was safe to stat a letter over his own telephone, but he could and did assume that a public phone picked at random could be used for dictation recording. The spool containing his report would then be consigned at once to the anonymity of the postal system.

Longcourt Phyllis took up much of his free time. He freely admitted that the woman intrigued him; he did not admit even to himself that she represented anything more than diversion to him. Nevertheless, he was quite likely to be found waiting for her at the end of her working day. For she was a working woman—four hours a day, seven days a week, forty weeks a year, as a practical psychopediatrician in the Wallingford Infant Development Center.

Her occupation disturbed him a little. Why anyone should voluntarily associate day after day with a mob of yelling, sticky little brats was beyond him. She seemed normal otherwise—normal but stimulating.

He was too preoccupied to take much interest in the news of the world these days, which was why he did not follow the career of J. Darlington Smith, the "Man from the Past," very closely. He was aware that Smith had been a news sensation for a few days, until crowded out by the Lunar field trials, and a report—erroneous—of intelli-



gent life on Ganymede. The public soon filed him away with the duckbill platypus and the mummy of Ramses II—interesting relics of the past, no doubt, but nothing to get excited about. It might have been different if his advent had been by means of the often-discussed and theoretically impossible time-travel, but it was nothing of the sort—simply an odd case of suspended animation. A sight-sound record from the same period was just as interesting—if one were interested.

Hamilton had seen him once, for a few minutes, in a newscast. He spoke with a most barbarous accent and was still dressed in his ancient costume, baggy pantaloons described by the interlocutor as "plus fours" and a shapeless knitted garment which covered his chest and arms.

None of which prepared Hamilton for the reception of a stat relating to J. Darlington Smith.

"Greetings," it began, et cetera, et cetera. The gist of it was that the interlocutor appointed by the Institute as temporary guardian for Smith desired that Hamilton grant the favor of an hour of his no-doubt valuable time to Smith. No explanation.

In his bemused frame of mind his first impulse was to ignore it. Then he recalled that such an act would not have fitted his former, pre-intrigue, conduct. He would have seen the barbarian, from sheer curiosity.

Now was as good a time as any. He called the Institute, got hold of the interlocutor, and arranged for Smith to come to his apartment at once. As an afterthought he called Monroe-Alpha, having remembered his friend's romantic interest in Smith. He explained what was about to take place.

"I thought you might like to meet your primitive hero."

"My hero? What do you mean?"

"I thought you were telling me what a bucolic paradise he came from?"

"Oh, that! Slight mistake in dates. Smith is from 1926. It seems that gadgeting was beginning to spoil the culture, even then."

"Then you wouldn't be interested in seeing him?"

"No, I think I would. It was a transition period. He may have seen something of the old culture with his own eyes. I'll be over, but I may be a little late."

"Fine. Long life." He cleared without waiting for a reply.

Smith showed up promptly, alone. He was dressed, rather badly, in modern clothes, but was unarmed. "I'm John Darlington Smith," he began.

Hamilton hesitated for a moment at the sight of the brassard, then decided to treat him as an equal. Discrimination, he felt, under the circumstances would be sheer unkindness. "I am honored that you visit me, sir."

"Not at all. Awfully good of you, and so forth."

"I had expected that there would be someone with you."

"Oh, you mean my nursemaid." He grinned boyishly. He was, Hamilton decided, perhaps ten years younger than Hamilton himself—discounting the years he had spent in stasis. "I'm beginning to manage the lingo all right, well enough to get around."

"I suppose so," Hamilton agreed. "Both lingos are basically Anglic."

"It's not so difficult. I wish lingo were the only trouble I have."

Hamilton was a little at a loss as to how to handle him. It was utterly inurbane to display interest in a stranger's personal affairs; dangerous, if the stranger were an armed citizen. But this lad seemed to invite friendly interest. "What is troubling you, sir?"

"Well, lots of things, hard to define. Everything is—different."

"Didn't you expect things to be different?"

"I didn't expect anything. I didn't expect to come to . . . to *now*."

"Eh? I understood that— Never mind. Do you mean that you did not know that you were entering the stasis?"

"I did and I didn't."

"What do you mean?"

"Well— Listen, do you think you could stand a long story? I've told this story about forty-'leven times, and I know it doesn't do any good to try to shorten it. They just don't understand."

"Go ahead."

"Well, I'd better go back a little. I graduated from Eastern U. in the spring of '26 and—"

"You what?"

"Oh, dear! You see, in those days the schools—"

"Sorry. Just tell it your own way. Anything I can't pick up I'll ask you about later."

"Maybe that would be better. I had a pretty good job offered to me, selling bonds—one of the best houses on the Street. I was pretty well known—All-American back two seasons." Hamilton restrained himself and made about four mental notes.

"That's an athletic honor," Smith explained hastily. "You'll understand. I don't want you to think I was a football bum, though. To be sure the fraternity helped me a little, but I worked for every cent I got. Worked summers, too. And I studied. My major was efficiency engineering. I had a pretty thorough education in business, finance, economics, salesmanship. It's true that I got my job because Grantland Rice picked me—I mean football helped a lot to make me well known—but I was prepared to be an asset to any firm that hired me. You see that, don't you?"

"Oh, most certainly!"

"It's important, because it has a bearing on what happened afterward. I wasn't working on my second million but I was getting along. Things were slick enough. The night it happened I was celebrating a little—with reason. I had unloaded an allotment of South American Republics—"

"Eh?"

"Bonds. It seemed like a good time to throw a party. It was a Saturday night, so everybody starts out with the dinner-dance at the country club. It was the usual thing. I looked over the flappers for a while, didn't see one I wanted to dance with, and wandered into the locker room, looking for a drink. The attendant used to sell it to people he could trust."

"Which reminds me," said Hamilton, and returned a moment later with glasses and refreshment.

"Thanks. His gin was pure bathtub, but usually reliable. Maybe it wasn't, that night. Or maybe I should have eaten dinner. Anyhow, I found myself listening to an argument that was going on in one end of the room. One of these parlor bolsheviks was holding forth—maybe you still have the type. Attack anything, just so long as it was respectable and decent."

Hamilton smiled.

"You do, eh? He was one of 'em. Read nothing but the *American Mercury* and *Jurgen* and then knew it all. I'm not narrow-minded. I read those things, too, but I didn't have to believe 'em. I read the *Literary Digest*, too, and the *Times*, something they would never do. To get on, he was panning the administration and predicting that the whole country was about to go to the bow-wows—go to pieces. He didn't like the gold standard; he didn't like Wall Street; he thought we ought to write off the War debts.

"I could see that some of our better members were getting pretty sick of it, so I jumped in. 'They hired the money, didn't they?' I told him.

"He grinned at me—sneered, I should say. 'I suppose you voted for *him*.'

"'I certainly did,' I answered, which was not strictly true; I hadn't gotten around to registering, such things coming in the middle of the football season. But I wasn't going to let him get away with sneering at Mr. Coolidge. 'I suppose *you* voted for Davis.'

"'Not likely,' he says. 'I voted for Norman Thomas.'

"Well, that burned me up. 'See here,' I said, 'the proper place for people like you is in Red Russia. You're probably an atheist, to boot. You have the advantage of living in the greatest period in the history of the greatest country in history. We've got an administration in Washington that understands business. We're back to normalcy and we're going to stay that way. We don't need you rocking the boat. We are leveled off on a plateau of permanent prosperity. Take it from me—don't sell America short!'

"I got quite a burst of applause.

"'You seem pretty sure of that,' he says weakly.

"'I ought to be sure,' I told him. 'I'm in the Street.'

"'Then there is no point in me arguing,' he said, and just walked out.

"Somebody poured me another drink, and we

got to talking. He was a pleasant, portly chap, looking like a banker or a broker. I didn't recognize him, but I believe in establishing contacts. 'Let me introduce myself,' he said. 'My name is Thaddeus Johnson.'

"I told him mine.

" 'Well, Mr. Smith,' he said, 'you seem to have confidence in the future of our country.'

"I told him I certainly did.

" 'Confident enough to bet on it?'

" 'At any odds you want to name, money, marbles or chalk.'

" 'Then I have a proposition that might interest you.'

"I pricked up my ears. 'What is it?' I said.

" 'Could you take a little joyride with me?' he said. 'Between the saxophones and those Charleston-crazy kids, a man can't hear himself think.' I didn't mind—those things don't break up until 3 G. M.; I knew I could stand a spell of fresh air. He had a long, low, wicked-looking Hispano-Suiza. Class.

"I must have dozed off. I woke up when we stopped at his place. He took me in and fixed me a drink and told me about the stasis—only he called it a 'level-entropy field.' And he showed it to me. He did a lot of stunts with it, put a cat in it, left it in while we killed a drink. It was all right.

" 'But that isn't the half of it,' he said. 'Watch.' He took the cat and *threw* it, right through where the field would be if it was turned on. When the cat was right spang in the center of the area, he threw the switch. We waited again, a little longer this time. Then he released the switch. *The cat came sailing out, just the way it was heading when we saw it last.* It landed, spitting and swearing.

" 'That was just to convince you,' he said, 'that inside that field, time doesn't exist—no increase of entropy. The cat never knew the field was turned on.'

"Then he changed his tack. 'Jack,' he says, 'what will the country be like in twenty-five years?'

"I thought about it. 'The same—only more so,' I decided.

" 'Think A. T. & T. will still be a good investment?'

" 'Certainly!'

" 'Jack,' he says softly, 'would you enter that field for ten shares of A. T. & T.?"

" 'For how long?'

" 'Twenty-five years, Jack.'

"Naturally, it takes a little time to decide a thing like that. Ten of A. T. & T. didn't tempt me; he added ten of U. S. Steel. And he laid 'em out on the table. I was as sure as I'm standing here that the stock would be worth a lot more in a quarter of a century, and a kid fresh out of college doesn't get blue chips to play with very easily. But a quarter of a century! It was like dying.

"When he added ten of National City, I said: 'Look, Mr. Johnson, let me try it for five minutes. If it didn't kill the cat, I ought to be able to hold my breath that long.'

"He had been filling out the assignments in my name, just to tempt me. He said, 'Surely, Jack.' I stepped to the proper spot on the floor while I still had my courage up. I saw him reach for the switch.

"That's all I know."

Hamilton Felix sat up suddenly. "Huh? How's that?"

"That's all I know," repeated Smith. "I started to tell him to go ahead, when I realized he wasn't there any more. The room was filled with strangers; it was a different room. I was here. I was *now.*"

"That," said Hamilton, "deserves another drink."

They drank it in silence.

"My real trouble is this," said Smith. "I don't understand this world at all. I'm a businessman. I'd like to go into business here. (Mind you, I've got nothing against this world, this period. It seems O. K., but I don't understand it.) I can't go into business. Damn it, nothing *works* the same. All they taught me in school, all I learned on the Street, seems utterly foreign to the way they do business now."

"I should think that business would be much the same in any age—fabrication, buying, selling."

"Yes and no. I'm a finance man—and, damn it, finance is cockeyed nowadays!"

"I admit that the details are a little involved," Hamilton answered, "but the basic principles are evident enough. Say—I've a friend coming over who is the chief mathematician for the department of finance. He'll straighten you out."

Smith shook his head decisively. "I've been experted to death. They don't speak my lingo."

"Well," said Hamilton, "I might tackle the problem myself."

"Would you? Please?"

Hamilton thought about it. It was one thing to kid sober-sided Clifford about his "money machine"; another matter entirely to explain the workings of finance economics to . . . to the hypothetical Man from Arcturus. "Suppose we start this way," he said. "It's basically a matter of costs and prices. A businessman manufactures something. That costs him money—materials, wages, housing and so forth. In order to stay in business he has to get his costs back in prices. Understand me?"

"That's obvious."

"Fine. He has put into circulation an amount of money exactly equal to his costs."

"Say that again."

"Eh? It's a simple identity. The money he has had to spend, put into circulation, *is* his costs."

"Oh—but how about his profit?"

"His profit is part of his cost. You don't expect him to work for nothing."

"But profits aren't costs. They're . . . they're *profits.*"

Hamilton felt a little baffled. "Have it your own way. Costs—what you call 'costs'—plus profit must equal price. Costs and profits are available as purchasing power to buy the product at a price exactly equal to them. That's how purchasing power comes into existence."

"But . . . but he doesn't buy from himself."

"He's a consumer, too. He uses his profits to pay for his own and other producers' products."

"But he *owns* his own products."

"Now you're getting *me* mixed up. Forget about him buying his own products. Suppose he buys what he needs for himself from other businessmen. It comes out the same in the long run. Let's get on. Production puts into circulation the amount of money—*exactly*—needed to buy the product. But some of that money put into circulation is saved and invested in new production. There, it is a cost charge against the new production, leaving a net shortage in necessary purchasing power. The government makes up that shortage by issuing new money."

"That's the point that bothers me," said Smith. "It's all right for the government to issue money, but it ought to be *backed* by something—gold or government bonds."

"Why, in the Name of the Egg, should a symbol represent anything but the thing it is supposed to accomplish?"

"But you talk as if money was simply an abstract symbol."

"What else is it?"

Smith did not answer at once. They had reached an *impasse* of different concepts, totally different orientations. When he did speak it was to another point. "But the government simply *gives away* all this new money. That's rank charity. It's demoralizing. A man should work for what he gets. But forgetting that aspect for a moment, you can't run a government that way. A government is just like a business. It can't be all outgo and no income."

"Why can't it? There's no parallel between a government and a business. They are for entirely different purposes."

"But it's not *sound.* It leads to bankruptcy. Read Adam Smith."

"I don't know this Adam Smith. Relative of yours?"

"No, he's a— Oh, Lord!"

"Crave pardon?"

"It's no use," Smith said. "We don't speak the same lingo."

"I am afraid that *is* the trouble, really. I think perhaps you should go to see a corrective semantician."

"Anyhow," Smith said, one drink later, "I didn't come here to ask you to explain finance to me. I came for another purpose."

"Yes?"

"Well, you see I had already decided that I couldn't go into finance. But I want to get to work, make some money. Everybody here is rich—except me."

"Rich?"

"They look rich to me. Everybody is expensively dressed. Everybody eats well. Hell! They give food away—it's preposterous."

"Why don't you live on the dividend? Why worry about money?"

"I could, of course, but, shucks, I'm a workingman. There are business chances all around. It drives me nuts not to do anything about them. But I can't—I don't know the ropes. Look—there is just one thing else besides finance that I know well. I thought you might be able to show me how to capitalize on it."

"What is it?"

"Football."

"Football?"

"Football. I'm told that you are the big man in games. Games 'tycoon' they called you." Hamilton conceded it wordlessly. "Now, football is a game. There ought to be money in it, handled right."

"What sort of a game? Tell me about it."

Smith went into a long description of the sport. He drew diagrams of plays, described tackling, blocking, forward passing. He described the crowds and spoke of gate receipts.

"It sounds very colorful," Hamilton admitted. "How many men get killed in an engagement?"

"Killed? You don't hurt anybody—barring a broken collar bone or so."

"We can change that. Wouldn't it be better if the men defending the ball-handler were armored? Otherwise we would have to replace them with every maneuver."

"No, you don't understand. It's . . . well—"

"I suppose I don't," Hamilton agreed. "I've never seen the game played. It's a little out of my line. My games are usually mechanicals—wagering machines."

"Then you aren't interested?"

Hamilton was not, very. But he looked at the youth's disappointed face and decided to stretch a point. "I'm interested, but it isn't my line. I'll put you in touch with my agent. I think he could work something out of it. I'll talk with him first."

"Say, that's white of you!"

"I take it that means approval. It's no trouble to me, really."

The annunciator warned of a visitor—Monroe-Alpha. Hamilton let him in, and warned him, *sotto voce,* to treat Smith as an armed equal. Some time was consumed in polite formalities, before Monroe-Alpha got around to his enthusiasm. "I understand that your background is urban industrial, sir."

"I was mostly a city boy, if that's what you mean."

"Yes, that was the implication. I was hoping that you would be able to tell me something of the brave simple life that was just dying out in your period."

"What do you mean? Country life?"

Monroe-Alpha sketched a short glowing account of his notion of rustic paradise. Smith looked exceedingly puzzled. "Mr. Monroe," he said, "somebody has been feeding you a lot of cock-and-bull, or else I'm very much mistaken. I don't recognize anything familiar in the picture."

Monroe-Alpha's smile was just a little patronizing. "But you were an urban dweller. Naturally the life is unfamiliar to you."

"What you describe may be unfamiliar, but the circumstances aren't. I followed the harvest two summers, I've done a certain amount of camping, and I used to spend my summers and Christmases on a farm when I was a kid. If you think there is anything romantic, or desirable *per se,* in getting along without civilized comforts, well, you just ought to try tackling a two-holer on a frosty morning. Or try cooking a meal on a wood-burning range."

"Surely those things would simply stimulate a man. It's the primitive, basic struggle with nature."

"Did you ever have a mule step on your foot?"

"No, but—"

"Try it sometime. Honest—I don't wish to seem impertinent, but you have your wires crossed. The simple life is all right for a few days vacation, but day in and day out it's just so much dirty, back-breaking drudgery. Romantic? Hell, man, there's no *time* to be romantic about it, and damned little incentive."

Monroe-Alpha's smile was a little bit forced. "Perhaps we aren't talking about the same thing. After all, you came from a period when the natural life had already been sullied by overemphasis on machines. Your evaluations were already distorted."

Smith himself was beginning to get a little heated. "I hate to tell you, but you don't know what you are talking about. Country life in my day, miserable as it was, was tolerable in direct proportion to the extent to which it was backed up by industrialization. They might not have had electric light and running water, but they had Sears-Roebuck and everything that implies."

"Had what?" asked Hamilton.

Smith took time out to explain mail-order shopping. "But what you're talking about means giving up all that—just the noble primitive, simple and self-sufficient. He's going to chop down a tree—*who sold him the ax?* He wants to shoot a deer—*who made his gun?* No, mister, I know what I'm talking about—I've studied economics." (*That* to Monroe-Alpha, thought Hamilton, with a repressed grin.) "There never was and there never could be a noble simple creature such as you described. He'd be an ignorant savage, with dirt on his skin and lice in his hair. He would work sixteen hours a day to stay alive at all. He'd sleep in a filthy hut on a dirt floor. And his point of view and his mental processes would be just two jumps above an animal."

Hamilton was relieved when the discussion was broken into by another chime from the annunciator. It was just as well—Cliff was getting a little white around the lips. He couldn't take it. But, damn it, he had it coming to him. He wondered how a man could be as brilliant as Monroe-Alpha undoubtedly was—about figures—and be such an utter fool about human affairs.

The plate showed McFee Norbert. Hamilton would have liked not to have admitted him, but it was not politic. The worm had the annoying habit of dropping in on his underlings, which Hamilton resented, but was helpless to do anything about—as yet.

McFee behaved well enough, for McFee. He was visibly impressed by Monroe-Alpha, whose name and position he knew, but tried not to show it. Toward Smith he was patronizingly supercilious. "So you're the man from out of the past? Well, well—how amusing! You did not time it very well."

"What do you mean?"

"Ah, that would be telling! But ten years from now might have been a better time—eh, Hamilton?" He laughed.

"Perhaps," Hamilton answered shortly, and tried to turn attention away from Smith. "You might talk to Monroe-Alpha about it. He thinks we could improve things." He regretted the remark at once, for McFee turned to Monroe-Alpha with immediate interest.

"Interested in social matters, sir?"

"Yes—in a way."

"So am I. Perhaps we can get together and talk."

"It would be a pleasure, I'm sure. Felix, I must leave you now."

"So must I," McFee said promptly. "May I drop you off?"

"Don't trouble."

Hamilton broke in. "Did you wish to see me, McFee?"

"Nothing important. I hope to see you at the club tonight."

Hamilton understood the circumlocution. It was a direct order to report—at McFee's convenience.

McFee turned back to Monroe-Alpha and added: "No trouble at all. Right on my way."

Hamilton watched them leave together with a feeling of vague discomfort.

VII.

Longcourt Phyllis showed up for a moment in the waiting room of the development center and spoke to Hamilton. "Hello, Filthy."

"H'lo, Phil."

"Be with you in a moment. I've got to change." She was dressed in complete coveralls, with helmet. An inhaler dangled loose about her neck.

"O. K."

She returned promptly, dressed in more conventional and entirely feminine clothes. She was unarmed. He looked her over approvingly. "That's better," he said. "What was the masquerade?"

"Hm-m-m? Oh, you mean the aseptic uniform. I'm on a new assignment—control naturals. You have to be terrifically careful in handling them. Poor little beggars!"

"Why?"

"You know why. They're subject to infections. We don't dare let them roll around in the dirt with the others. One little scratch, and anything can happen. We even have to sterilize their food."

"Why bother? Why not let the weak ones die out?"

She looked annoyed. "I could answer that conventionally by saying that the control naturals are an invaluable reference plane for genetics—but I won't. The real point is that they are human beings. They are just as precious to their parents as you were to yours, Filthy."

"Sorry. I didn't know my parents."

She looked suddenly regretful. "Oh—Felix, I forgot!"

"No matter. I never could see," he continued, "why you want to bury yourself in that cage of monkeys. It must be deadly."

"Huh-uh. Babies are fun. And they're not much trouble. Feed 'em occasionally, help them when they need it, and love them a lot. That's all there is to it."

"I've always favored the bunghole theory myself."

"The what?"

"You take the child at an early age and place it in a barrel. You feed it through the bunghole. At the age of seventeen, you drive in the bung."

She grinned at him. "Filthy, for a nice man you have a nasty sense of humor. Seriously, your method leaves out the most essential part of a child's rearing—the petting he gets from his nurses."

"I don't seem to recall much of it. I thought the basic idea was to take care of its physical needs and otherwise leave it strictly alone."

"You're way out of date. They used to have a notion of that sort, but it was silly—contra-biological." It occurred to her that Hamilton's faulty orientation might have its origin in the injudicious application of that outmoded, unfounded theory. The natural urges of mothers had prevented it ever being applied thoroughly in most cases, but his case was different. He had been what was, to her, the most tragic thing on earth—a baby that never left the development center. When she found one of these exceptions among her own charges she lavished on it extra affection and a little over. But she said nothing of this to him.

"Why," she continued, "do you think animals lick their young?"

"To clean them, I suppose."

"Nonsense! You can't expect an animal to appreciate cleanliness. It's a caress, an expression of instinctive affection. So-called instincts are instructive, Felix. They point to survival values."

He shrugged. "We're here."

They entered the restaurant—a pay restaurant—he had chosen, and went to a private room reserved for them. They started the meal in silence. His usual sardonic humor was dampened by the things in the back of his mind. This business of the Survivors Club—he had entered into it lightheartedly, but now it was developing ominous overtones which worried him. He wished that Mordan—the government, rather—would *act*.

He had not gotten ahead as fast in the organization as he had hoped. They were anxious to use him, willing to accept, to demand, his money, but he still had not obtained a clear picture of the whole network. He still did not know who was senior to McFee Norbert, nor did he know the numbers of the whole organization.

Meantime, daily the tightrope became more difficult to walk.

He had been permitted to see one thing which tended to show that the organization was older and larger than he had guessed. McFee Norbert had escorted him personally, as one of the final lessons in his education in the New Order, to a place in the country, location carefully concealed from Hamilton, where he was permitted to see the results of clandestine experiments in genetics.

Beastly little horrors!

He had viewed, through one-way glass, "human" children whose embryonic gills had been retained and stimulated. They were at home in air or water, but required a humid atmosphere at all

times. "Useful on Venus, don't you think?" McFee had commented.

"We assumed too readily," he continued, "that the other planets in this system were not useful. Naturally the leaders will live here, most of the time; but, with special adaptation, quite useful supporting types could remain permanently on any of the planets. Remind me to show you the antiradiation and low-gravity types."

"I'd be interested," Hamilton stated truthfully but incompletely. "By the way, where do we get our breeding stock?"

"That's an impertinent and irrelevant question, Hamilton, but I'll answer you. You are a leader type—you'll need to know eventually. The male plasm we supply ourselves. The females were captured among the barbarians—usually."

"Doesn't that mean rather inferior stock?"

"Yes, surely. These are simply experiments. None of them will be retained. After the Change, it will be another story. We'll have superior stock to start with—you, for example."

"Yes, of course." He did not care to pursue that line. "No one has ever told me just what our plans are for the barbarians."

"No need for juniors to discuss it. We'll save some of them for experimentation. In time, the rest will be liquidated."

A neat but sweeping plan, Hamilton had thought. The scattered tribes of Eurasia and Africa, fighting their way back up to civilization after the disasters of the Second War, consigned without their consent or knowledge to the oblivion of the laboratory or death. He decided to cut off McFee's ears a bit at a time.

"This is possibly the most stimulating exhibit," McFee had continued, moving on. Hamilton had looked where he was directed. The exhibit appeared to be a hydrocephalic idiot, but Hamilton had never seen one. His eyes saw an obviously sick child with a head much too big for it. "A tetroid type," McFee stated. "Ninety-six chromosomes. We once thought that was the secret of the hyperbrain, but we were mistaken. The staff geneticists are now on the right track."

"Why don't you kill it?"

"We will, presently. There is still something to be learned from it."

There were other things—things that Hamilton preferred not to think about. He felt now that, if he had managed to get through that test without displaying his true feelings, he had been damned lucky!

The proposed extermination of the barbarians reminded him of another matter. Most curiously, the strange advent of John Darlington Smith had had an indirect effect on the plans of the Survivors Club. The compelling logic of the plans for the New Order seemed to call automatically for the deaths of the inefficient and sickly control naturals, as well as the deaths of synthesists, recalcitrant geneticists, counter-revolutionaries in general.

The plans for the latter aroused no opposition to speak of, but many of the club members had a sentimental fondness for control naturals. They regarded them with the kindly paternal contempt that members of a ruling class frequently feel for subject "inferior" races. Just what to do about this psychological problem had delayed the zero hour of the Change.

The Adirondack stasis gave a means.

Control naturals were to be placed in a stasis for an indefinite period. It was an entirely humane procedure; the prisoners would be unhurt by their stay and would emerge in the distant future. McFee had asked Hamilton what he thought of the scheme, after the meeting.

"It should be popular," Hamilton had admitted. "But what happens after they are let out?"

McFee had looked surprised, then laughed. "We are practical men, you and I," he had said in a low voice.

"You mean—"

"Surely. But keep your mouth shut."

Phyllis decided that it was time to interrupt his morose preoccupation. "What's eating you, Filthy?" she inquired. "You haven't said two words since we sat down."

He returned to his surroundings with a start. "Nothing important," he lied—wishing that he could unburden himself to her. "You haven't been chatty yourself. Anything on your mind?"

"Yes," she admitted, "I've just selected the name for our son."

"Great jumping balls of fire! Aren't you being just a little premature? You know damned well we aren't ever going to have children."

"That remains to be seen."

"Humph! What name have you picked for this hypothetical offspring?"

"Theobald—'Bold for the People,'" she answered dreamily.

"'Bold for the—' Better make it Jabez."

"Jabez? What does it mean?"

"'He will bring sorrow.'"

"'He will bring sorrow'! Filthy, you're filthy!"

"I know it. Why don't you forget all this business, give that noisy nursery a miss, and team up with me?"

"Say that slowly."

"I'm suggesting matrimony."

She appeared to consider it. "Just what do you have in mind?"

"You write the ticket. Ortho-spouse, registered companion, legal mate—any contract you want."

"To what," she said slowly, "am I to attribute this sudden change of mind?"

"It isn't sudden. I've been thinking about it

ever since . . . ever since you tried to shoot me."

"Something's wrong here. Two minutes ago you were declaring that Theobald was impossibly hypothetical."

"Wait a minute," he said hastily. "I didn't say a word about children. That's another subject. I was talking about us."

"So? Well, understand this, Master Hamilton. When I get married, it will not be to a man who regards it as sort of a super-recreation." She turned her attention back to her dinner.

A thick silence followed for several minutes. He broke it.

"Sore at me?"

"No. Filthy, you're such a rat."

"Yeah, I know that, too. Finished?"

"Yes. Coming home with me?"

"I'd like to, but I can't tonight."

After he left her he went straight to the Hall of the Wolf. A full roundup had been ordered for that evening, no reason given but no excuses accepted. It happened also to be his first meeting since he had been promoted to the minor dignity of section leader.

The door of the clubroom stood open. A few members assembled inside were being moderately noisy and convivial, in accordance with doctrine. It was even possible that a stranger, or two, was present. Such presence was desired when nothing was going on. Later, they would be gently dismissed.

Hamilton wandered in, said hello to a couple of people, drew himself a stein of beer, and settled down to watch a dart game taking place in one end of the lounge.

Some time later, McFee bustled in, checked over the company by sight, picked out two section leaders by eye, and signaled them with a jerk of his head to get rid of the one remaining outsider. The stranger had been well lubricated; he was reluctant to leave, but presented no real problem. When he was gone and the doorway had relaxed, McFee said, "To business, brothers." To Hamilton he added, "You attend conference tonight, you know."

Hamilton started to acknowledge the order, when he felt a touch on his shoulder and a voice behind him. "Felix. Oh, Felix!"

He turned around, half recognizing the voice. Nevertheless, it was only his animal quickness which enabled him to cover up in time. It was Monroe-Alpha.

"I knew you were one of us," his friend said happily. "I have been wondering when—"

"Get to your section room," McFee said sternly.

"Yes, sir! See you later, Felix."

"Sure thing, Cliff," Hamilton responded heartily.

He followed McFee into the council room, glad of the brief chance to get his raging thoughts in order. Cliff! Great Egg—*Cliff!* What in the Name of Life was he doing in this nest of vermin? Why hadn't he seen him? He knew why, of course—a member of one section was extremely unlikely to meet the member of another. Different instruction nights and so on. He cursed the whole system. But why Cliff? Cliff was the gentlest, kindest man who ever packed a gun? Why would he fall for this rot?

He considered the idea that Monroe-Alpha might be an *agent provocateur,* like himself—and amazed to find *him* there. Or perhaps not amazed—he might know Hamilton's status even though Hamilton did not know his. No, that did not make sense. Cliff didn't have the talent for deception required. His emotions showed on his sleeve. He was as pellucid as air. He couldn't act worth a damn.

McFee was speaking. "Leaders," he was saying, "I have been ordered to transmit to you great news!" He paused. "The Change is upon us."

They stirred, alert, attentive. Hamilton sat up. "Hell's delight!" he thought. "The ship about to raise and I have to be saddled with that holy fool, Cliff."

"Bournby!"

"Yes, sir."

"You and your section—prime communications. Here's your spool. Memorize it at once. You'll co-operate with the chief of propaganda."

"Right."

"Steinwitz, your section is assigned to Power Center. Take your spool. Harrickson!"

"Yes, sir."

It went on and on. Hamilton listened with half his mind, face impassive, while he tried to think himself out of his predicament. Mordan had to be warned—that was primary!—at the earliest possible moment at which he could break clear. After that, if there was some way to save the fool from his folly, he would try it.

"Hamilton!"

"Yes, sir."

"Special assignment. You will—"

"Just a moment, chief. Something has come to my attention that constitutes a danger to the movement."

"Yes?" McFee's manner was impatient and frosty.

"Junior member Monroe-Alpha. I want him assigned to me."

"Impossible. Attend your orders."

"I am not being undisciplined," Hamilton stated evenly. "I happen to know this member better than any of you. He is erratic and inclined to be hysterical. He's a deviant type. But he is personally devoted to me. I want him where I can keep an eye on him."

McFee tapped the table impatiently. "Utterly impossible. Your zeal exceeds your sense of subordination. Don't repeat the error. Furthermore, if what you say is true, he is better off where he is—you couldn't use him. Mosely—you're his section leader. Watch him."

"Yes, sir."

"Now, Hamilton—" Hamilton realized with sinking heart that his attempt to find a way out for Monroe-Alpha had simply placed his friend in greater jeopardy. He was snapped to attention by McFee's succeeding words. "At the time of action, you will get yourself admitted to the Moderator for Genetics—Mordan. Burn him down at once, being particularly careful not to give him a chance to draw."

"I know his speed," Hamilton said dryly.

"You need no help on the assignment, as you are one man who can get in to see him easily—as you and I know."

"That's correct."

"So it's just as well that you haven't been assigned a section." McFee relaxed a trifle. "I imagine you'll enjoy this assignment; you have a personal interest, I think." He favored Hamilton with a sly smile.

"Very, very small pieces," thought Hamilton. But he managed an appropriately grim smile and answered, "There's something in what you say."

"Ah, yes! That's all, gentlemen. No one is to leave until I give the word—then by ones and twos. To your sections!"

"When do we start?" someone ventured.

"Read your spools."

Hamilton stopped McFee on the way to the lounge. "I have no spool. When is the zero time?"

"Oh, yes. As a matter of fact, it hasn't been assigned yet. Be ready from now on. Stay where you can be reached."

"Here?"

"No. At your apartment."

"I'll leave, then."

"No, don't. Leave when the rest do. Come, have a drink with me and help me relax. What was that song about the 'Rocket Pilot's Children'?"

Hamilton spent the next hour helping The Great Man relax.

Monroe-Alpha's section was dismissed shortly before McFee released them. Hamilton used his new seniority to see to it that he and his friend were among the first groups to filter out. Once outside Monroe-Alpha, tense and excited by the prospect of action, started to babble. "Shut up," Hamilton snapped.

"Why, Felix!"

"Do as you're told," he said savagely. "To your apartment."

Monroe-Alpha continued in sulky silence, which was just as well. Hamilton wanted no talk with him until he had him alone. In the meantime he had his eye open for a telephone. The distance was short—a few flights and a short slide-a-way. They passed two booths. The first was occupied; the second showed a glowing transparency: "Out of Service." He swore to himself and continued.

They passed a monitor, but he despaired of getting his message across to a routine-indoctrinated mind. They hurried on to Monroe-Alpha's home. Once inside and the door sealed behind them, Hamilton stepped quickly to his friend's side and relieved him of his weapon before Monroe-Alpha had time to realize what he was up to.

Monroe-Alpha stepped back in surprise. "What did you do that for, Felix?" he protested. "What's up? Don't you trust me?"

Hamilton looked him up and down.

"You fool," he said bitterly. "You utter, stupid, hysterical fool!"

TO BE CONCLUDED.

BUSBARS AND SHORTAGES

The present shortage of copper and the shortage of aluminum cross each other up in one way—busbars. Aluminum and magnesium, the two light structural metals, are both produced almost entirely by electrolytic process. No element has a more determined affinity for oxygen than magnesium—and aluminum runs a close second. To reduce the oxides of that pair, electric power in huge quantities is needed, tens and hundreds of thousands of amperes fed into the great electrolysis baths through massive conductors thick as a man's leg. In a large plant, busbars hundreds, even thousands of feet long will be needed—and that means hundreds of tons of copper.

But artillery shells need copper driver bands, brass shell cases, a hundred other military uses of copper demand all the metal available. The only common, good substitute for copper as an electrical conductor is—aluminum.

There's one other excellent, cheap and efficient substitute for copper busbars that has been used. It involves two little-known facts. First the identity of the cheapest metal available on a cubic-foot basis. Iron is cheapest per ton, of course, but it is a dense metal, and a cubic foot of iron weighs almost a quarter of a ton. But in electrical conductors you need a *length* of metal with a certain *area* of cross-section—volume, in other words, not weight. Metallic sodium is so cheap, and so light, that a cubic foot of it sells for about the price of a cubic foot of iron. And sodium is very nearly as good a conductor as copper.

For such applications as electrolytic refining plants, metallic sodium busbars can be made by installing the necessary lengths of iron sewer pipe, and pouring molten metallic sodium into it. The ends are sealed, and connection made. The iron pipe supplies the mechanical strength and the chemical protection; the sodium carries enormous currents with a minimum of resistance.

But an even more interesting solution has been proposed. The best of all conductors is metallic silver. The government has nearly one hundred thousand tons of metallic silver in its bullion vaults. It if were simply cast into busbars, it could be installed in the defense plants and serve a useful function while still perfectly good bullion reserve! It would be thoroughly safe against theft; the plants producing the light metals are currently under heavy guard, and operating twenty-four hours a day. And it would be a highly ingenious thief indeed who could hack-saw out a section of silver busbar without interrupting the steady flow of current!

"IF YOU'RE SMART—"

By Colin Keith

● Seems a pretty obvious crack for a business sharper to make to an inventor. "If you're so smart, why don't you make some money yourself?" Maybe so. But this scientist had an even better answer—

Illustrated by Kolliker

"If you're so damn smart, why ain't you rich?"

That hoary wisecrack must have been all of three centuries old when Wolf Carmichael pulled it on Dr. Claud Kellog. The Wolf of Saturn loved it and used it often. That day he lay back in his swivel chair, chuckling offensively somewhere in the fatty depths of his triple chin, as he threw it. But his roving, piggish eyes showed no mirth. They were hard and scheming, the ruthless eyes that had made him master of all commerce and industry throughout the Saturnian system. To his money-grubbing mentality, this question was the ultimate in triumphant repartee.

"A scholar named Archimedes was asked that question once," replied Dr. Kellog, flushing angrily, "and to prove he could be rich if he wished,

he knocked off his important mathematical researches long enough to buy up all the wine presses in the country. It was winter, then, but when the next fall came the vintners had to have their presses back or else lose the grape crop. Archimedes made a tidy profit."

"Never heard of him," snorted Carmichael. "Musta been some little fellow on Venus. If he was a real big shot in the booze racket, he'd be on the board of Interplanetary Distillers. He aint."

Carmichael threw away the stump of the cigar he was smoking and lit another.

"To get back to this gadget of yours," he resumed indifferently. "Maybe it's as good as you say, maybe not. But George Carmichael was always the boy to give a struggling inventor a chance—"

Kellog winced. Yeah. Wolf would back anything that promised sure profit and no loss—provided he was given control.

"—so here's what I'm willing to do. Your proposition to have me lend you enough to get your machines built is out—the machines might flop, then where'd I be? What we'll do is this—incorporate your whatchamacallit—"

"Antichron."

"Antichron, huh? We'll incorporate it first, then put it into production. I get fifty-five percent of the stock for promotion fee, we sell twenty to the public for working capital, and all the rest is yours. See?"

Kellog saw. It was a typical Carmichael proposition. Kellog would furnish the work and brains, the sucker public the money. If the venture failed, Carmichael couldn't be hurt; if it succeeded, he would rake in the lion's share. Kellog reached for his hat and jammed it on his head.

"That's pure burglary, Mr. Carmichael," he said fairly evenly, mustering all his powers of self-restraint. "I'll see you in hell first."

"Tut, tut, my boy," said Carmichael with a repetition of his nasty chuckle, "how fiery you are! That's bad. You should never mix emotion with business. Take me. Am I offended? No. I'll be here tomorrow, and the day after that, and the day after that, ready to do business with you. You'll come back—they always do."

Kellog only glared at him, then strode from the room, boiling at the arrogance of the grasping capitalist. And as he angrily made his way down the main street of Saturnport, everything he saw added to his rage—and to his gloom, too. For every enterprise of any magnitude on Titan, or on any of the other Saturnian satellites, was owned or controlled by Carmichael. The list was an imposing one. Carmichael was the president of the Titanic Trust Co., the only bank. He owned the Saturnport Supply Co. and Titan Shipyards outright. He had a fat finger in Rhean Ranches, Miman Mines, Titan Radio Power, the Dione angrauk packeries, and the ruby pits on Enceladus. What burned up Kellog the most was Trans-Saturnian Lighter Service.

That line of small intersatellite freighters had been established and built by his father, years before. It supplied a much-needed service, for the great interplanetary ships stopped only at Saturnport. The little lighters carried the slaughtered angrauks from Rhea to the packeries of Dione, and thence to the big port. They hauled ores from the mines of Mimas to the smelters on Titan, and did other chores of the kind. Carmichael saw it was a profitable line and tried to buy into it. The elder Kellog resisted. Carmichael shut down his mines for a year, cutting off important revenue. A quarantine on angrauks was mysteriously promulgated; taxes on intersatellite shipping increased. The bank called Kellog's notes. His lighter service was forced into bankruptcy.

"And Carmichael bought it for a song," muttered Doc, bitterly, "had the new taxes repealed and the quarantine rescinded. It broke dad's heart."

That was the way the Wolf of Saturn did things. Honeyed words, cash advances, at first, anything for a foothold. Then squeeze, squeeze until the enterprise was his. Now that he had the colonies of the Saturnian system well under his thumb, he was branching out into larger fields. He had ambitions of going back to the Earth one day and taking his place among the mighty in Wall Street, where the Systemic Stock Exchange was. He wanted to lock horns with such magnates as Aalman, head of Venus Exploitation, Inc., and chairman of the board of the Tellurian Master Bank. He wanted a bigger say-so in the operation of the Interplanetary Transport Co. and a directorship on Etherways, the planets' communication system. Therefore, when he was not in his office at the Carmichael Building, he could be found in the brokerage office of Neville & Beardsley, trading fiercely in securities, trying to match wits with Aalman and the other tycoons.

Doc Kellog knew all that and knew how hopeless his fight was. Yet that illiterate taunt still rang in his ears. He *was* smart, but he wasn't rich. There must be something wrong with his approach to things. Other men with half his brains got along and prospered; why couldn't he? That thought was uppermost in his mind when he reached his laboratory.

"What luck, Doc?" asked cheery Billy Wade, his chief assistant.

"The usual," growled Kellog. "He wants to hog the show, otherwise no dice. I told him to go to hell."

"Swell," grinned Billy Wade, admiringly, "but where do we get off? Fold up and get jobs somewhere?"

"Maybe." Doc Kellog's anger had cooled somewhat and dejection had succeeded it. But he was not quite ready to surrender. The memory of that sneering challenge still rankled. Kellog sat down and stared at the floor in deep thought.

Things looked black. The single model of his antichron worked perfectly. It had proved that his theory was correct. He could warp space-time, given power enough, and bring all the planets together, just as centuries before the introduction of telegraph and radio brought all the countries of the Earth together. But his money was gone, his bills mounting, and he was forced to deal with interlocking monopolies for all his supplies, power and credit. Carmichael knew that as well as he did and was waiting for the plum to drop in his lap. Kellog knew that Carmichael would fight him tooth and nail unless he cut him in. And that Kellog was resolved not to do.

He had never thought of his invention in terms of money before, but rather in terms of the immense boon it would be to all humanity, taking it for granted that his own compensation would be just and adequate. But now he was racking his brain for a way to turn it into money—lots of money—and quickly. He had exhausted all his own resources in building the one model he had, and the power bills were eating him up. If they were not paid by the end of the week, Titan Power would attach his laboratory and its contents, which was the same as saying Carmichael would.

Antichron—what were its chief virtues? What could he cash in on *now?* For he must not only save what he had, but construct other machines to introduce to the public. He sat up and looked at his model thoughtfully. It was a clumsy-looking device, a monster machine taking up the whole side of the room. Its main feature was a six-foot-square crystal window, framed by shiny steel panels studded with knobs, dials, glowing tubes, buttons and cranks. The crystal resembled an ordinary televise scanner of the type used by Etherways, except that it was thicker and double-faced. Whatever form of energy, whether heat, electricity or light, impinged on one face was immediately transmitted to the other. Where it differed from the standard models was that its two faces could be split apart when subjected to antichronic stresses, and separated by any number of millions of miles. But the same antichronic stresses also created a warp in space-time so that the interval seemed not to exist. It was a window that with the proper manipulations of its complex controls could be made to look upon any spot in the universe and receive energy impulse from it *then.*

That "then" was its great virtue. Long before space travel was an actuality, mathematicians had known that there was no such thing as simultaneity. Time, like space, was relative. They had had their first practical demonstration of it when they tried to use two-way television between the Earth and Moon. Radio waves took a little over a second to travel each way. A man would speak, then wait for two seconds before his answer began coming back to him. Later, that time lag became almost intolerable. From Callisto it was three quarters of an hour—you activated the machine, waited forty or so minutes for it to light up, and then you waited an equal period for the inquiring face looking at you to register understanding and begin his reply. Obviously, where an hour and a half intervened between question and answer, sprightly conversation was impossible. The antichron would cure that. With the space between warped out of existence, instantaneous response could be had.

"Why ain't I rich, huh?" repeated Kellog, sourly, and began thinking on how men got rich. Not by inventing useful things or hard work, necessarily. He thought of Carmichael's career, and Aalman's, and those of others. They had one common denominator—they were men who bought and sold, bought cheap and sold dear. And where did they find their sellers and buyers? Why, on the Stock Exchange, of course. Kellog's eyes lit up and he almost trembled with excitement as the full implications of that chance thought dawned upon him. He jumped up and called Wade to him.

"How much money have we?" he asked excitedly.

Billy Wade pulled out a wallet and squinted at its contents.

"There's about a thousand here of my own and the three thousand you gave me to keep for the power bill."

"Willing to gamble?"

Wade just grinned and handed over the money.

"Quick, now. Grab the current 'Ephemerides' and find the Earth's present position and rate of relative movement. Then look up the exact latitude and longitude of the lower tip of Manhattan Island—that's in New York."

Kellog ran over to the antichron and began setting the dials as Wade called out the figures. Then he threw a master switch and the machine hummed into activity. In a moment the screen was glowing, then transparent. It was as if Kellog were looking out of a window high over a green park surrounded on three sides by water. He adjusted the mechanism and caused the projected screen to lower itself to a great sprawling building that lay below. He forced it through a wall, and there he was—looking in on the trading floor of the nerve center of the Solar System, the Systemic Stock Exchange!

Thousands of men were milling about beneath, gesticulating and shouting. At the other end of the vast hall an immense annunciator board stood,

on which names and numbers appeared. A flickering screen beside it was displaying news flashes.

"A notebook! Hurry!" exclaimed Doc Kellog. He jotted down quotations as he watched. Callistan Radioactives was high and climbing—a sale at 423½, then another at 428, then at 430¼. A flash came over the screen saying Martian Gems had passed its dividend. Martian Gems promptly dropped twelve points. Etherways and I. P. T. were strong. The market generally was strong.

"Let her run," Doc shouted, shoving the book into his pocket. "Damn the power bill. If I'm right, it won't matter; if I'm wrong, it won't matter either. I'll be seeing you."

Then he was out and gone, hurrying to Neville & Beardsley.

Mr. Neville took the money, but he looked at the young scientist dubiously.

"Small margin accounts are dangerous," he warned. "We accept them, but we don't solicit them. Those wolves out there will take the shirt off your back so quick it will make your head swim."

"Fair enough," answered Kellog cheerfully. "As a matter of fact, I am in the market for a few wolfskins myself. Here, buy me some Callistan Radioactives and sell some Martian Gems; all you can for the money."

Neville grunted disapprovingly, but took the money. Nobody but an ignorant fool would sell Martian short, and Callistan was no bargain above 400. Kellog went on into the board room and sat down behind the group of local capitalists who were scanning the board in a listless, bored way. Kellog had a hard time restraining his elation, for the figures on the board they were looking at were ancient history to him. His information was over an hour ahead of it. After a while he got up and phoned Wade from a booth.

"Read me the latest dope," he said. Then listened as Wade gave him the quotations. Martian had stopped falling; there was a flurry in Oberon Metals. He hung up and stopped at Neville's desk on the way back to his chair.

"Cover that Martian sale, then buy me some Oberon."

Neville blinked. Oberon had been inactive for days. But he noticed Kellog had doubled his money on the Martian transaction, and had a nice paper profit on his Callistan stock.

"Beginner's luck," he cautioned, as he filed the order.

When Kellog got the day's close from Wade, he closed out his line. It was not a bad day's work. His cash balance on Neville's books was over fourteen thousand. He left it there; tomorrow was another day.

The next day he ran the fourteen thousand up to forty-five. The day after that he finished up with a couple of hundred. He drew enough of it to pay the power bill, then walked on to the booking office of Titan General Shops.

"Last week," said Kellog to the clerk, "I left an order here for some parts for a special televise machine—"

"It's N. G.," said the insolent clerk. "Credit disapproved."

"I've got the money now," added Kellog. But the clerk shook his head and walked away. Over his shoulder he flung:

"You gotta get Wolf's O. K. He stopped it—personally."

"Oh," said Kellog. So he wouldn't be permitted to develop his invention on Titan *even* if he had money! Carmichael held the reins—the supply house, the shops, the power plant, transportation. Kellog walked slowly back to his laboratory, thinking on the way what his next step would be.

The following day he had better luck. When he looked from his antichron onto the clamoring mob of Wall Street brokers he knew at once that something unusual was afoot. Pandemonium reigned, and often awed faces would turn to stare up at the quotation board with its ever-changing symbols of good and bad news. Kellog read the last bulletin hurriedly.

"Following the suicide early this morning of Charles Bean, general manager of Venus Exploitation, rumors persist that the company's billion-dollar investment in mimil plantations has had to be written off as a total loss. The stock opened at 240, but fell off over a hundred points in the first few minutes of trading. The last sale was at 97—"

Kellog waited, tense. He watched Exploitation sink rapidly to 60, 50, then 40. A gong rang and the screen lighted up again.

"A correction to the last bulletin," it said. "President Aalman has made a statement. He says that Bean's suicide was due entirely to domestic difficulties. The mimil venture has been tremendously successful. So much so that the board of directors announce a one hundred percent stock dividend and an equal amount in cash. He further states that he will buy personally all the stock that is offered under 500."

At once the tumult on the floor increased to a howling typhoon of sound as the brokers suddenly reversed their position and began hunting sellers as fervidly as they had previously been hunting buyers. The bidding was wild, leaping by bounds to ever-higher figures. Exploitation rose from its depths like a soaring skyrocket—up into the hundreds, past the five-hundred mark of Aalman's bid, on to a thousand and upward.

Another gong. Another announcement.

"It is apparent that an effort is being made to corner Venus Exploitation. The Exchange authorities have ordered dealings in the stock suspended. Speculators short of stock may settle at the rate of two thousand dollars per share."

"Wow!" yelled Doc Kellog, and a moment later he was burning up the road to Neville & Beardsley.

The board room was crowded when he got there. All the big shots of Titan were present, not excepting Carmichael. There was sheer panic in the faces of some as they stared at the earlier bulletins, for Exploitation represented a heavy investment for most of them. Even Wolf's usually expressionless face showed concern as he saw his spare millions dwindle to half and less. He was so intent on following the damning figures that he did not notice the entrance of Kellog, or that he sat down beside him in the chair vacated by a haggard man who had just rushed despairingly from the room.

"It's more of Aalman's skulduggery, the pirate!" growled Carmichael to the fellow sitting on the other side. "He's looted the company, that's what. We're stuck. I'm getting out while I can."

He wrote an order and beckoned to Neville.

"The hell of it is," Wolf added, to his crafty-looking partner, "that while this order is getting to New York, the stock will drop forty points more. Damn that time lag!"

Neville approached, bowed respectfully, and took the order. He looked at it, then remarked:

"This is for more than you own. Are you taking a short position?"

"Right! The stuff's wallpaper. When Aalman milks 'em, they stay milked. Tomorrow I can cover at three. Get rid of this—quick."

Neville bowed again and turned away. Kellog plucked him by the sleeve. He had sneaked a look at the order. The amount he had on balance would margin it.

"I'll take that—at the current price," he whispered. "You needn't send it to New York."

"You're crazy," said Neville, but he noted the order.

Kellog sat back and waited, gloating. In a few minutes the news would come through that the market had reversed itself. He had made a brilliant double play. If Carmichael's selling order had gone through in the regular way, when it hit New York his stock would have brought him hundreds of dollars a share; conversely, if his own buying order had, he would have had to pay the corresponding price. As it was, he got Carmichael's stock at 43, close to the bottom, and for it Wolf received but 43.

"Whipsawed!" Carmichael yelled when Aalman's bullish statement was broadcast. "The dirty rattlesnake. He started the rumors to depress the stock; now he's buying it in at a bargain. Neville! Cancel my selling orders."

Neville was late in coming. In the meantime the later flash showed on the screen—the one telling of suspension of trading and the penalties levied on short-sellers.

"Sorry, sir," said Neville, as placatingly as possible, "but it is already executed. You said quick, so I disposed of it locally."

Carmichael snorted and looked about him.

"What fool—" he began, but Neville simply said, "The gentleman on your right."

Carmichael glared at Kellog. Kellog glared right back.

"You!" howled Wolf, his porcine eyes incredulous.

"Me," grinned Kellog. "You owe me five thousand shares of Exploitation, I believe. I want it."

Carmichael sputtered and gazed questioningly at Neville. It must be a joke—this silly upstart of a scientist holding the whip hand over him. Why, only a few days before he had come whining to his office for the loan of a miserable few thousand. Now he was demanding ten million. Preposterous!

"If you haven't the cash, I'll settle for a deed to Titan Shops, lock, stock and barrel," offered Kellog smoothly, but he could not conceal the triumph in his eyes. "I am rather anxious to get

NO FINER DRINK EAST OR WEST OF THE ROCKIES!

BETTER TASTE... PEPSI-COLA ...BIGGER DRINK

Purity...in the big big bottle —that's Pepsi-Cola!

a little job done there, but up to now they haven't been very . . . uh . . . co-operative."

Carmichael grunted like a prodded boar, frowning. He was in a tight spot; he knew it. He had to settle and he did not have the cash. Moreover, it hurt him to give up a property. But there seemed to be no choice, and he was aware that the other speculators in the room were watching him closely. He couldn't welsh—not openly.

"Done!" he exploded.

That night Kellog took over the Titan General Shops. He and Wade worked late, laying out the program for the following day. Tomorrow they would start construction on the first batch of commercial antichrons. But just at midnight a messenger came, bearing a communication from the power company. It read:

You are hereby notified that due to inadequate generating facilities, Titan Radio Power finds itself compelled to curtail its service. Since our contract to furnish your plant with power was made with Mr. George Carmichael personally and not with the Titan General Shops, the change of ownership voids it. All service will be discontinued within four hours.

"The dirty rat!" blazed Kellog.

"Wolf is the word," corrected Billy Wade with a sigh. "You can't beat him."

"We'll see," said Kellog grimly. "Let's have a look at the electrical hook-up here. Maybe we can use antichron in another way."

Neither he nor Wade attempted to sleep that night. They were much too busy. The machine was retuned and put in search for the New York home of the general manager of Tellurian Power. They found him, aroused him and made their proposition. Yes, the Earth plants had unlimited power. Yes, if Kellog could project a receiving plate into one of Tellurian's generating plants, its men would connect leads to it. The general manager doubted whether power could be transmitted from planet to planet—it had never been done before—but if they would pay for it, he would send it.

Kellog closed the deal. Then he and Wade went about altering the antichron for gathering pure current, not light. They marked the back face to show where the Earthly electrodes should be placed. On the front they attached their own connections. Those led to the shops. Then they set the space-time warper to working. In a moment the back face was gone. No doubt, at that instant, startled engineers were puzzling over the bizarre outlet that had suddenly appeared in their plant.

"Say," said Billy Wade. "He said unlimited power, didn't he? And the rate there is a tenth what it is here. Why not peddle some juice on the side?"

"Right!" yelped Kellog, and he reached for a pad.

POWER FOR SALE, CHEAP

Owing to surplus productive capacity provided by new owners, Titan General Shops is in a position to furnish any quantity of power at the rate of ten cents a megawatt hour.

"Get that to the Saturnport *Herald* to be run in the next edition," he told Wade.

"This'll wash up Titan Power, if my guess is any good," remarked Wade cheerfully. "They've been getting away with murder."

"Yep," said Kellog dreamily. Carmichael would have to write off another asset, for local power could not possibly compete with Tellurian now that there was a way to transmit it. And the power monopoly was the biggest plum in Wolf's basket.

In an hour the first surges of energy were coming in from Earth, flowing from the antichron into the local radio distributing emission set. The electricians at the plant simply tuned out on Titan Power and in on the laboratory set. The shift was made.

Carmichael did not take the fresh assault upon him lying down. He promptly went about getting an injunction against the unfranchised sale of power, but it was several days before he could get it issued. In the meantime, with the full facilities of the shop at his disposal, Kellog had completed a batch of sight-sound antichrons for use in communication. He hired and instructed operators. Then the machines were focused on the various important planets, satellites and asteroids. At one stroke Saturnport became the central clearing house of the Solar System for news. If necessary, a Pluto signal could be relayed through Titan to Earth in only the time necessary to make the connections. Etherways was at once ruined. All its equipment was junk, except for nearby use.

"That ought to hurt," observed Billy Wade, jubilantly. "They say Wolf had a pile of Etherways Preferred."

"Probably," said Kellog. But he was smarting under the injunction. The corrupt local court had forbidden the outside sale of power. Not only that, the Saturnport Council—all creatures of Carmichael—issued an edict prohibiting the importation of power generated outside of Titan. This time the shops did have to close down until Kellog could improvise some old-fashioned magnetic generators of the field-armature type. Not content with inflicting those inconveniences on Kellog, Carmichael might be expected next to bring suit for personal damages ensuing from the collapse of Etherways. Etherways represented the investment of important money, and the men

who lost were not the type who would console themselves that their company had been replaced by something incomparably better.

"I've got to go all the way," concluded Kellog, soberly. "If I don't get him, he'll get me."

Again he put his and Wade's head together and designed a new type of antichron. It was three-dimensional—a cubical box, to be exact, with four sides and a bottom, but open at the top. It worked on the same principle as the flat screen, but with slight variations. It operated as a shuttle, not continuously.

Kellog put one of his television machines in focus with the mine on Mimas. Miman Mines was only partly owned by Carmichael; he controlled the industries on the lesser satellites by virtue of his strangle hold on transportation. So the manager was willing to talk to Kellog.

"What do you pay that buccaneer to haul ore to Titan?" asked Kellog.

"Twenty cents a ton."

"I'll haul it for two."

"You can't," objected the manager. "The Trans-Saturnian Lighter Service's charter says—"

"I know what it says," snapped back Kellog. "My father drew it up. It confers a perpetual monopoly on all intersatellite *ship-borne* commerce. Now listen. Clear a place about twenty feet square and arrange to dump ore in it from twenty feet or more above. Mark it off with safety lines and don't ever let a man step across the lines. Then watch my smoke."

He cut the connection long enough to send similar instructions to the receiving station by the smelter. Then he watched through the antichron while the preparations were being made at both ends of the line. When they were ready he turned the machine over to Wade.

Wade sat down and got to work. His job was very much like that of the operator of a grab bucket. He kept his eyes on the visual screen, his hands on the controls of the cubical one.

Current!—the empty cube appears on Mimas—an avalanche of ore fills it—shift current—it disappears from Mimas, appears at the smelter on Titan—the unloading cradle on which it materializes tips and dumps the ore—when it is upright again, shift current. Mimas, fill; Titan, dump. Mimas, fill; Titan, dump. That was all there was to it. Hundreds of tons a minute, delivered in Titan the day it is mined.

"That shoots Interplanetary Transportation and Trans-Saturnian all to hell, I should say," drawled the editor of the *Herald,* who had been invited to watch the demonstration. He was conducting a campaign to have Carmichael's injunction revoked. Now that the people knew cheap power was available, they were angry about it. "Yes," continued the editor, "they're sunk. I'm going to stroll down to the bank and draw out my balance before the run starts."

"What do you mean?" asked Kellog.

"Plenty. The bank is really a sort of holding company for Wolf. Now that his companies are all shot, it'll crash. You may not know it yet, but Carmichael is ruined. He will be a very sick wolf in an hour or so."

Who is the Wolf of Saturn? People on Titan will point out a blowzy, sodden old derelict who hangs out in a dive near the skyport and tell you that "Carmy," as they call him now, used to wear that title. He was a big shot once, they say.

But if you should ask any of the frequenters of the big building on lower Manhattan who the Wolf of Saturn is, they will tell you instantly. It is a crackpot on Titan by the name of Kellog. He was the fellow who ruthlessly and without warning wrecked two of the biggest and most profitable enterprises in the universe—Etherways, Inc., and Interplanetary Transport—and many of the smartest financiers of the System with it. What a guy! Not only that, but he wrecked the System's entire price structure with his cheap services. "Benefactor?" they will squall. "He's a wild man—a wolf!"

THE END.

THE ANALYTICAL LABORATORY

Catherine Moore, with her "There Shall Be Darkness," has won first place—a very real accomplishment in the face of competition from E. E. Smith's "Second Stage Lensmen." The point-scores indicate rather clearly that there was considerable competition in the voting between these two stories, which were fairly consistently ranked high, and a second stage of keen competition between the remaining yarns. There is less than three-quarters of a point difference in the score of No. 3 and No. 5—which means diversified opinions.

Place	*Story*	*Author*	*Points*
1.	There Shall Be Darkness	C. L. Moore	1.66
2.	Second Stage Lensmen	E. E. Smith, Ph. D.	2.33
3.	Starting Point	R. F. Jones	3.6
4.	Medusa	Theodore Sturgeon	3.90
5.	Sorcerer of Rhianon	Leigh Brackett	4.25

The Editor.

SILENCE IS—DEADLY

By Bertrand L. Shurtleff

● Radio is an absolute necessity in modern organization—and particularly in modern naval organization. If you could silence all radio—silence of that sort would be deadly!

Illustrated by Kolliker

The hurried *rat-a-tat* of knuckles hammered on the cabin door. Commander Bob Curtis roused himself from his doze, got up from his chair, stretched himself to his full, lanky height and yawned. That would be Nelson, his navigating officer. Nelson always knocked that way—like a man in an external state of jitters over nothing at all.

Curtis didn't hurry. It pleased him to let Nelson wait. He moved slowly to the door, paused there, and flung a backward glance at the man in the cabin with him—Zukor Androka, the elderly Czech scientist, a guest of the United States navy, here aboard the cruiser *Comerford*.

The wizened face of the older man was molded in intent lines of concentration, as his bushy gray head bent over his drawing board. Curtis got a glimpse of the design on which he was working, and his lips relaxed in a faint smile.

Androka had arrived on board the *Comerford* the day before she sailed from Norfolk. With him came a boatload of scientific apparatus and equipment, including a number of things that looked like oxygen tanks, which were now stored in the forward hold. Androka had watched over his treasures with the jealous care of a mother hen, and spent hours daily in the room in the superstructure that had been assigned as his laboratory.

Sometimes, Curtis thought old Androka was a bit wacky—a scientist whose mind had been turned by the horror that had come to his country under the domination of the Nazi *gestapo*. At other times, the man seemed a genius. Perhaps that was the answer—a mad genius!

Curtis opened the door and looked out. Rain whipped against his face like a stinging wet lash. Overhead, the sky was a storm-racked mass of clouds, broken in one spot by a tiny patch of starlit blue.

His eyes rested inquiringly on the face of the man who stood before him. It *was* Nelson, his shaggy blond brows drawn scowlingly down over his pale eyes; his thin face a mass of tense lines; his big hands fumbling at the neck of his slicker. Rain was coursing down his white cheeks, streaking them with glistening furrows.

The fellow was a headache to Curtis. He was overfriendly with a black-browed bos'n's mate named Joe Bradford—the worst trouble maker on board. But there was no question of his ability. He was a good navigating officer—dependable, accurate, conscientious. Nevertheless, his taut face, restless, searching eyes, and eternally nervous manner got Curtis' goat.

"Come in, Nelson!" he said.

Nelson shouldered his way inside, and stood there in his dripping oilskins, blinking his eyes against the yellow light.

Curtis closed the door and nodded toward the bent form of Zukor Androka, with a quizzical grin. "Old Czech-and-Double-Czech is working hard on his latest invention to pull Hitler's teeth and re-establish the Czech Republic!"

Nelson had no answering smile, although there had been a great deal of good-natured joking aboard the *Comerford* ever since the navy department had sent the scientist on board the cruiser to carry on his experiments.

"I'm worried, sir!" Nelson said. "I'm not sure about my dead reckoning. This storm—"

Curtis threw his arm around Nelson's dripping shoulders. "Forget it! Don't let a little error get you down!"

"But this storm, sir!" Nelson avoided Curtis' friendly eyes and slipped out from under his arm. "It's got me worried. Quartering wind of undetermined force, variable and gusty. There's a chop to the sea—as if from unestimated currents among the islets. No chance to check by observation, and now there is a chance—look at me!"

He held out his hands. They were shaking as if he had the chills.

"You say there is a chance?" Curtis asked. "Stars out?"

"As if by providence, sir, there's a clear patch. I'm wondering—" His voice trailed off, but his eyes swung toward the gleaming sextant on the rack.

Commander Curtis shrugged good-naturedly and reached for the instrument. "Not that I've lost confidence in you, Nels, but just because you asked for it!"

Curtis donned his slicker and went outside, sextant in hand. In a few minutes he returned and handed Nelson a sheet of paper with figures underlined heavily.

"Here's what I make it," the commander told his navigating officer. "Bet you're not off appreciably."

Nelson stared at the computations with shaking head. Then he mutely held up his own.

Curtis stared, frowned, grabbed his own sheet again. "Any time I'm that far off old Figure-'em Nelson's estimate, I'm checking back," he declared, frowning at the two papers and hastily rechecking his own figures.

"Call up to the bridge to stop her," he told Nelson. "We can't afford to move in these waters with such a possibility of error!"

Nelson complied, and the throbbing drive of the engines lessened at once. Nelson said: "I've been wondering, sir, if it wouldn't be advisable to try getting a radio cross-bearing. With all these rocks and islets—"

"Radio?" repeated the little Czech, thrusting his face between the other two, in his independent fashion that ignored ship's discipline. "You're using your radio?" He broke into a knowing chuckle, his keen old eyes twinkling behind their thick lenses. "Go ahead and try it. See how much you can get! It will be no more than Hitler can get when Zukor Androka decrees silence over the German airways! Try it! Try it, I say!"

Bob Curtis stared at him, as if questioning his sanity. Then he hastened to the radio room, with Nelson at his heels, and the Czech trotting along behind.

The door burst open as they neared it. A frightened operator came out, still wearing his earphones, and stood staring upward incredulously at the aërial.

"Get us a radio cross-bearing for location at once," Curtis said sharply, for the operator seemed in a daze.

"Bearing, sir?" The man brought his eyes down with difficulty, as if still dissatisfied. "I'm sorry, sir, but the outfit's dead. Went out on me about five minutes ago. I was taking the weather report when the set conked. I was trying to see if something's wrong."

The Czech inventor giggled. Curtis gave him another curious look and thrust himself into the radio room.

"Try again!" he told the operator. "See what you can get!"

The radio man leaped to his seat and tried frantically. Again and again, he sent off a request for a cross-bearing from shore stations that had recently been established to insure safety to naval vessels, but there was no answer on any of the bands—not even the blare of a high-powered commercial program in the higher reach, nor the chatter of ships or amateurs on the shorter.

"Dead!" Androka muttered, with a bitter laugh. "Yet not dead, gentlemen! The set is uninjured. The waves are what have been upset. I have shattered them around your ship, just as I can eventually shatter them all over Central Europe! For the next two hours, no radio messages can enter or leave my zone of radio silence—of refracted radio waves, set up by my little station on one of the neighboring islets!"

There was a long pause, while commander and navigator stared at him. Curtis was the first to speak.

"Your secrecy might well cost the United States navy one of its best light cruisers—and us our lives!" he said angrily. "We need that check by radio at once! If you're not talking nonsense, call off your dogs till we learn just where we are!"

Androka held out his palms helplessly. "I can do nothing. I have given orders to my assistant that he must keep two hours of radio silence! I can get no message to him, for our radio is dead!"

As if to mock him, the ship's radio began to answer:

"Station 297 calling U. S. Cruiser *Comerford.* Station 297 calling U. S. Cruiser *Comerford—*"

"U. S. Cruiser *Comerford* calling Station 297!" the operator intoned, winking at the two officers over Androka's discomfiture, and asked for the bearings.

The answer came back: "Bearings north east by a quarter east, U. S. Cruiser *Comerford!*"

Curtis sighed with relief. He saw that Nelson was staring fiercely at the radio operator, as the man went on calling: "U. S. Cruiser *Comerford* calling Station 364. U. S. Cruiser *Comerford* calling Station 364—"

Then the instrument rasped again: "Station 364 calling U. S. Cruiser *Comerford.* Bearings north west by three west. Bearings north west by three west, U. S. Cruiser *Comerford* from Cay 364."

Commander and navigator had both scribbled verifications of the numbers. Ignoring the gibbering Androka, who was wailing his disappointment that messages had penetrated his veil of silence, they raced for the chart room.

Quickly the parallels stepped off the bearing from the designated points. Light intersecting lines proclaimed a check on their position.

Curtis frowned and shook his head. Slowly he forced a reluctant grin as he stuck out his hand.

"Shake, Nels," he said. "It's my turn to eat crow. You and the radio must be right. Continue as you were!"

"I'm relieved, sir, just the same," Nelson admitted, "to have the radio bearings. We'd have piled up sure if you'd been right."

They went on through the night. The starlit gap in the clouds had closed. The sky was again a blanket of darkness pouring sheets of rain at them.

Nelson went back to the bridge, and Androka returned to the commander's cabin. Curtis lingered in the wireless room with the radio operator.

"It's a funny thing," the latter said, still dialing and grousing, "how I got that cross-bearing through and can't get another squeak out of her. I'm wondering if that old goat really *has* done something to the ether. The set seems O. K."

He lingered over the apparatus, checking and rechecking. Tubes lighted; wires were alive to the touch and set him to shaking his head at the tingle they sent through his inquiring fingers.

Curtis left him at it, and went to rejoin Androka in the cabin. He found the little inventor pacing up and down, shaking his fists in the air; pausing every now and then to run his bony fingers through his tangled mop of gray hair, or to claw nervously at his beard.

"You have seen a miracle, commander!" he shouted at Curtis. "*My* miracle! My invention has shattered the ether waves hereabouts hopelessly."

"Seems to me," Curtis said dryly, "this invention can harm your friends as much as your enemies."

The scientist drew himself up to his full height—which was only a little over five feet. His voice grew shrill. "Wait! Just wait! There are other inventions to supplement this one. Put them together, and they will defeat the Nazi hordes which have ravaged my country!"

Curtis was a little shocked by the hatred that gleamed in Androka's eyes, under their bushy brows. There was something of the wild animal in the man's expression, as his lips drew back from his yellowed teeth.

"Those tanks you have below," Curtis said, "have they some connection with this radio silence?"

A far-away look came into Androka's eyes. He did not seem to hear the question. He lowered his voice: "My daughter is still in Prague. So are my sister and her husband, and *their* two daughters. If the *gestapo* knew what I am doing, all of them would be better dead. You understand—better dead?"

Curtis said: "I understand."

"And if the Nazi agents in America knew of the islet from which my zone of silence is projected—" Androka paused, his head tilted to one side, as if he were listening to something—

On deck, there was shouting and commotion. Curtis rushed out, pulling on his slicker as he went. The shout from the watch forward had been picked up, and was being relayed all over the ship. The words struck on Curtis' ears with a note of impending tragedy.

"Breakers ahead!"

He was beside Navigating Officer Nelson on the bridge, and saw the helmsman climbing the rapidly spinning wheel like a monkey as he put it hard aport.

Then the ship struck. Everything movable shot ahead until it brought up at the end of a swing or smacked against something solid.

Curtis felt Nelson's hand grip his shoulder, as he put his lips close to his ear and shouted: "You must have been right, sir, and the radio bearings and my reckoning wrong. We've hit that reef a terrific smack. I'm afraid we're gored!"

"Get out the collision mat!" Curtis ordered. "We ought to be able to keep her up!"

And then he became aware of a deadly stillness. A vast wall of silence enveloped the entire cruiser. Looking over the side, he could no longer see the waves that a few minutes before had beaten savagely against the ship.

The *Comerford* was shrouded in a huge pall of yellowish-gray mist, and more of it was coming up from below—from ventilators and hatchways and skylights—as if the whole ship were flooded with some evil vapor.

Somehow, Curtis' mind flashed to the stories he'd heard of the forts of the Maginot Line, and of other forts in Holland and Belgium that had fallen before the early Nazi blitzkrieg, when their defenders found themselves struck numb and helpless by a gas that had been flooded into the inner compartments of their strongholds.

There were those who said it was the work of sappers who had tunneled under the foundations, while others laid the induction of the gas to Fifth Column traitors. There were a hundred more or less plausible explanations—

The vapor clouds that enveloped the *Comerford* were becoming thicker. All about the deck lay the forms of unconscious seamen, suddenly stricken helpless. And then Curtis saw other forms flitting about the deck—forms that looked like creatures from another world, but he recognized them for what they were—men wearing gas masks.

Nelson was nowhere in sight. The steersman lay in a limp heap beside the swinging wheel. Then a gas-masked figure appeared through the shroud of mist and steadied it, so that the cruiser would not be completely at the mercy of the wind and the waves.

Curtis heard the anchor let down, as if by invisible hands, the chain screaming and flailing its clanking way through the hawse hole. Then he was completely walled in by the yellowish-gray mist. He felt his senses swimming.

Voices droned all around him in mumbling confusion—guttural voices that ebbed and flowed in a tide of excited talk. He caught a word of English now and then, mixed in with a flood of Teuton phonetics.

Two words, in particular, registered clearly on his mind. One was *"Carethusia";* the other was "convoy." But gradually his eardrums began to throb, as if someone were pounding on them from the inside. He couldn't get his breath; a cloud seemed to be mounting within him until it swept over his brain—

He felt something strike the side of his head, and realized that he had fallen in a heap on the bridge. And after that, he wasn't conscious of anything—

The rain had abated to a foggy drizzle. The wash of the surf swung the *Comerford* in a lazy, rolling motion, as she lay with her bow nosing into the sandbar at the entrance of the inlet.

From her bridge, Navigating Officer Nelson watched the gas-masked figures moving about the decks, descending companionways—like goblins from an ancient fairy tale or a modern horror story. Nelson looked like a goblin himself, with his face covered by a respirator. At his side, stood his fellow conspirator Bos'n's Mate Joe Bradford, also wearing a gas mask.

Nelson spoke in a low tone, his lips close to Bradford's ear. "It worked, Joe!"

"Yeah!" Bradford agreed. "It worked—fine!"

The limp bodies of the *Comerford's* crew were being carried to the lowered accommodation ladder and transferred into waiting lifeboats.

Nelson swore under his breath. "Reckon it'll take a couple of hours before the ship's rid of that damn gas!"

Bradford shook his head in disagreement. "The old geezer claims he's got a neutralizing chemical in one of them tanks of his that'll clear everything up inside half an hour."

"I'd rather get along without Androka, if we

could!" Nelson muttered. "He's nothing but a crackpot!"

"It was a crackpot who invented the gas we used to break up the Maginot Line," Bradford reminded him. "It saved a lot of lives for the *Fuehrer*—lives that'd have been lost if the forts had to be taken by our storm troopers!"

Nelson grunted and turned away. A short, thick-set figure in the uniform of a German naval commander had ascended the accommodation ladder and was mounting to the bridge. He, too, was equipped with a respirator.

He came up to Nelson, saluted, and held out his hand, introducing himself as Herr Kommander Brandt. He began to speak in German, but Nelson stopped him.

"I don't speak any German," he explained. "I was born and educated in the United States—of German parents, who had been ruined in the First World War. My mother committed suicide when she learned that we were penniless. My father—" He paused and cleared his throat.

"*Ja!* Your father?" the German officer prompted, dropping into accented English. "Your father?"

"My father dedicated me to a career of revenge—to wipe out his wrongs," Nelson continued. "If America hadn't gone into the First World War, he wouldn't have lost his business; my mother would still be living. When he joined the Nazi party, the way became clear to use me—to educate me in a military prep school, then send me to Annapolis, for a career in the United States navy—and no one suspected me. No one—"

"Sometimes," Bradford put in, "I think Curtis suspected you."

"Maybe Curtis'll find out his suspicions were justified," Nelson said bitterly. "But it won't do Curtis any good—a commander who's lost his ship." He turned to Brandt. "You have plenty of men to work the *Comerford?*"

Brandt nodded his square head. "We have a full crew—two hundred men—officers, seamen, mechanics, radio men, technical experts, all German naval reservists living in the United States, who've been sent here secretly, a few at a time, during the past six weeks!"

The three—Brandt, Nelson and Bradford—stood on the bridge and talked, while the efficient stretcher-bearers worked industriously to remove the limp bodies of the *Comerford's* unconscious crew and row them ashore.

And when that task was completed, lifeboats began to come alongside with strange-looking radio equipment, and more gas tanks like those Androka had brought aboard the *Comerford* with him, and dynamos and batteries that looked like something out of a scientific nightmare.

And bustling all over the place, barking excited commands in German, pushing and pulling and pointing to emphasize his directions, was the strange figure of Professor Zukor Androka!

"The professor's in his glory!" Nelson remarked to Kommander Brandt.

"Funny thing about him," Bradford put in, "is that his inventions work. That zone of silence cut us off completely."

Kommander Brandt nodded. "Goodt! But you got your message giving your bearings—the wrong ones?"

"Yes," Nelson said. "That came through all right. And won't Curtis have a time explaining it!"

"Hereafter," Brandt said solemnly, "the zone of silence vill be projected from the *Comerford;* and ve have another invention of Androka's vich vill be even more useful vhen ve come to cut the *Carethusia* out of her convoy."

"The *Carethusia?*" Nelson asked, in a puzzled tone.

Brandt said: "She's a freighter in a convoy out of St. Johns—twelve thousand tons. The orders are to take her; not sink her."

"What's the idea?"

"Her cargo," Brandt explained. "It iss more precious than rubies. It includes a large shipment of boarts."

"Boarts?" Nelson repeated. "What are they?"

"Boarts," Brandt told him, "are industrial diamonds—black, imperfectly crystallized stones, but far more valuable to us than flawless diamonds from Tiffany's on Fift' Avenue. They are needed for making machine tools. They come from northern Brazil—and our supply is low."

"I should think we could get a shipment of these boarts direct from Brazil—through the blockade," Nelson said, "without taking the risk of capturing a United States navy cruiser."

"There are other things Germany needs desperately on board the *Carethusia,*" Brandt explained. "Vanadium and nickel and hundreds of barrels of lard oil for machine-tool lubrication. Our agents have been watching the convoys closely for weeks for just such a cargo as the *Carethusia* is taking over."

"Can we trust Androka?" Nelson asked, with a sudden note of suspicion in his voice.

"Yes," Brandt assured him. "Of all men—we can trust Androka!"

"But he's a Czech," Nelson argued.

"The *gestapo* takes care of Czechs and Poles and Frenchmen and other foreigners whom it chooses as its agents," Brandt pointed out. "Androka has a daughter and other relations in Prague. He knows that if anything misfires, if there is the slightest suspicion of treachery on his part, his daughter and the others will suffer. Androka's loyalty is assured!"

Nelson turned to watch the forward fighting top of the *Comerford.* The masked German seamen

were installing some sort of apparatus up there—a strange-looking object that looked something like an old-fashioned trench mortar, and which connected with cables to the room that served as Androka's laboratory and workshop.

Another crew was installing radio apparatus in the mizzentop turret.

Descending a companionway to see what was going on below, Nelson found that portholes were being opened, and men were spraying chemical around to rid the below-decks atmosphere of the lethal gas that had overcome the *Comerford's* American crew.

Returning to the bridge, he found that the tide in the inlet had risen considerably, and that the cruiser was riding more easily at her anchor.

Then, at Brandt's orders, the anchor was hauled in, and lifeboats and a motor launch were used as tugs to work the vessel entirely free of the sand bar. This was accomplished without difficulty.

Brandt came over to where Nelson was standing on the bridge and held out his hand.

"Congratulations, Herr Kommander Nelson!" he said. "Ve have stolen one of the United States navy's newest and fastest cruisers!" He made a gesture as if raising a beer stein to drink a toast. "*Prosit!*" he added.

"*Prosit!*" Nelson repeated, and the two grinned at each other.

Stars were twinkling in a patch of black-blue sky, and broken mountains of gray cloud were skudding before the east wind. Commander Bob Curtis found himself lying in wet sand, on a beach, somewhere, with the rain—now a light, driving mist—beating on his face. He was chilled; his limbs were stiff and numb. His nose and throat felt parched inside, as if a wave of searing heat had scorched them.

According to his last calculations, the *Comerford* had been cruising off the Maine coast. This probably was one of the islets of that region, or it might be the mainland.

It was hard work getting to his feet, and when he did manage to stand, he could only plant his heels in the sand and sway to and fro for fully a minute, like a child learning to walk.

All around him in the nearly total darkness, he could make out the dim forms of men sprawled on the beach; and of other men moving about, exploring. He heard the murmur of voices and saw the glow of lighted cigarettes.

A man with a flashlight was approaching him. Its white glare shone for a moment in Curtis' face, and the familiar voice of Ensign Jack Dillon spoke: "Commander Curtis! Are you O. K., sir?"

"I think so!" Curtis' heart warmed at the eager expression in Dillon's face; at the heartfelt concern in his friendly brown eyes. The young ensign was red-headed, impetuous, thoroughly genuine in his emotions. "How about yourself, Jack?" Curtis added.

"A bit of a headache from the gas, but that's all. Any orders, sir?"

Curtis thought for a moment. "Muster the crew, as best you can. We'll try to make a roll call. Is there any sign of the ship?"

There was a solemn note in Dillon's voice. "No, sir. She's been worked off the sandbar and put to sea!"

The words struck Curtis with the numbing shock of a blow on some nerve center. For the first time, he realized fully the tragedy that had swept down on him. He had lost his ship—one of the United States navy's fastest and newest small light cruisers—under circumstances which smelled strongly of treachery and sabotage.

As he thought back, he realized that he *might* have prevented the loss, if he had been more alert, more suspicious. For it was clear to him now that the *Comerford* had been deliberately steered to this place; that the men who had seized her had been waiting here for that very purpose.

The pieces of the picture fitted together like a jigsaw puzzle—Androka's zone of silence; the bearings given by radio; Navigating Officer Nelson's queer conduct. They were all part of a carefully laid plan!

All the suspicious circumstances surrounding Nelson came flooding into Curtis' mind. He had never liked the man; never trusted him. Nelson always acted as if he had some secret, something to hide.

Curtis recalled that Nelson and Androka had long conversations together—conversations which they would end abruptly when anyone else came within earshot. And Nelson had always been chummy with the worst trouble maker in the crew—Bos'n's Mate Bradford.

Curtis went around, finding the officers, issuing orders. There were still some unconscious men to be revived. In a sheltered cove among the rocks, an exploring group had found enough dry driftwood to make a fire—

In another hour, the skies had cleared, and white moonlight flooded the scene with a ghostly radiance. The men of the *Comerford* had all regained consciousness and were drying out in front of the big driftwood bonfires in the cove.

Curtis ordered a beacon kept burning on a high promontory. Then he got the men lined up, according to their respective classifications, for a check-up on the missing.

When this was completed, it was found that the *Comerford's* entire complement of two hundred and twenty men were present—except Navigating Officer Nelson, and Bos'n's Mate Bradford! And Zukor Androka was also missing!

With the coming of dawn, a little exploration

revealed that the Comerford's crew was marooned on an islet, about a square mile in area; that they had been put ashore without food or extra clothing or equipment of any kind, and that no boats had been left for them.

One searching party reported finding the ruins of what had been a radio station on a high promontory on the north shore of the islet. Another had found the remains of tents and log cabins, recently demolished, in a small, timbered hollow—a well-hidden spot invisible from the air, unless one were flying very low; a place where two hundred or more men could have camped.

There was a good water supply—a small creek fed by springs—but nothing in the way of food. Evidently food was a precious commodity which the recent inhabitants of the islet couldn't afford to leave behind.

Curtis was studying the wreckage of the wireless station, wondering if this might have been the source of Androka's zone of silence, when Ensign Jack Dillon came up to him.

"There's a coast-guard cutter heading for the island, sir," he announced.

From the coast-guard station on Hawk Island, a fast navy plane whipped Commander Bob Curtis to the naval base at Portsmouth, New Hampshire. But he was received there with suspicious glances. Even some of his old buddies from way back did no more than give him a limp handshake and a faint "Good luck, Bob!" when they heard of his misadventure.

Within two hours of his arrival, he was facing a court of inquiry, presided over by Rear Admiral Henderson—a sarcastic, leathery-faced seadog, who had fought as an ensign under Schley at Santiago in '98, and had since seen service on the North Sea patrol in the First World War. Even to his best friends, he was known as "Old Curmudgeon."

Curtis fidgeted uncomfortably under his questions. They were so hostile in tone, phrased in such a way as to imply guilt on his part, that Curtis could not help feeling that he was making a bad impression.

"Will you kindly repeat that statement in a clear voice, so that everyone can hear you, commander?" the rear

admiral demanded, with a stinging sharpness in his tone.

Curtis cleared his throat and repeated his former explanation: "The radio bearings from the two shore stations checked exactly with the dead reckoning of my navigating officer, refuting my astronomical observation. Naturally, I conceded that I must be wrong, although I could not understand how I made such a mistake."

The voice of Old Curmudgeon became suave and silky—the kind of voice he used when he wished to be nasty. "Commander, did you *hear* the radioed replies from the island stations in answer to your operator's inquiries?"

Curtis squared his shoulders and faced his questioner boldly. "I did, sir. The radio man on duty reported that he was unable to get anything from the set; claimed it was dead. I insisted that he try, although Androka claimed he had instituted a period of radio silence by some device operating on a neighboring island. He was intensely disappointed when both stations answered clearly and distinctly, giving us bearings that checked with Lieutenant Commander Nelson's dead reckoning."

The rear admiral sneered. "A very pretty story, commander—but all a fabrication!"

Curtis stiffened. His eyes blazed anger for a full minute, out of a face already drawn and white.

"I shall now proceed to prove my accusations," Old Curmudgeon continued. "Bring in those operators!"

There was a commotion at the door, and two radio men came in, saluting smartly. Curtis wondered what was coming.

Old Curmudgeon smiled at them. "You are the radio operators on island stations 297 and 364?"

"Yes, sir."

"And you were both on duty during the mysterious two hours of silence on the night of July 7th?"

"Yes, sir!"

"Did you at any time during the two hours leave your posts?"

"No, sir!"

"Did you, during those two hours, receive any call whatsoever or give out bearings to any ship, particularly the U. S. Cruiser *Comerford?*"

"No, sir!"

"You are positive about that?"

"Yes, sir!"

"Gentlemen," the rear admiral said triumphantly, turning to the board of inquiry, "I submit to you that this evidence proves that Commander Curtis has told an untruth. I recommend that he be court-martialed on charges of gross negligence in the loss of government property intrusted to his care and of misrepresenting facts regarding the circumstances of loss!"

During the awed silence that followed, Curtis felt his world whirling to pieces.

The rear admiral's voice went on in its most rasping tone: "I recommend further, gentlemen, that Commander Curtis be relieved from active duty, placed on parole, and confined to this station on his own recognizance until the disappearance of the *Comerford* can be thoroughly investigated."

The members of the inquiry board conferred and voted. There was no dissenting voice from the opinion expressed by Old Curmudgeon.

Angry, ashamed, dazed, Curtis stood to hear the verdict announced. "Gentlemen," he managed to say, his tongue almost choking him, "my only hope is for speedy recovery of the ship!"

Later, in the room assigned to him in the naval barracks, Curtis listened for almost an hour to his short-wave radio set; but it told him nothing of the *Comerford*—and that was all he cared about.

He shut it off and reached for the telephone. A new idea had come into his mind—something he had vaguely remembered from the night before, the two words overheard as he lay half conscious on the *Comerford's* bridge—*"Carethusia"*—"convoy."

"Is there an officer of the British naval intelligence in town?" he asked the operator.

"Yes, sir. Captain Rathbun. Shall I get him for you?"

"Please!"

Fifteen minutes later, Curtis was in the small office where the British naval man made his headquarters, on the main street of the town.

Rathbun listened with close attention to Curtis' story, throwing in a question now and then.

"Yes," he said, "there is a ship called the *Carethusia* carrying supplies to Britain. But it'd take a little time to locate her. I'd have to wire Halifax!"

He sent off a code telegram and waited. An hour elapsed—two hours—then came the reply. Rathbun decoded it and read it to Curtis.

"Carethusia, carrying valuable cargo to Britain, left St. Johns, Newfoundland, in convoy midnight Friday. American destroyers will join, according to instructions."

"That," Curtis said, "solves part of my problem. The *Comerford's* after the *Carethusia.* There must be something of particular value aboard that the *Comerford* wants!"

"Yes," Captain Rathbun agreed. "There *must* be!"

Curtis stood up. "Thank you, captain! You've helped me a lot! You've shown me where to look for the *Comerford!"*

Captain Rathbun shook hands with him. "Right-o! Come and see me again, if there's anything else I can do!"

"Do you suppose you could wire the *Carethusia* and warn her—or warn the commander of the convoy?"

"That would have to be done from Halifax, or St. Johns," Rathbun said. "I'll ask them."

"And will you let me know what happens?" Curtis asked.

"Gladly," said the Britisher.

Outside, Curtis walked at a breathless pace, almost knocking over a couple of pedestrians and innocent bystanders in his haste. Reaching the naval administration building, he ran up the stairs two at a time to the top floor and barged unannounced into the office of Rear Admiral Henderson.

Old Curmudgeon looked up from his desk with a sour grin on his leathery face. "What d'you mean, Curtis—" he began.

But Bob Curtis ignored his indignation, let the door swing to behind him, and sat down in the vacant chair beside the desk.

"This is no time to stand on ceremony, sir!" he stated firmly. "I've come to give information as to where the *Comerford* is most likely to be found!"

A sneer twisted Old Curmudgeon's hard features, and anger blazed coldly in his blue eyes. "You wish to make a clean breast of the whole thing, Curtis?"

"I've been proved guilty of nothing," Curtis reminded him. "I have nothing to confess. If you don't want to listen to me—"

Old Curmudgeon's eyes softened. The lines of his face relaxed. "I'm listening."

Curtis quickly told him of the words he'd overheard as he lay half conscious on the bridge of the *Comerford,* and of how they dovetailed with the information obtained from the British Intelligence Service.

Henderson seemed impressed. There was a more respectful note in his gruff voice. He picked up his telephone and started to dial.

"Remember, Curtis, I'm doing this at your insistence!"

Crisply, concisely, he gave his message, then got up from his desk and went to the window. His eyes turned toward the basin, where the big navy patrol bombers lay at their floats. His head cocked, as if listening for the roar of their motors.

Curtis moved toward him. His eyes lighted with hope as he heard the man-made thunder, saw the big birds taxi out, pick up speed, go soaring into the air, after kicking their spiteful way off the tops of a few waves.

"They'll have our answer," Henderson said, "within a few hours. I'll let you know what happens!"

Curtis took the words as meaning that he was dismissed. He thanked Old Curmudgeon and started back for his quarters.

There, he crouched over the short-wave radio set and waited and listened. The air was alive with calls and messages. From time to time, he caught the reports from the three navy planes that were winging steadily on their flight after the *Comerford.*

Then, just after midnight, the reassuring words of the operator on one of the bombers were cut off short.

"They've struck the zone of silence," Curtis whispered. "The *Comerford* must have spread it, so that it encircles the entire convoy. Those bombers'll shove in, see what's happening and come back out of the zone to report, even if their radios are silenced. Nelson never figured on that!"

His telephone shrilled. It was Captain Rathbun, of the British Intelligence. His words confirmed Curtis' suspicions.

"I've just had word from Halifax. They arranged to contact the *Carethusia's* convoy by wireless every night at eleven-thirty, but tonight, they got no answer. The convoy must be caught in the zone of silence."

Curtis couldn't keep the note of triumph out of his voice. "Then all we've got to do is locate the convoy—and we've got the *Comerford!*"

"Cheerio!" said Rathbun's voice, and he hung up.

Curtis relaxed in his chair beside the short-wave set. Dawn came and found him still alert, listening, wakeful. He had breakfast sent up, but touched nothing except the pot of black coffee.

Several times, he computed the probable flying time of the three planes, and the distance the slow-moving convoy could have covered since sailing at midnight on the previous Friday. Then he tried to find the position of the convoy on the map.

Again the phone rang. A strange voice spoke over the wire. "This is Rear Admiral Henderson's office. He'd like you to come over at once."

"I'll be there!" Curtis said.

He found Old Curmudgeon pacing nervously up and down, chewing savagely on a half-smoked cigar which smelled vilely. From the expression on the old seadog's face, he knew there was bad news.

"I've just had a message from the *Lexington,*" Henderson said. "She's found the bombers!"

"Found them?" Curtis was puzzled.

The rear admiral's face was gloomy. "They were floating—in a sinking condition. The crews of all three were dazed. None of them could understand what had happened, but they all told the same story!"

"And what was it?" Curtis asked, as Old Curmudgeon paused.

The older man slumped into his chair, his shoulders sagging wearily. "They were circling about the *Comerford,* ready to close in, when

a sudden blinding flash, which seemed to come from the foremast turret, killed both radio and motor."

"That must have been the new invention Androka was working on!" Curtis exclaimed. "Have you heard how badly the equipment was damaged?"

"Yes," Old Curmudgeon answered. "It was burned out by a terrific heat that melted copper wires, cracked the porcelain on plugs, and fused them into their sockets. Batteries, magnetos, tubes—everything was destroyed!"

Curtis leaned forward and gazed earnestly into the rear admiral's tired face. "Sir, you have received proof that something unusual has taken place aboard the *Comerford;* that she is in the hands of enemies. Do you believe now that I have told the truth?"

Old Curmudgeon's eyes held a kinder expression than Curtis had ever seen in them before. "Yes; I believe you!"

"Thank you, sir!" Bob Curtis said, deeply moved. "I don't blame you," he added. "The story I told *was* unbelievable! But I think I know a way to catch up with the *Comerford*—recapture her without destroying her!"

"Tell me your plan!" Henderson said quietly, and he leaned back in his chair to listen.

Curtis spoke to him earnestly for some time. When he had finished, Old Curmudgeon raised his telephone and began dialing and giving orders.

Then he stood up and held out his hand. "Good luck, commander! Your plane'll be ready in half an hour!"

Commander Bob Curtis was in the co-pilot's seat, as the big PBY flying boat, one of the navy's latest-type patrol bombers, spanked out into the choppy water, lifted, went roaring off. The miles slipped away astern under the pull of its mighty propellers as they raced on their journey.

Every once in a while, Curtis turned his eyes away from the restless gray Atlantic to glance toward the cabin, where the navigator and wireless operator sat at his little table. There was, he knew, a machine gunner at his post in the tail of the plane, and a bombardier lying flat in the nose of the fuselage.

At short intervals, Curtis got the relayed radio reports, through his headphones, from the *Lexington.* The seaplane's wireless was keeping in constant touch with the big aircraft carrier, which evidently was still outside the limits of Zukor Androka's zone of silence.

The *Lexington* held the key to Curtis' secret plan. This flight was the first leg of his journey to recapture the *Comerford.*

At the controls, the pilot, Lieutenant Delton, sat relaxed, smiling confidently, a cigarette in the corner of his mouth. He offered one to Curtis, who took it with a nod of thanks, lighted it and inhaled deeply. It tasted good, eased the strain on his nerves.

The voice of the navigator came through his phones. "*Lexington* hasn't answered for the past half hour. I've been calling her every five minutes!"

Curtis' heart leaped at the news. The *Lexington* had come into the silence area!

That might mean the *Comerford* was close at hand; or it might be five hundred miles away. For that, Curtis figured, was the maximum radius over which Androka's zone could extend its influence. And the device for killing all electrical apparatus with a ray would necessarily operate at a much shorter distance—unless Androka's invention bordered on the miraculous.

The *Lexington* hove in sight. Curtis thrilled at the sight of her top deck, with its rows upon rows of planes, their propellers agleam in the sunlight that had recently broken through the Atlantic fog.

For a moment, his lips tightened as he thought of the destruction which Androka's deadly ray could wreak on this splendid array of aircraft, and the resolution in him gained renewed confidence, as his eyes swept the *Lexington's* powerful hull.

He was aware that the pilot had shut off the motor and was gliding in a circular descent that would bring the heavy navy bomber taxiing to a stop alongside the aircraft carrier. The man out front in the bomber's pit had diffused his bombs and left his post in the nose of the fuselage, and the machine-gunner aft had come out of his nest—both glad of the opportunity to change their cramped quarters for a spell.

The *Lexington* lowered a boat and took Curtis on board. A few minutes later, he was explaining his theory to the *Lexington's* commander, with the aid of a map of the Atlantic in the chart room.

"The way I figure it, sir," he stated, "is that the *Comerford* has been detailed to cut the *Carethusia* out of her convoy and take her to some French port—probably Bordeaux, where she will be less likely to prove a target for R. A. F. bombers."

The *Lexington's* commander nodded. "I think I follow you. The *Carethusia's* cargo must be something of immense value to the Nazi war machine."

"There's no doubt that it is, sir," Curtis said, "or they wouldn't take so much trouble to capture it. And there'd be no point in separating the *Carethusia* from her convoy before they're fairly close to the French port which they intend to make."

"Where do you place the convoy at present?" the other man asked.

Curtis put his finger on a spot on the map, in about mid-Atlantic, along one of the more northerly sea lanes. "I've checked with the British

Naval Intelligence. The convoy makes the voyage in sixteen days, under normal conditions. Its speed is that of the slowest boat. It left at midnight last Friday, and this is Friday again."

"And the *Comerford?*"

"The *Comerford,*" Curtis said, "is undoubtedly with the convoy, making the British believe that she is one of the American war vessels which usually pick up these convoys at a designated point on the way across."

The *Lexington's* commander frowned; his face wore a puzzled expression. "But suppose the British escort ships discover the deception?"

"If it came to a showdown," Curtiss argued, "the *Comerford,* equipped with Androka's inventions, is more than a match for any or all of the British war vessels with the convoy. You know they're using mostly light corvettes and over-age destroyers these days."

"I guess you're right," the other agreed. "I haven't forgotten the mess the *Comerford* made of those three bombers we picked up."

"How long," Curtis asked, "would it take the *Lexington* to get within striking distance of the convoy—say between fifty and a hundred miles?"

"We could make it shortly after nightfall tomorrow," the other decided, after a bit of figuring.

"And that special plane you've reserved for me will be ready then?" Curtis said.

"It's ready now, if you want it," the commander of the *Lexington* told him.

The convoy was wallowing its way through the darkness, across the dreary wastes of the Atlantic, following a far-northern sea lane that would be most likely to offer safety from attack by enemy raiders and U-boats.

The *Comerford* had joined the convoy shortly after it had passed the shores of Iceland, reporting that she had been sent to strengthen it against possible attack by a powerful German sea raider that was reported to be at large in the north Atlantic.

The story was accepted by the commander of the convoy squadron.

In the center of the convoy, the ten ships containing the most valuable cargoes were ranged in parallel lines. They were ringed around by a cordon of converted merchant vessels, armed cargo ships and destroyers, in addition to the U. S. Cruiser *Comerford,* and the aforementioned British cruiser of First World War vintage.

On the bridge of the *Comerford,* Navigating Officer Nelson, ex-U. S. N., stood watching the other vessels as they plowed their way through the heavy seas.

All were running without lights, but the phosphorescent wash of the water against their bows and the dark bulk of their hulls revealed their positions.

Nelson's chief attention was focused on the central group of ships—especially on the *Carethusia.* Another day, perhaps, and it would be time to make his bid to cut the *Carethusia* out of the convoy and head her for the French port designated in the secret orders which Herr Kommander Brandt had brought on board with him.

Here was Herr Kommander Brandt now, climbing the ladder to the bridge on his stumpy legs. He came up to Nelson, puffing obesely.

"*Ach!* I vish dis voyage was ofer!" Brandt grunted.

"I hope you mean *successfully* over," Nelson said.

"Dot old Czech!" Brandt grumbled. "He iss driving me crazy with his fool inventions!"

"Czech and double Czech!" Nelson kidded him. "But his inventions do all he claims for them; and that's saying a lot!"

"*Ja!*" Brandt agreed. "Dot's so. But—"

He broke off with a guttural oath in German, as a low droning overhead came to his ears. Nelson heard it, too, and raised his night glasses to sweep the sky for the source of the sound.

Suddenly he clutched Brandt by the arm and handed the glasses to him. "There! Look!"

Brandt took the binoculars and focused them to suit his own vision.

"It is some sort of airplane," he said a few minutes later, returning the glasses to Nelson. "A queer-looking one. I can't quite make it out!"

Nelson took the glasses and refocused them. There *was* something queer about the gliding motion of the aircraft, and then as it came closer, he could make out that it had a second propeller overhead.

"It's a helicopter!" he exclaimed softly. "But it hardly makes any sound at all—a noiseless helicopter. I bet it's Diesel-engined!"

"*Ja?*" There was surprise in Herr Kommander Brandt's tone.

"And I'll bet," Nelson went on, his eyes suddenly flashing and his voice quivering with excitement, "that Curtis has sent it after us. He always advocated the freer use of helicopters, especially the Diesel-engined type. It wouldn't surprise me if he's in it!"

"Ve can blast him out of the air mit Androka's ray!" Brandt said. "Like ve blasted those bombers!"

"Maybe!" Nelson's tone held a touch of doubt. "We can try!" He used his telephone to call Androka. "Get busy, Androka!" he said into the mouthpiece. "Blast it with your plane-destroyer! Come up right away!"

The old inventor's cracked voice answered over the wire. "I'll be with you at once!"

Nelson left the bridge and met Androka on the way to the room in the superstructure from which

he operated the rays for the destruction of electric equipment.

The old inventor's eyes were blazing with an almost maniacal light as he fiddled with various levers and batteries. From high above them, in the fighting top of the steel foremast, came the humming of a powerful dynamo as the apparatus built up its tremendous voltage.

Through a skylight in the roof of his workshop, Androka sighted the hovering plane. He spoke into the telephone. In the turret top of the foremast, a weapon that looked like an old-style trench mortar was suddenly uncovered.

Androka said a few words in German into the speaking tube and watched, as the huge mouth of the weapon swung toward the hovering plane.

There was a flash, a shower of sparks; rays darted from the muzzle of the weapon in the mast turret. But the dynamic force that had blasted three navy bombers into helpless wreckage had no effect on the strange craft that hung suspended in the sky over the *Comerford.*

And then it seemed that the powerful rays struck something—something afar off that picked them up like a handful of thunderbolts and hurled them back. There was a report, like the blowing out of a giant fuse. The whole hull of the *Comerford* shuddered, as if from the impact of a powerful electric shock. The vessel quivered from stem to stern. Lights dimmed, went out.

For fully ten seconds, there wasn't an atom of power on board the *Comerford.* She was stricken as if with a paralysis of her electric force.

Then the dimmed lights began to glow again.

Nelson looked at Androka, his cheeks ghastly. "What . . . what happened?"

"The rays must have struck some electric cable carrying tremendous power—more powerful than any cable to be found on shipboard," the inventor explained, in a husky voice. "That would put so heavy a power load on it that the rays were no longer capable of short-circuiting it to extinction. They carried the overload back to us and burned out our generator."

"But that little plane," Nelson argued. "It couldn't—"

Androka shrugged his narrow shoulders and ran his fingers nervously through his gray beard. "There must be some other vessel near at hand—with power cables such as I have described."

Nelson cursed savagely and tore out of the room. He raced up the ladder to the bridge, tugged at Herr Kommander Brandt's sleeve.

"That fool Androka's rays have failed. They've short-circuited themselves. We've got to shoot down Curtis—that helicopter—with our antiaircraft guns!"

"Better have Androka release the radio and tell the others what we're doing," Brandt advised.

In the next few minutes, the radio silence was lifted long enough to let Nelson tell the rest of the convoy that an enemy plane was hovering over the *Comerford.*

Then a blast from the antiaircraft batteries of the cruiser screamed into the sky. Other armed vessels in the convoy cut loose with a fierce barrage.

A few minutes of bedlam. Then the firing ceased.

Nelson, sweeping the sky with his binoculars, saw the blasted fragments of wings and fuselage fluttering out of the clouds, to be swallowed up in the black waters. He handed the glasses to Brandt, saying: "I reckon that's the end of Curtis and his helicopter!"

Herr Kommander Brandt searched the sky for a moment, then explored the dark wastes of ocean astern.

"Ja," he agreed. "Ve must have blown him to bits. He ain't in the sky nor the sea!"

Other eyes were watching the fragments of aircraft wreckage that drifted with the eternal wash of the Atlantic waves astern of the convoy. Through the observation window in the helicopter's fuselage, Commander Bob Curtis grinned as he watched the sea-tossed remains of the dummy plane—a smaller replica of the helicopter—that he had thrown out as a target for the antiaircraft batteries of the *Comerford.*

Slowly he wound in the light cable by which the decoy aircraft had been lowered from the trapdoor in the helicopter's hull to take the full fury of the barrage, while Curtis and his pilot Lieutenant Jay Lancaster were hovering safely far overhead, protected by a cloud of vapor.

Curtis thrilled with a sense of keen satisfaction, because many of his own ideas were embodied in this helicopter. For many months of his spare time, he had worked in the navy's chemical laboratories on the aluminoid paint formula that rendered it practically invisible, especially when enveloped by the cloud of gas that could be released from the series of valves in the fuselage by touching a key on the instrument board. The collapsible dummy plane, which could be towed at a safe distance as a decoy for ambitious antiaircraft gunners had also been Curtis' own idea.

For hours after that, the helicopter drifted in the sky, high over the convoy, which, Curtis found, was still enveloped in the zone of radio silence, for he could neither send nor receive any message through the ether.

Finally, he touched Lancaster on the arm and spoke into the mouthpiece on his chest: "The *Comerford's* running alongside the *Carethusia.* If the other ships try to interfere, the *Comerford's* guns are heavy enough to sink them. There's only one thing to do. We *must* break that zone of radio silence!"

"But how—" Lancaster began.

"Listen!" Curtis said, and spoke rapidly for the next few minutes.

Lancaster began to maneuver the helicopter, throttling down the frontal engine, and reversing the lateral engine, so that the plane glided in slow circles, like a swooping hawk, till it was about three hundred feet above the *Comerford's* mastheads.

Curtis shook hands with Lancaster. The latter murmured "Good luck!" and Curtis crawled out of the cockpit and back into the plane's small cabin. He loosened the fastenings of his 'chute pack, saw that his automatic was safe in its holster.

Then he pushed open the escape hatch and jumped out into space.

From the plane's cloud-gas valves, a mass of opaque vapor streamed, enveloping him in a fog-like cloud that combined with the blackness of the night to render him invisible to those on the ship below.

The 'chute opened out, and Curtis found himself descending on the *Comerford.* By kicking with his legs and manipulating the cords, he maneuvered the 'chute so that he would land in the mizzen-mast turret. From what Androka had once told him—perhaps in an unguarded moment—he felt certain that the radio silence was projected from this point.

The cords of his 'chute tangled with the basket-like structure of the mast. Curtis got out his knife, cut himself free of the 'chute, then scrambled down the mast till he was at the entrance to the turret.

He pushed his way into the small chamber and found himself facing two sailors, in United States naval uniforms, but they uttered harsh exclamations in German at sight of him, and went for their holstered automatics.

Curtis brought his gun up, pointed it, and squeezed the trigger—once—twice—three times—four—

The first German sailor's face took on a look of surprise, the guttural curses died on his lips, as he slumped forward in a bloody heap. The second man uttered a scream and clutched at his chest, as Curtis' lead tore into him. Then he fell beside his companion.

A huge dome stood in the center of the turret, with antennae radiating out from it in every direction. Curtis could hear the low, humming drone, as of a powerful dynamo at work, and he could see a heavy cable, which evidently fed this dome of silence with its power.

He found a switch and shut off the current; then he attacked the cable with the pliers he had brought with him. One by one, the thick strands of wire began to part—

Behind him, a harsh, inhuman cry caused Curtis to look around swiftly. Instinctively, he dropped the pliers, reached for his automatic, then hesitated, his finger on the safety catch.

Zukor Androka stood in the turret entrance, his gray hair floating in wisps around his head, his eyes ablaze with a maniac's fury, his hands extended toward Curtis like gouging claws.

"You . . . you . . . you have ruined my invention!" Androka murmured, in a heartbroken voice. "You have wrecked the zone of silence!"

Curtis took a step forward, seized the Crech inventor by the shoulder and shook him.

"You dirty little traitor!" he barked. "You've lied and cheated—sold out to the Nazis you profess to hate!"

Androka looked at him, terror-stricken, evidently recognizing him for the first time. "You—you're Commander Curtis!"

"Yes!" Curtis gave the inventor another shake and released him. "And you helped steal my ship—tried to ruin me as an officer of the United States navy!"

"Listen!" Androka moved closer to Curtis, then fell on his knees in an attitude of supplication. "Listen to me!"

Curtis stared at him coldly. "I'm listening, Androka. But talk quickly!"

"Commander, I was forced to do this. I had to do it—to save the lives of my people back in Prague. My daughter—"

"Yes," Curtis cut his protestations short. "I know about that!"

Androka fumbled inside his coat and pulled out a sheaf of papers and blueprints. "Here, Curtis! These are the designs, the secret details of manufacture, and the formulas for my inventions—the zone of silence, the destroying rays that wrecked those bombers, and the gas. I'm giving them to you. I'll never use them again—no matter what happens to those I love. I swear it!"

Curtis took the papers and thrust them into an inner pocket. Then he knelt and quickly completed his task of severing the strands of the cable.

He pushed past the groveling form of Androka, and the still corpses of the two sailors, climbed down the mast to the superstructure, and headed for the wireless room.

The operator sat at his table, a cigarette drooping in the corner of his mouth, half asleep.

Curtis clubbed him efficiently with the butt of his gun. The man slumped forward with a groan and lay still. Curtis hauled him to one side and then sat down to send:

"Come aboard U. S. Cruiser *Comerford* at once. Ship in hands of Nazis, in plot to steal the *Carethusia.* Commander Curtis speaking from the *Comerford.* Lancaster, summon help—"

Curtis stopped and hurriedly cast aside the

headphones. The sound of heavy footsteps outside warned him of impending danger. He reached for his gun, released the safety catch, and whirled about.

Men were crowding the doorway of the wireless room—men in whose throats rumbled the angry cry of a baffled wolf pack, whose eyes gleamed with the savage light of murder.

The wireless room was abruptly full of powder smoke, punctuated with gun flashes, as he sprayed bullets at the doorway. The steel door protected him; his attackers were exposed.

He saw that the crowd had given way before the figure of one man, bolder than the rest—or perhaps more desperate—pushing forward, a blazing automatic in his hand.

Curtis recognized the white, hard-lined face, the pale, cruel eyes, set under shaggy blond brows, now blazing with a wild, half-insane light—Nelson! Curtis was busy shoving in a new clip of ammunition—

A shot from Nelson's pistol went wild, shattered the lights, throwing the wireless room into almost total darkness. His second bullet seared Curtis' jaw, a burning, flesh-tearing wound. Another smashed into his shoulder—high up.

Curtis felt sick as he felt lead splintering the bone. He fired—and missed. His shoulder ached— He gritted his teeth, steadied his aim, and let Nelson have it again.

In the faint light that came in at the entrance, he saw Nelson's white face suddenly become a crimson mask. His body fell backward—outside.

Curtis dashed forward and slammed the steel door, bolting it, locking himself in. A terrible wave of nausea rose up within him. The pain of his wounded shoulder was like torturing knives turning in his flesh, grinding against the shattered bones—

He felt his fingers relax on his gun, as his knees buckled under him, and he sank to the floor.

The next thing Curtis knew, he was in a ship's cabin in bed, his wounded shoulder incased in a comfortable surgical dressing. A brown-skinned Filipino mess boy poked his head in and grinned in friendly fashion. On his cap, Curtis read the lettering "U. S. S. *Lexington*" and knew that he must have been taken on board the big aircraft carrier.

The mess boy ducked out as quietly as he had looked in, and a few minutes later, the *Lexington's* commander entered.

"Congratulations!" he said cordially, after asking Curtis how he felt. "Everything worked out perfectly. The new helicopter had its first chance to demonstrate its efficiency and came through a hundred percent. You were right also in your theory that the *Lexington's* power cables, with their tremendous current-carrying capacity, would shatter the rays into worthless junk. The power from our cables kicked back on Androka's invention and smashed it!"

Curiosity prompted Curtis to ask a question. "What . . . what became of Androka? Did he—" He paused as he saw the gleam of horror in the other man's eyes!

"Androka got panicked," the commander of the *Lexington* said, "when he saw that the *Comerford* had been surrounded by the fighting vessels of the British convoy, and he knew that both his inventions were wrecked. I guess seeing Nelson dead softened him up, too."

"So what did Androka do?" Curtis asked. "Blow up the ship?"

The *Lexington's* commander shook his head slowly. "No; he blew *himself* up—in his workroom—with some explosives he'd been experimenting with!"

Curtis leaned back on his pillows. The excitement of listening to the other's story had made him a little tense. He felt he needed to relax.

THE END.

STRAIN

By L. Ron Hubbard

● The essence of military success is teamwork—the essence of that is absolute reliability of every man, every unit of the team, under any strain that may be imposed. And the duty of a good general—?

Illustrated by Schneeman

It was unreasonable, he told himself, to feel no agony of apprehension. He was in the vortex of a time whirlwind and here all stood precariously upon the edge of disaster, but stood quietly, waiting and unbreathing.

No man who had survived a crash, survived bullets, survived the paralyzing rays of the guards, had a right to be calm. And it was not like him to be calm; his slender hands and even, delicate features were those of an aristocrat, those of a sensitive thoroughbred whose nerves coursed on the surface, whose health depended upon the quietness of those nerves.

They threw him into the domed room, and his space boots rang upon the metal floor, and the glare of savage lights bit into his skull scarcely less than the impact from the eyes of the enemy intelligence officer.

The identification papers were pushed across the desk by this guard and the intelligence officer scanned them. "Hm-m-m." The brutish, Saturnian countenance lighted and became interested. The slitted eyes flicked with satisfaction from one to the other of the two captured officers.

"Captain Forrester de Wolf," said the man behind the desk. "Which one of you?"

He looked steadily at the Saturnian and was a little amazed to find himself still calm. "I am he."

"Ah! Then you are Flight Officer Morrison?"

The captain's companion was sweating and his voice had a tremor in it. His youthful, not too bright face twitched. "You got no right to do anything to us. We are prisoners of war captured in uniform in line of combat duty! We treat Saturnians well enough when we grab them!"

This speech or perhaps its undertone of panic was of great satisfaction to the intelligence officer. He stood up with irony in his bearing and shook Captain de Wolf by the hand. Then, less politely but with more interest, bowed slightly to Flight Officer Morrison. The intelligence officer sat down.

"Ah, yes," he said, looking at the papers. "Fortunes of war. You came down into range of the batteries and—well, you came down. You gentlemen don't accuse the Saturnians of a lack in knowing the rules of war, I trust." But there was false candor there. "We will give you every courtesy as captured officers: your pay until the end of the war, suitable quarters, servants, good food, access to entertainment and a right to look after your less fortunate enlisted captives." There was no end to the statement. It hung there, waiting for an additional qualification. And then the intelligence officer looked at them quickly, falsely, and said, "Of course, that is contingent upon your willingness to give us certain information."

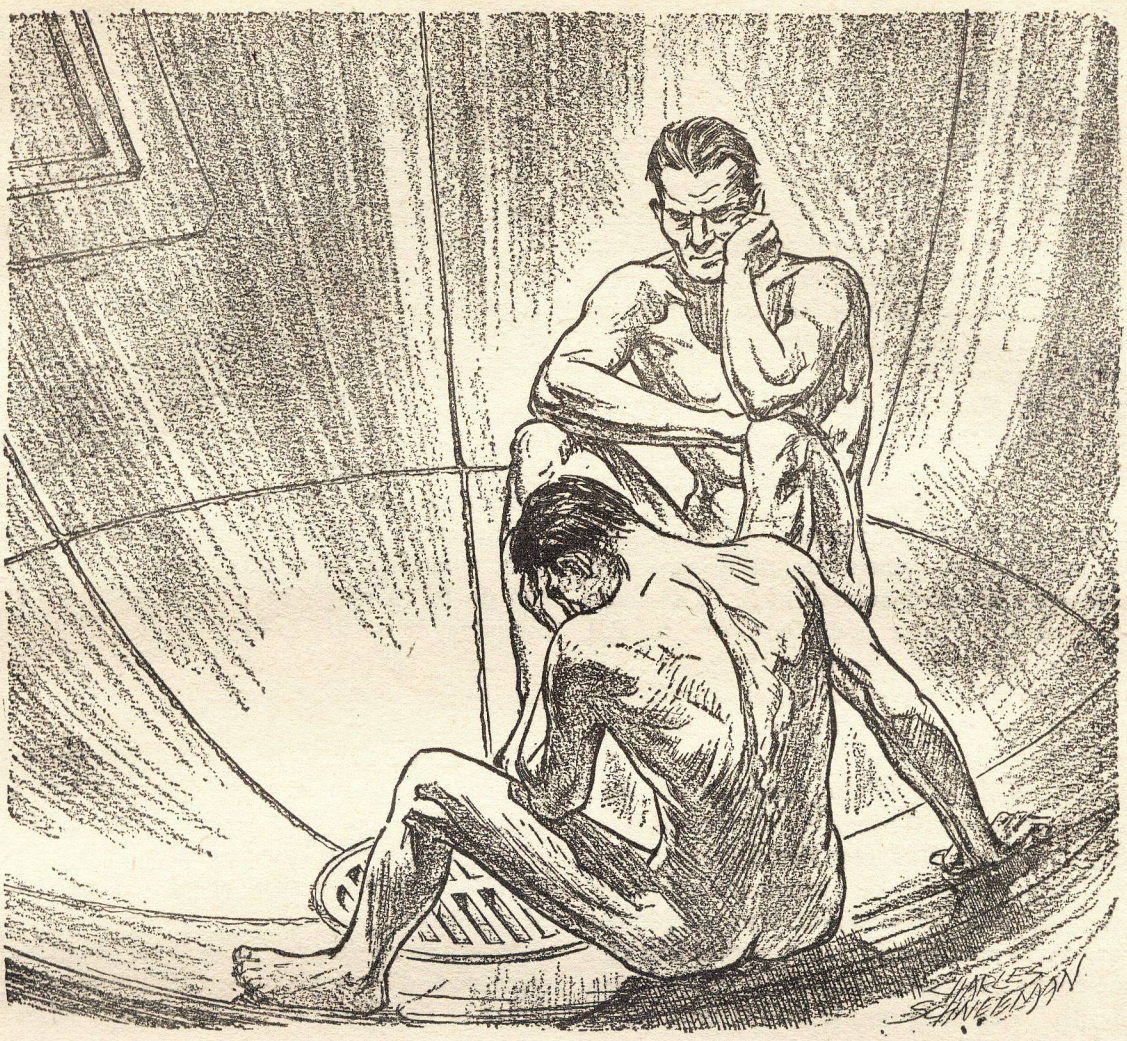
Flight Officer Morrison licked overly dry lips. He was young. He had heard many stories about the treatment, even the torture, the Saturnians gave their prisoners. And he knew that as a staff officer the Saturnians would know his inadvertent possession of the battle plan so all-important to this campaign. Morrison flicked a scared glance at his captain and then tried to assume a blustering attitude.

Captain de Wolf spoke calmly—a little surprised at himself that he could be so calm in the knowledge that as aide to General Balantine he knew far more than was good to know.

"I am afraid," said the captain quietly, "that we know nothing of any use to you."

The intelligence officer smiled and read the papers again. "On the contrary, my dear captain, I think you know a great deal. It was not clever of you to wear that staff aiguillette on a reconnaissance patrol. It was not clever of you to suppose that merely because we had never succeeded in forcing down a G-434 such as yours that it could not be done. And it is not at all clever of you to suppose that we have no knowledge of a pending attack, a very broad attack. We have that knowledge. We must know more." His smile was ingratiating. "And you, naturally, will tell us."

"You go to hell!" said Flight Officer Morrison, hysteria lurking behind his eyes.



The walls were icy; the air was baking-hot and Sahara-dry and foul. They waited—waited for Saturn's inquisitioners—

"Now, now, do not be so hasty, gentlemen," said the intelligence officer. "Sit down and smoke a cigarette with me and settle this thing."

Neither officer made a move toward the indicated chairs. Through Morrison's mind coursed the crude atrocity stories which had been circulated among the troops of Earth, stories which concerned Earth soldiers lashed to ant hills and honey injected into their wounds, stories which dealt with a courier skinned alive, square inch by square inch, stories about a man staked out, eyelids cut away, to be let go mad in the blaze of Mercurian noon.

Captain de Wolf was detached in a dull and disinterested way, standing back some feet from himself and watching the clever young staff captain emotionlessly regard the sly Saturnian.

The intelligence officer looked from one to the other. He was a good intelligence officer. He knew faces, could feel emotions telepathically, and he knew exactly what information he must get. The flight officer could be broken. It might take several hours and several persuasive instruments, but he could be broken. The staff captain could not be broken, but because he was an intelligent, sensitive man he could be driven to the brink of madness, his mind could be warped and the information could thus be extracted. It was too bad to have to resort to these expedients. It was not exactly a gentlemanly way of conducting a war. But there were necessities which knew no rules, and there was a Saturnian general staff which did not now believe in anything resembling humanity.

"Gentlemen," said the intelligence officer, looking at his cigarette and then at his long, sharp nails, "we have no wish to break your bodies, wreck your minds and discard you. That is useless. You are already beaten. The extraction of information is, with us, a science. I do not threaten. But unless we learn what we wish to learn we must proceed. Now, why don't you tell me all about it here and now and save us this uncomfortable and regrettable necessity?" He knew men. He knew Earthmen. He knew the temper of an officer of the United States of Earth, and he did not expect them to do anything but what they

did—stiffen up, become hostile and angry. But this was the first step. This was the implanting of the seed of concern. He knew just how far he could go. He smiled at them.

"You," he continued, "are young. Women doubtless love you. Your lives lay far ahead of you. It is not so bad to be an honored prisoner, truly. Why court the possibility of broken bodies, broken minds, warped and twisted spirits? There is nothing worth that. Your loyalty lies to yourselves, primarily. A state does not own a man. Now, what have you to say?"

Flight Officer Morrison glanced at his captain. He looked back at the intelligence officer. "Go to hell," he said.

There were no blankets or bunks in the cell and there was no light save when the guard came, and then there was a blinding torrent of it. The walls sloped toward the center and there was no flat floor but a rounded continuation of the walls. The entire place was built of especially heat-conductive metal and the two prisoners had been stripped of all their clothes.

Captain de Wolf sat in the freezing ink and tried to keep as much of himself as possible from contacting the metal. For some hours a water drop had been falling somewhere on something tinny, and it did not fall with regularity; sometimes there were three splashes in rapid succession and then none for ten seconds, twenty seconds or even for a minute. The body would build itself up to the next drop, would relax only when it had fallen, would build up for the expected interval and then wait, wait, wait and finally slack down in the thought that it would come no longer. Suddenly the drop would fall—a very small sound to react so shatteringly upon the nerves.

The captain was trying to keep his thoughts in a logical, regulation pattern despite the weariness which assailed him, despite the shock of chill which racked him every time he forgot and relaxed against the metal. How hot was this foul air! How cold was this wall!

"Forrester," groped Morrison's voice.

"Hello"—startling himself with the loudness of his tone.

"Do— Is it possible they'll keep us here forever?"

"I don't think so," said the captain. "After all, our information won't be any good in any length of time. If you are hoping for action, I think you'll get it."

"Is . . . is this good sense to hold out?"

"Listen to me," said the captain. "You've been in the service long enough to know that if one man fails he is liable to take the regiment along with him. If we fail, we'll take the entire army. Remember that. We can't let General Balantine down. We can't let our brother officers down. We can't let the troops down. And we can't let ourselves down. Make up your mind to keep your mouth shut and you'll feel better."

It sounded, thought the captain, horribly melodramatic. But he continued: "You haven't had the grind of West Point. A company, a regiment or an army has no thought of the individual. It cannot have any thought, and the individual, therefore, cannot fail, being a vital part of the larger body. If either of us break now, it would be like a man's heart stopping. We're unlucky enough to be that heart at the moment."

"I've heard," said Morrison in a gruesome attempt at jocularity, "that getting gutted is comfortable compared to some of the things these Saturnians can think up."

The captain wished he could believe fully the trite remark he must offer here. "Anything they can do to us won't be half of what we'd feel in ourselves if we did talk."

"Sure," agreed Morrison. "Sure, I see that." But he had agreed too swiftly.

The shock of the light was physical and even the captain cowered away from it and threw a hand across his eyes. There was a clatter and a slither and a tray lay in the middle of the cell, having come from an unseen hand at the bottom of the door.

Morrison squinted at it with a glad grin. There were several little dishes sitting around a big metal cover of the type used to keep food warm. Morrison snatched at the cover and whipped it off. And then, cover still raised, he stared.

On the platter a cat was lying, agony and appeal in its eyes, crucified to a wooden slab with forks through its paws, cockroaches crawling and eating at its skinned side.

The cover dropped with a clatter and was then snatched up. The heavy edge of it came down on the skull of the cat, and with a sound between a sigh and a scream it relaxed, dead.

Gray-faced Morrison put the cover back on the dish. The captain looked at the flight officer and tried to keep his attention upon Morrison's reaction and thus avoid the illness which fought upward within him.

The light went out and they could feel each other staring into the dark, could feel each other's thoughts. From the captain came the compulsion to silence; from Morrison, a struggling but unspoken panic.

One sentence ran through Captain de Wolf's mind, over and over. "He is going to break at the first chance he has. He is going to break at the first chance he has. He is going to break at the first chance he has. He is—"

Angrily he broke the chain. How could he tell this man what it would mean. Himself a Point officer, it was hard for him to reach out and un-

derstand the reaction of one who had been until recently a civilian pilot. How could he harden in an hour or a day the resolution to loyalty?

It was a step ahead, a tribute to De Wolf's understanding that he realized the difference between them. He knew how carefully belief in service had been built within himself and he knew how vital was that belief. But how could he make Morrison know that fifty thousand Earthmen, his friends, the hope of Earth, might die if the time and plan of the attack were disclosed?

Futilely he wished that they had not been at the council which had decided it, that knowledge of it had been necessary for them to do a complete scout of the situation for General Balantine. If no word of this came to the Saturnians, then this planet might be wholly cleared of the enemy with one lightning blow by space and land.

Suddenly De Wolf discovered that he had been wondering for a long time about his daughter, who had been reported by his wife as having a case of measles. Angrily he yanked his mind from such a fatal course. He could not allow himself to be human, to know that people would sorrow if he went. He was part of an army and as part of that army he had no right to personality or self. He was here, he could not fail, he could not let Morrison fail!

If only that drop would stop falling!

It was both relief and agony when the light went on once more. The captain had no conception of the amount of time which had passed, was only conscious of the misery of his body and the determination not to fail.

The door swung open and a dark-hooded Saturnian infantryman stood there. An officer beyond him beckoned and said, "We want a word with Morrison, the flight officer, if you please."

Not until Morrison had been gone an hour or more did Captain de Wolf begin to crumble within. The irregular, loud drop, the continued shocks of a body sweating in the hot air and then touching the icy metal, the fact that Morrison—

The man was not a regular; he was a civilian less than a year in the service. Unlike Captain de Wolf, he was not a personality molded into a military machine, and a civilian, having earned a personality of his own through the necessity to seek for self, could not be drawn too far down the road of agony without breaking.

Captain de Wolf, sick with physical and nervous discomfort, was ground down further by his fear that Morrison would crack. And as time went by and Morrison was not returned, De Wolf became convinced.

Surging up at last, he battered at the door. No answer came to him; the lock was steadfast. Wildly he turned and beat at the plates of the cell, and not until pain reached his consciousness from his bloodied fists did he realize the danger in which he stood. He himself was cracking. He stilled the will to scream at the dropping water. He carefully took himself in hand and felt the light die in his eyes.

He had no hope of escape. The Saturnians would be too clever for that. But he could no longer trust himself to wait, and he used his time by examining the whole of this cell. The walls were huge, unyielding plates and there was no window; but, passing back and forth, he repeatedly felt the roughness of a grate underfoot. This he finally investigated, a gesture more than a hope. For this served as the room's only plumbing and was foul and odorous and could lead nowhere save into a sewage pipe.

For the space of several loud and shattering drops De Wolf stood crouched, loose grate in hand, filled with disbelief. For there was a faint ray of light reflected from somewhere below, and in that light it could be seen that there was room enough to pass through!

Suddenly crafty, he listened at the door. Then, with quick, sure motions, slid into the foul hole and pulled the grate into place over his head. The light, not yet seen, was beckoning to him at the end of a tunnel in which he could just crouch.

He crawled in the muck for two hundred feet before he came to the light, and here he stopped, staring upward. The hope in him flickered, waned and nearly vanished in a tidal wave of despair. For the light came from an upper grate fourteen feet above the floor of the tunnel, far out of reach upon a slimy, unflawed wall. He tried to leap for it and fell back, slipping and cruelly banging his head as he dropped.

Again he took solid hold of himself. He forced his trained mind to think, forced his trained body to obey. He stood a long way back from himself and critically observed his actions and impulses as though he was something besides a man and the man was on parade.

He looked farther along the tunnel and fumbled his way away from the light. He was sure he would have another outlet presented to him by fate. He could not be led this far without some recompense. And he felt in the top of the tunnel for a grate which might lead out through an empty cell. The tunnel curved and then a new sound made him fumble before he took another step. There was a drop there, an emptiness which might extend ten feet or a hundred. He had to return or chance it.

The water which sluggishly gurgled about his ankles spilled over the soft lip of the hole and dropped soundlessly. Suddenly he was filled with sickness and panic and premonition. This foul trap into which he had ventured hemmed him close, imprisoned him, would embrace him for some awesome purpose and never give him up.

He forced himself into line. He froze his terror. He dropped blindly over the lip of the hole.

He was not shaken, for he had dropped less than six feet and the bottom was soft. He crouched, his emotions clashing, disgust and relief. And then when he looked about him again he felt the mad surge of hope, for there was light ahead!

Floundering and splashing and steadying himself against the walls, he gained the bend and saw the blinding force of daylight. For some little while he could not look directly at it nor could his wits embrace the whole of the promise that light offered. But at last, when his pupils were contracted to normal and his realization distilled into reason, he went forward and looked down. Once more his hope died. Here was a sheer drop of nearly a hundred feet, a cliff face which offered no slightest hold, greased by the sewage and worn smooth by the water.

Clinging forlornly to the edge, he scanned the great dome of the military base a mile overhead, scanned the cluster of metal huts on the plain before him, watched far-off dots which were soldiers. There was a roar overhead and he drew back lest he be seen by the small scout plane which cruised beneath the dome. When its sound had faded he again ventured a glance out, looking up to make sure he was not seen from above. And once more hope flared.

For the wall above this opening offered grips in the form of projecting stones, and the climb was less than twenty feet!

It was difficult to swing out of the opening and grab the first rock. It took courage to so expose himself to the sentries who, though two thousand yards away, could pick him easily off the wall if they noticed him.

The rock he grabbed came loose in his hand and he nearly hurtled down the cliff. He crouched, panting, defiled, wearied beyond endurance with the sudden shock of it. And then he stood off from himself again and snarled a command to go on and up.

The next rock he trusted held, and in a moment he was glued to the face of the sheer wall, making weary muscles respond to orders. Why he was tired he did not understand, for he had done no great amount of physical exertion. But rock by rock, as he went up, his energy flooded from him and left him in a hazed realm of semiconsciousness which threatened uncaring surrender. He rested for longer and longer intervals between lifts, and what had been twenty feet seemed to stretch to a tortured infinity.

He could not believe that he had come within two feet of the top; but, staring up, he saw that he should believe it. A savage will took hold of him and he reached out for the next handhold. It did not exist.

He fumbled and groped across the smooth face above him. He stretched to reach the lip so near him. And then he realized that, near as he was, he could not go farther. Already his bleeding hands refused to hold beyond the next few seconds. A foot slipped and in sweating terror he wildly clawed for his hold.

His right hand slipped loose. A red haze of strain covered his vision. One foot came free and the tendons of his right arm were stretched to the snapping point. He knew he was going, knew that he would fall, knew that Morrison would sell an army to the gods of slaughter— His right hand numbed and lost its grip and he started to fall.

There was a wrench which tore muscles and nerves, and something was around his wrist. He was not falling. He was dangling over emptiness and something had him from above!

They pulled him up over the edge and dropped him in an exhausted, broken huddle upon the gravel of the small plateau. And at last, when he opened his eyes, it was to see the grinning face of the intelligence officer and the stolid guards.

"Usually," said the intelligence officer, in an offhand voice, "they make it up and over by tearing a grip out of the cliff with their fingernails. You, however, are of a much more delicate nervous structure, it seems. I rather thought you'd fail where you did. One gets to know these things after some practice."

Captain de Wolf lay where they had dropped him. A dull haze of beaten anger clouded his sight and then dropped away from him and left him naked, filthy and alone among his country's enemies.

Diffidently the guards picked him up and lugged him toward the small buildings. They took him down a corridor and into a large, strange room. Glad to be quit of this, they put him in a chair and strapped his wrists down. Captain de Wolf made no resistance. He did not look up.

The intelligence officer walked gracefully back and forth, slowly touring the room. He stopped and lighted a cigarette. "It was really quite useless, that escape of yours," he said. "Your friend Morrison talked to the limit of his knowledge. He gave us troops, divisions to be used, state of equipment, general battle plan, in fact everything but two small facts which he did not know." He came nearer to De Wolf. "He was not able to recall the time of the attack or the assembly point after it had succeeded—if it did succeed. You are to give us that data, for, as a staff officer, you, of course, know. Brauls! Make ready with No. 4!"

Captain de Wolf tried to rally. He tried to feel rage against Morrison. He tried to realize that an army would perish because of this day's work. He could not think, could not feel. They were rolling some kind of machine toward him, and the

wriggly thing called Brauls was adjusting something on it. "I won't tell you anything," said De Wolf leadenly.

A dog was pulled out of a cage and placed on a table where it was strapped down. It whimpered and tried to lick at the hand of the soldier who did the work. Brauls, face hidden in a hood, worked expertly with a little track. On this was a small car having two high sides and neither back nor front; it ran on a little track which had been widened to accommodate the width of the dog.

Brauls touched a button and from jets on either side of the car small streams shot forth with sudden ferocity. These jets sprayed water under tremendous hydraulic pressure, jets which would cut wood faster than any saw and which hissed hungrily as they began to roll toward the dog.

Captain de Wolf tried to drop his eyes. He could not. The little car crept up on the dog and then the jets began to carve away, a fraction of an inch at a time— De Wolf managed to look away. The shrieks of agony which came from the dog carved through De Wolf.

"I won't tell you anything," he said.

They stretched out his arm and fixed the track on either side of it. They started the car toward his outstretched hand. Fixedly he watched it coming.

To the persuasive drawl of the intelligence officer he said, "I won't tell you anything."

A few hours later the intelligence officer was making out his report. He stopped after he had written the caption and the date and gazed at his long, sharp fingernails stained with nicotine. Then he sighed and resumed his writing.

INTELLIGENCE REPORT
Base 34D Mercury
Adsama 452

Today interrogated two officers captured from Earth reconnaissance plane, Captain Forrester de Wolf and Flight Officer Morrison.

Captain de Wolf, under procedure twenty-three escape tactic, revealed nothing. Later he was given procedures forty-five, ninety-seven, twenty-one and six. He died without talking.

Flight Officer Morrison was taken from the cell to the chamber. He was very combative. Procedures forty-five, ninety-seven and six were employed. Despite state of subject he was able to get at the automatic of a guard in a moment of carelessness and succeeded in retaining it even after he was shot. Rather than risk the divulgence of data, Flight Officer Morrison blew out his brains. The guard is under arrest.

From this attempt and the stubbornness of the enemy I conclude that there may be some attack in the making but, as our own scouts have discovered nothing, I do not expect it in this quarter for some time.

Drau Shadma
Captain, Saturnian Imperials
Intelligence

At headquarters of the Third Space Army, United States of Earth, General Balantine sat massively at his field desk impatiently going through a sheaf of reports.

"Belts!" he brayed at an aide. "Tell Colonel Strawn that whether he thinks regulation hold-down belts are useless or not his troops will wear them and parade with them!"

"Yessir," said the aide timidly. He had a report in his hand and was not very anxious to give it.

"Well?" said General Balantine sharply. "What have you there?"

"It's a report, sir. Captain de Wolf and Flight Officer Morrison are missing on reconnaissance. They are unreported for a day and a half."

"Morrison? De Wolf? Oh, yes, De Wolf." General Balantine was perfectly silent for a moment. Then, in an altered tone: "Morrison . . . Morrison. I don't know the man. I . . . don't . . . know—" He was silent again, so that his abrupt return to activity was the more startling.

"Post an order for a council of officers. And have another aide appointed to me. Dammit, that was a neat plan of attack, too."

"You're changing the plan, sir?"

General Balantine snorted. "They'll wear those hold-down safety belts. I'll change that plan of attack. I don't know—can't know—what the Saturnians found out. I don't think De Wolf . . . but it makes no difference. I'd have to *know* and that's impossible. There's time to change. Post that notice."

THE END.

CO-OPERATE—OR ELSE!

By A. E. van Vogt

● It's perfectly possible for men to live among a civilized, highly intelligent race—and not know it! Particularly if that race doesn't believe in the slightest in co-operation—

Illustrated by Schneeman

As the spaceship vanished into the steamy mists of Eristan II, Professor Jamieson drew his gun. He felt physically sick, battered, by the way he had been carried for so many long moments in the furious wind stream of the great ship. But the sense of danger held him tense there in the harness that was attached by metal cables to the now gently swaying antigravity plate above him. With narrowed eyes, he stared up at the ezwal which was peering cautiously down at him over the edge of the antigravity plate.

Its three-in-line eyes, gray as dully polished steel, gazed at him, unwinking; its massive blue head poised there alertly and—Jamieson knew—ready to jerk back the instant it read in his thoughts an intention of shooting.

"Well," said Jamieson harshly, "here we are, both of us about a hundred thousand years from our respective home planets. And we're falling down into a primitive jungle hell that you, with only your isolated life on Carson's Planet to judge by, cannot begin to imagine despite your ability to read my thoughts. Even a six-thousand-pound ezwal hasn't got a chance down there—alone!"

A great, long-fingered, claw-studded paw edged gingerly over the side of the raft, flicked down at one of the four metal cables that supported Jamieson's harness. There was a bright, steely *ping*. The cable parted like rotted twine before the ferocity of that one cutting blow.

Like a streak of blurred light, the enormous arm jerked back out of sight; and then there was only the great head and the calm, unwinking eyes peering down at him. Finally, a thought penetrated to Jamieson, a thought cool and unhurried:

"You and I, Professor Jamieson, understand each other very well. Of the hundred-odd men on your ship, only you remain alive. Out of all the human race, therefore, only you know that the ezwals of what you call Carson's Planet are not senseless beasts, but intelligent beings.

"I could have stayed on the ship, and so eventually reached home. But rather than take the slightest risk of your escaping the jungle dangers below, I took the desperate chance of jumping on top of this antigravity raft just as you were launching yourself out of the lock.

"What I cannot clearly understand is why you didn't escape while I was still battering down the control-room door. There is a blurred fear-picture in your mind, but—"

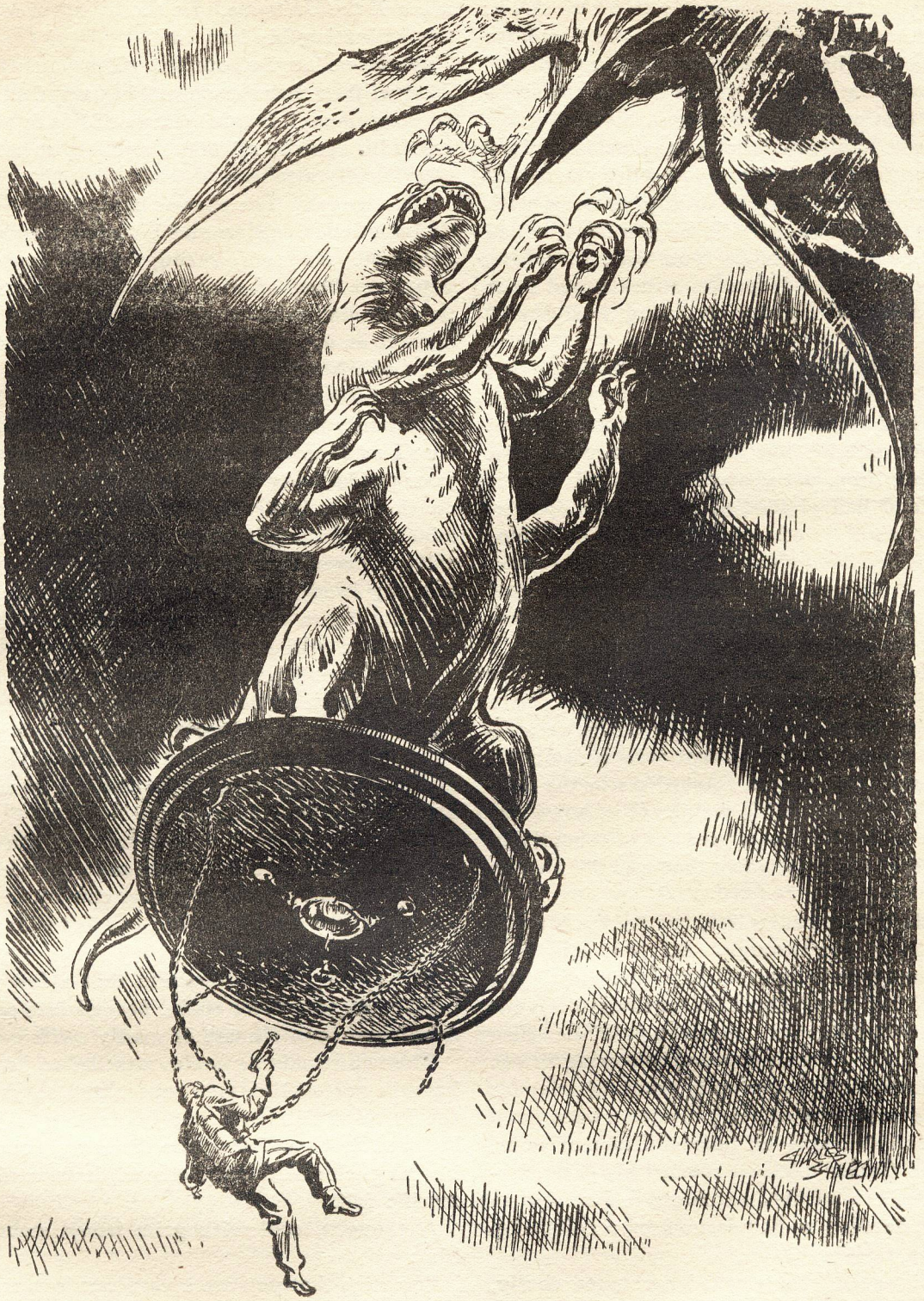
Jamieson was laughing, a jarring sound in his own ears, but there was genuine amusement in the grim thoughts that accompanied it. "You poor fool!" he choked at last. "You still don't realize what you're falling down to. While you were hammering away at that door, the ship was flying over the biggest ocean on this planet. All those glints of water down there are really continuation of the ocean, and every pool is swarming with malignant beasts.

"And, somewhere ahead of us, are the Demon Straits, a body of water about fifty miles wide that separates this ocean-jungle from the mainland beyond. Our ship will crash somewhere on that mainland, about a thousand miles from here, I should say. To reach it, we've got to cross that fifty miles of *thing*-infested sea. Now you know why I was waiting, and why you had a chance to jump onto that antigravity plate. I—"

His voice collapsed in an *"ugh"* of amazement as, with the speed of a striking snake, the ezwal twisted up, a rearing, monstrous blue shape of frightful fangs and claws that reached with hideous power at the gigantic bird that dived straight down at the shining surface of the antigravity raft.

The bird did not swoop aside. Jamieson had a brief, terrible glimpse of its merciless, protruding, glassy eyes, and of the massive, hooked, pitchfork-long claws, tensing for the thrust at the ezwal; and then—

The crash set the raft tossing like a chip in stormy waters. Jamieson swung with a mad, dizzy, jerky speed from side to side. The roar of the



wind from the smashing power of those mighty wings was like thunder that stunned his brain with its fury. With a gasp, he raised his gun. The red flame of it reached with blazing hunger at one of those wings. The wing turned a streaky black, collapsed; and, simultaneously, the bird was literally flung from the raft by the raging strength of the ezwal.

It plunged down, down, became a blurred dot in the mist, and was lost against the dark background of ground.

Above Jamieson, the ezwal, dangerously off balance, hung poised over the edge of the raft. Four of its combination leg-arms pawed the air uselessly; the remaining two fought with bitter effort at the metal bars on top of the raft—and won. The great body drew back, until, once again, only the massive blue head was visible. Jamieson lowered his gun in grim good humor.

"You see," he said, "even a bird was almost too much for us—and I could have burned your belly open. I didn't because maybe it's beginning to

penetrate your head that we've got to postpone our private quarrel, and fight together if we ever hope to get out of the hell of jungle and swamp below."

The answering thought was as cold as the sleet-gray eyes that stared down at him so steadily:

"Professor Jamieson, what you *could* have done was unimportant to me who knew what you *would* do. As for your kind offer to ally yourself with me, I repeat that I am here to see you dead, not to protect your pitiful body. You will, therefore, refrain from further desperate appeals, and meet your fate with the dignity becoming a scientist."

Jamieson was silent. A thin, warm, wet wind breathed against his body, bringing the first faint, obscene odors from below. The raft was still at an immense height, but the steamy mists that clung with a limp, yet obscuring strength to this primeval land had yielded some of their opaqueness. Patches of jungle and sea that, a few minutes before, had been blurred by that all-pervading fog, showed clearer now, a terrible, patternless sprawl of dark trees alternating with water that shone and flashed in the probing sunlight.

Fantastic, incredible scene. As far as the eye could see into the remote mists to the north, there was steaming jungle and foggy, glittering ocean—the endless, deadly reality that was Eristan II. And, somewhere out there, somewhere in the dimness beyond the concealing weight of steam, those apparently interminable jungles ended abruptly in the dark, ugly swell of water that was the Demon Straits!

"So," said Jamieson at last, softly, "you think you're going to get through. All your long life, all the long generations of your ancestors, you and your kind have depended entirely on your magnificent bodies for survival. While men herded fearfully in their caves, discovering fire as a partial protection, desperately creating weapons that had never before existed, always a bare jump ahead of violent death—all those millions of years, the ezwal of Carson's Planet roamed his great, fertile continents, unafraid, matchless in strength as in intellect, needing no homes, no fires, no clothing, no weapons, no—"

"You will agree," the ezwal interrupted coolly, "that adaptation to a difficult environment must be one of the goals of the superior being. Human beings have created what they call civilization, which is actually merely a material barrier between themselves and their environment, so vast and unwieldy that keeping it going occupies the entire existence of the race. Individually, man is a frivolous, fragile, inconsequential *slave*, who tugs his mite at the wheel, and dies wretchedly of some flaw in his disease-ridden body.

"Unfortunately, this monstrous, built-up weakling with his power lusts and murderous instincts is the greatest danger extant to the sane, healthy races of the Universe. He must be prevented from contaminating his betters."

Jamieson laughed curtly. "But you will agree, I hope, that there is something wonderful about an insignificant, fearful jetsam of life fighting successfully against all odds, aspiring to all knowledge, finally attaining the very stars!"

"Nonsense!" The answer held overtones of brittle impatience. "Man and his thoughts constitute a disease. As proof, during the past few minutes, you have been offering specious arguments, apparently unbiased, actually designed to lead once more to an appeal for my assistance, an intolerable form of dishonesty.

"As further evidence I need but anticipate intellectually the moment of our landing. Assuming that I make no attempt to harm you, nevertheless your pitiful body will be instantly and, thereafter, continuously in deadly danger, while I—you must admit that, though there are beasts below physically stronger than I, the difference is not so great that my intelligence, even if it took the form of cunning flight, would more than balance the weakness. You will admit furthermore—"

"I admit nothing!" Jamieson snapped. "Except that you're going to get the surprise of your life. And you're going to regret beyond all your present capacity for emotionalism the lack of those very artificialities you despise in man. I do not mean material weapons, but—"

"What you mean is unimportant. I can see that you intend to persist in this useless, mendacious type of reasoning, and you have convinced me that you will never emerge alive from that island jungle below. Therefore—"

The same, tremendous arm that a few minutes before had torn steel chain, flashed into sight and downward in one burst of madly swift gesture.

The two remaining cables attached to Jamieson's harness parted like wet paper; and so great was the force of the blow that Jamieson was jerked a hundred feet parallel to the distant ground before his long, clenched body curved downward for its terrific fall.

A thought, cool with grim irony, struck after him:

"I notice that you are a very cautious man, professor, in that you have not only a packsack, but a parachute strapped to your back. This will enable you to reach ground safely, but your landing will be largely governed by chance. Your logical mind will doubtless enable you to visualize the situation. Good-by and—bad luck!"

Jamieson strained at the thin, strong ropes of his parachute, his gaze narrowed on the scene below. Through the now almost transparent mist, and somewhat to the north, was a green-brown blaze of jungle. If he could get there—

He tugged again at the ropes, and with icy

speculation watched the effect, calculated the mathematical possibilities. He was falling slowly; that would be the effect of the heavy air of this planet: pressure eighteen pounds per square inch at sea level.

Sea level! He smiled wryly, without humor. Sea level was approximately where he would be in a very few minutes.

There was, he saw, no sea immediately beneath him. A few splotches of water, yes, and a straggle of trees. The rest was a sort of clearing, except that it wasn't exactly. It had a strange, grayish, repellent appearance like—

The terrible shock of recognition drained the blood from his cheeks. His mind shrank as from an unthinkably lecherous thought. In panic he tore at the ropes, as if by sheer physical strength he would draw the tantalizingly near jungle to him. That jungle, that precious jungle! Horrors it might contain, but at least they were of the future, while that hellish stuff directly below held no future, nothing but a gray, quagmire trap, thick mud choking—

Abruptly, he saw that the solid mass of trees was beyond his reach. The parachute was less than five hundred feet above that deadly, unclean spread of mud. The jungle itself—stinking, horrible jungle, blatantly exuding the sharp, evil odors of rotting vegetation, yet suddenly the most desirable of places—was about the same distance to the northwest.

To make it would require a forty-five-degree descent. Carefully, he manipulated the rope controls of the parachute. It caught the wind like a glider; the jungle drew closer, closer—

He landed triumphantly in a tiny straggle of trees, a little island separated from the main bulk of forest by less than a hundred and fifty feet.

The island was ten feet long by eight wide; four trees, the longest about fifty feet tall, maintained a precarious existence on its soggy, wet, comparatively firm base.

Four trees, representing a total of about a hundred and eighty feet. Definitely enough length. But—his first glow of triumph began to fade—without a crane to manipulate three of those trees into place, the knowledge that they represented safety was utterly useless.

Jamieson sat down, conscious for the first time of the dull ache in his shoulders, the strained tenseness of his whole body, a sense of depressing heat. He could see the sun, a white blob barely visible through the white mists that formed the atmosphere of this deadly, fantastic land.

The blur of sun seemed to fade into remoteness; a vague darkness formed in his mind; and then a sharp, conscious thought that he had been asleep.

He opened his eyes with a start. The sun was much lower in the eastern sky and—

His mind stopped from the sheer shock of discovery. Instantly, however, it came alive, steady, cool, despite the vast, first shock of his amazement.

What had happened was like some fantasy out of a fairy story. The four trees, with the tattered remains of his parachute still clinging to them, towered above him. But his plan for them had taken form while he slept.

A bridge of trees, thicker, more solid than any the little island could have produced, stretched straight and strong from the island to the mainland. There was no doubt, of course, as to who had performed that colossal feat: the ezwal was standing unconcernedly on two of its six legs, leaning manlike against the thick trunk of a gigantic tree. Its thought came:

"You need have no fear, Professor Jamieson. I have come to see your point of view. I am prepared to assist you to reach the mainland and to co-operate with you thereafter. I—"

Jamieson's deep, ungracious laughter cut off the thought. "You damned liar!" the scientist said finally. "What you mean is that you've run up against something you couldn't handle. Well, that's all right with me. So long as we understand each other, we'll get along."

The snake slid heavily out of the jungle, ten feet from the mainland end of the bridge of trees, thirty feet to the right of the ezwal. Jamieson, scraping cautiously toward the center of the bridge, saw the first violent swaying of the long, luscious jungle grass—and froze where he was as the vicious, fantastic head reared into sight, followed by the first twenty feet of that thick, menacing body.

Briefly, the great head, in its swaying movement, was turned directly at him. The little pig eyes seemed to glare straight into his own stunned, brown eyes. Shock held him, sheer, unadulterated shock at the incredibly bad luck that had allowed this deadly creature to find him in such an immeasurably helpless position.

His paralysis there, under those blazing eyes, was a living, agonizing thing. Tautness struck like fire into every muscle of his body; it was an instinctive straining for rigidity, unnormal and terrible—but it worked.

The fearsome head whipped aside, fixed in eager fascination on the ezwal, and took on a rigidity all its own.

Jamieson relaxed; his brief fear changed to brief, violent anger; he projected a scathing thought at the ezwal:

"I understood you could sense the approach of dangerous beasts by reading their minds."

No answering thought came into his brain. The giant snake flowed farther into the clearing; and before that towering, horned head rearing monstrously from the long, titanically powerful body, the ezwal backed slowly, yielding with a grim

reluctance to the obvious conviction that it was no match for this vast creature.

Cool again, Jamieson directed an ironic thought at the ezwal:

"It may interest you to know that as chief scientist of the Interstellar Military Commission, I reported Eristan II unusable as a military base for our fleet; and there were two main reasons: one of the damnedest flesh-eating plants you ever saw, and this pretty little baby. There's millions of both of them. Each snake breeds hundreds in its lifetime, so they can't be stamped out. They're bisexual, attain a length of about a hundred and fifty feet and a weight of ten tons."

The ezwal, now some fifty feet away from the snake, stopped and, without looking at Jamieson, sent him a tight, swift thought:

"Its appearance did surprise me, but the reason is that its mind held only a vague curiosity about some sounds it had heard, no clear, sharp thought such as an intention to murder. But that's unimportant. It's here; it's dangerous. It hasn't seen you yet, so act accordingly. It doesn't think it can get me, but it's considering the situation. In spite of its desire for me, the problem remains essentially yours; the danger is *all* yours."

The ezwal concluded almost indifferently: "I am willing to give you limited aid in any plan you might have, but please don't offer any more nonsense about our interdependence. So far there's been only one dependent. I think you know who it is."

Jamieson was grim. "Don't be too sure that you're not in danger. That fellow looks muscle bound, but when he starts moving, he's like a steel spring for the first three or four hundred feet—and you haven't got that much space behind you."

"What do you mean? I can run four hundred feet in three seconds, Earth time."

Coldly, the scientist whipped out: "You could, *if you had four hundred feet in which to run.* But you haven't. I've just been forming a mental picture of this edge of jungle, as I saw it just before I landed.

"There's about a hundred and fifty feet of jungle, then a curving shore of mud plain, a continuation of this mud here. The curve swings back this way, and cuts you off neatly on this little outjutting of jungle. To get clear of the snake, you've got to dart past him. Roughly, your clearance is a hundred and fifty feet all around—and it isn't enough! Interdependent? You're damned right we are. Things like this will happen a thousand times a year on Eristan II."

There was startled silence; finally: "Why don't you turn your atomic gun on it—burn it?"

"And have it come out here, while I'm helpless. These big snakes are born in this mud, and live half their lives in it. It would take five minutes to burn off that tough head. By that time I'd be swallowed and digested."

The brief seconds that passed then were vibrant with reluctant desperation. But there could be no delay; swiftly the grudging request came:

"Professor Jamieson, I am open to suggestions—*and hurry!*"

The depressing realization came to Jamieson that the ezwal was once more asking for his assistance, *knowing* that it would be given; and yet it itself was giving no promise in return.

And there was no time for bargaining. Curtly, he projected:

"It's the purest case of our acting as a team. The snake has no real weakness—except possibly this:

"Before it attacks, its head will start swaying. That's almost a universal snake method of hypnotizing victims into paralysis. Actually, the motion is also partially self-hypnotizing. At the earliest possible moment after it begins to sway, I'll burn its eyes out—and you get on its back, *and hang on.* Its brain is located just behind that great horn. Claw your way there, and eat in while I burn—"

The thought scattered like a chaff, as the tremendous head began to move. With a trembling jerk, Jamieson snatched his gun—

It was not so much, then, that the snake put up a fight, as that it wouldn't die. Its smoking remains were still twisting half an hour later when Jamieson scrambled weakly from the bridge of trees and collapsed onto the ground.

When finally he climbed to his feet, the ezwal was sitting fifty feet away under a clump of trees, its middle legs also on the ground, its forelegs folded across its chest—and it was contemplating him.

It looked strangely sleek and beautiful in its blue coat and in the very massiveness of its form. And there was immeasurable comfort in the knowledge that, for the time being at least, the mighty muscles that rippled underneath that silk-smooth skin were on his side.

Jamieson returned the ezwal's stare steadily; finally he said:

"What happened to the antigravity raft?"

"I abandoned it thirty-five miles north of here."

Jamieson hesitated; then: "We'll have to go to it. I practically depowered my gun on that snake. It needs metal for recharging; and that raft is the only metal in bulk that I know of."

He was silent again; then softly: "One thing more. I want your word of honor that you won't even attempt to harm me until we are safely on the other side of the Demon Straits!"

"You'd accept my word?" The steel-gray, three-in-line eyes meditated on him curiously.

"Yes."

"Very well, I give it."

Jamieson shook his head, smiling darkly. "Oh, no, you don't, not as easily as that."

"I thought you said you'd accept my word." Peevishly.

"I will, but in the following phraseology." Jamieson stared with grim intentness at his mighty and deadly enemy. "I want you to swear by the sun that rises and by the green, fruitful earth, by the joys of the contemplative mind and the glory of immortal life—"

He paused. "Well?"

There was a gray fire in the ezwal's gaze, and its thought held a ferocious quality when finally it replied:

"You are, Professor Jamieson, even more dangerous than I thought. It is clear there can be no compromise between us."

"But you'll make the limited promise I ask for?"

The gray eyes dulled strangely; long, thin lips parted in a snarl that showed great, dark fangs.

"No!" Curtly.

"I thought," said Jamieson softly, "I ought to get that clear."

No answer. The ezwal simply sat there, its gaze fixed on him.

"Another thing," Jamieson went on, "stop pretending you can read all my thoughts. You didn't know that I knew about your religion. I'll wager you can only catch my sharpest idea-forms, and those particularly when my mind is focused on speech."

"I made no pretenses," the ezwal replied coolly. "I shall continue to keep you as much in the dark as possible."

"The doubt will, of course, harass my mind," said Jamieson, "but not too much. Once I accept a theory, I act accordingly. If I should prove wrong, there remains the final arbiter of my atomic gun against your strength. I wouldn't bet on the victor.

"But now"—he hunched his long body, and strode forward—"let's get going. The swiftest method, I believe, would be for me to ride on your back. I could tie a rope from my parachute around your body just in front of your middle legs and by hanging onto the rope keep myself from falling off. My only qualification is that you must promise to let me off before making any hostile move. Agreeable?"

The ezwal hesitated, then nodded: "For the time being."

Jamieson was smiling, his long, spare, yet strong, face ironical.

"That leaves only one thing: What did you run up against that made you change your mind about killing me immediately? Could it have been something entirely beyond the isolated, static, aristocratic existence of the ezwal?"

"Get on my back!" came the snarling thought. "I desire no lectures, nor any further sounds from your rasping voice. I fear nothing on this planet. My reasons for coming back have no connection with any of your pitiful ideas; and it would not take much to make me change my mind. Take warning!"

Jamieson was silent, startled. It had not been his intention to provoke the ezwal. He'd have to be more cautious in the future, or this great animal, bigger than eight lions, deadlier than a hundred, might turn on him long before it itself intended.

It was an hour later that the long, fish-shaped spaceship swung out of the steamy mists that patroled the skies of Eristan II. It coasted along less than a thousand feet up, cruel-looking as a swordfish with its finely pointed nose.

The explosive thought of the ezwal cut into Jamieson's brain: "Professor Jamieson, if you make so much as a single effort at signaling, you die—"

Jamieson was silent, his mind held stiff and blank, after one mental leap. As he watched, the great, half-mile-long ship sank visibly lower and, as it vanished beyond the rim of the jungle ahead, there was no doubt that it was going to land.

And then, the ezwal's thoughts came again, sly now, almost exultant:

"It's no use trying to hide it—because now that the actuality is here, I remember that your dead companions had awareness of another spaceship in the back of their minds."

Jamieson swallowed the hard lump in his throat. There was a sickness in him, and a vast rage at the incredibly bad luck of this ship coming here—now!

Miserably, he gave himself to the demanding rhythm of the ezwal's smooth gallop; and for a while there was only that odor-tainted wind, and the pad of six paws, a dull, flat flow of sound; and all around was the dark jungle, the occasional, queer *lap, lap* of treacherous, unseen waters. And it was all there, the strangeness, the terribleness of this wild ride of a man on the back of a blue-tinted, beastlike being that hated him—and knew about that ship.

At last, grudgingly, he yielded. He said snappishly, as if his words might yet snatch victory from defeat:

"Now I know, anyway, that your thought-reading ability is a damned sketchy thing. You didn't begin to suspect why you were able to conquer my ship so easily."

"Why should I?" The ezwal was impatient. "I remember now there was a long period when I caught no thoughts, only an excess of energy tension, abnormally more than were customary from your engines. That must have been when you speeded up.

"Then I noticed the cage door was ajar—and forgot everything else."

The scientist nodded, gloom a sickish weight on him. "We received some awful buffeting, nothing palpable, of course, because the interstellars were full on. But, somewhere, there must have been a blow that knocked our innards out of alignment.

"Afterward, we watched for dangers from outside; and so you, on the inside, got your chance to kill a hundred men, most of them sleeping—"

He tensed his body ever so carefully, eyes vaguely as possible on the limb of the tree just ahead, concentrating with enormous casualness on the idea of ducking under it— Somehow, his real purpose leaked from his straining brain.

In a single convulsion of movement, like a bucking horse, the ezwal reared. Shattering violence of movement! Like a shot from a gun, Jamieson was flung forward *bang* against that steel-hard back. Stunned, dizzy, he fought for balance—and then it was over.

The great animal plunged aside into a thick pattern of jungle, completely away from the protruding limb that had momentarily offered such sweet safety. It twisted skillfully between two giant trees, and emerged a moment later onto the beach of a long, glittering bay of ocean.

Fleet as the wind, it raced along the deserted sands, and then on into the thickening jungles beyond. No thought came from it, not a tendril of triumph, no indication of the tremendous victory it had just won.

Jamieson said sickly: "I made that attempt because I know what you're going to do. I admit

we had a running fight with that Rull cruiser. But you're crazy if you think they mean advantage for you.

"Rulls are different. They come from another galaxy. They're—"

"Professor!" The interrupting thought was like metal in the sheer, vibrating force of it. "Don't dare try to draw your gun to kill yourself. One false move, and I'll show you how violently and painfully a man can be disarmed."

"You promised," Jamieson almost mumbled, "to make no hostile move—"

"And I'll keep that promise—to the letter, after man's own fashion, *in my own good time.* But now—I gathered from your mind that you think these creatures landed because they detected the minute energy discharge of the antigravity raft."

"Pure deduction." Curtly. "There must be some logical reason, and unless you shut off the power as I did on the spaceship—"

"I didn't. Therefore, that is why they landed. Their instruments probably also registered your use of the gun on the snake. Therefore they definitely know someone is here. My best bet, accordingly, is to head straight for them before they kill me accidentally. I have no doubt of the welcome I shall receive when they see my captive, and I tell them that I and my fellow ezwals are prepared to help drive man from Carson's Planet. And you will have gotten off my back unharmed—thus my promise—"

The scientist licked dry lips. "That's bestial," he said finally. "You know damned well from reading my mind that Rulls eat human beings. Earth is one of the eight planets in this galaxy whose flesh is palatable to these hell-creatures—"

The ezwal said coldly: "I have seen men on Carson's Planet eat ezwals with relish. Why shouldn't men in turn be eaten by other beings?"

Jamieson was silent, a shocked silence at the hatred that was here. The flintlike thought of the other finished:

"You may not realize how important it is that no word of ezwal intelligence get back to Earth during the next few months, but we ezwals know.

"I want you dead!"

And still there was hope in him. He recognized it for what it was: that mad, senseless hope of a man still alive, refusing to acknowledge death till its gray chill lay cold on his bones.

A crash of brush roused him out of himself. Great branches of greater trees broke with wheezing unwillingness. A monstrous reptile head peered at them over a tall tree.

Jamieson had a spine-cooling glimpse of a scaly, glittering body; eyes as red as fire blazed at him—and then that lumbering nightmare was far behind, as the ezwal raced on, contemptuous, terrible in its unheeding strength.

And after a moment, then, in spite of hideous danger, in spite of his desperate conviction that he must convince the ezwal how wrong it was—admiration flared inside him, a wild, fascinated admiration.

"By God!" he exclaimed, "I wouldn't be surprised if you really could evade the terrors of this world. In all my journeys through space, I've never seen such a perfect combination of mind and magnificent muscle."

"Save your praise," sneered the ezwal.

Jamieson hardly heard. He was frowning in genuine thoughtfulness:

"There's a saber-toothed, furred creature about your size and speed that might damage you, but I think you can outrun or outfight all the other furred animals. Then there are the malignant plants, particularly a horrible creeper affair—it's not the only intelligent plant in the galaxy, but it's the smartest. You'd need my gun if you got tangled up with one of those.

"You could evade them, of course, but that implies ability to recognize that one's in the vicinity. There are signposts of their presence but"—he held his mind as dim as possible, and smiled grimly—"I'll leave that subject before you read the details in my brain.

"That leaves the great reptiles; they can probably catch you only in the water. That's where the Demon Straits would be a mortal handicap."

"I can swim," the ezwal snapped, "fifty miles in three hours with you on my back."

"Go on!" The scientist's voice was scathing. "If you could do all these things—if you could cross oceans and a thousand miles of jungle, why did you return for me, knowing, as you must now know, that I could never reach my ship alone? Why?"

"It's dark where you're going," the ezwal said impatiently, "and knowledge is not a requirement for death. All these fears of yours are but proof that man will yield to unfriendly environment where he would be unflinching in the face of intelligent opposition.

"And that is why your people must not learn of ezwal intelligence. Literally, we have created on Carson's Planet a dumb, beastlike atmosphere where men would eventually feel that nature was too strong for them. The fact that you have refused to face the nature-environment of this jungle planet of Eristan II and that the psycho-friction on Carson's Planet is already at the factual of point 135 is proof that—"

"Eh?" Jamieson stared at that gleaming, blue, rhythmically bobbing head, "you're crazy. Why, 135 would mean—twenty-five—thirty million. The limit is point 38."

"Exactly," glowed the ezwal, "thirty million dead."

A gulf was opening before Jamieson's brain, a black realization of where this—monstrous—creature's thoughts were leading. He said violently:

"It's a damned lie. My reports show—"

"Thirty million!" repeated the ezwal with a deadly satisfaction. "And I know exactly what that means in your terms of psycho-friction: point 135 as compared to a maximum safety tension limit of point 38. That limit, of course, obtains when nature is the opponent. If your people discovered the cause of their agony was an intelligent race, the resistance would go up to point 184—and we'd lose. You didn't know we'd studied your psychology so thoroughly."

Whitely, shakily, Jamieson replied: "In five years, we'll have a billion population on Carson's Planet, and the few ezwals that will have escaped will be a small, scattered, demoralized—"

"In five *months,*" interrupted the ezwal coldly, "man will figuratively explode from our planet. Revolution, a blind mob impulse to get into the interstellar transports at any cost, mad flight from intolerable dangers. And, added to everything, the sudden arrivals of the Rull warships to assist us. It will be the greatest disaster in the long, brutal history of conquering man."

With a terrible effort, Jamieson caught himself into a tight matter-of-factness: "Assuming all this, assuming that machines yield to muscles, what will you do with the Rulls after we're gone?"

"Just let them dare remain!"

Jamieson's brief, titanic effort at casualness collapsed into a wave of fury:

"Why, you blasted fools, man beat the Rulls to Carson's Planet by less than two years. While you stupid idiots interfered with us on the ground, we fought long, delaying actions in the deeps of space, protecting you from the most murderous, ruthless, unreasonable things that the Universe ever spawned."

He stopped, fought for control, said finally with

a grim effort at rational argument: "We've never been able to drive the Rull from any planet where he has established himself. And he drove us from three major bases before we realized the enormousness of the danger, and stood firm everywhere regardless of military losses."

He stopped again, conscious of the blank, obstinate, contemptuous wall that was the mind of this ezwal.

"Thirty million!" he said almost softly, half to himself. "Wives, husbands, children, lovers—"

A black anger blotted out his conscious thought. With a single, lightning-swift jerk of his arm, he drew his atomic gun, pressed its muzzle hard against the great blue-ridged backbone.

"By Heaven, at least you're not going to get the Rulls in on anything that happens."

His finger closed hard on that yielding trigger; there was a white blaze of fire that—missed! Amazingly—it missed.

Instants passed before his brain grasped the startling fact that he was flying through the air, flung clear by one incredibly swift jerk of that vast, blue body.

He struck brush. Agonizing fingers of sticky jungle vine wrenched at his clothes, ripped his hands, and tore at the gun, that precious, all-valuable gun.

His clothes shredded, blood came in red, ugly streaks—everything yielded to that desperate environment but the one, all-important thing. With a bitter, enduring singleness of purpose, he clung to the gun.

He landed on his side, rolled over in a flash—and twisted up his gun, finger once more on the trigger. Three feet from that deadly muzzle, the ezwal drew up with a hideous snarl of its great, square face—jumped thirty feet to one side, and vanished, a streak of amazing blue, behind a thick bole of steel-hard jungle fungi.

Shaky, almost ill, Jamieson sat up and surveyed the extent of his defeat, the limits of his victory.

All around was a curious, treeless jungle. Giant, ugly, yellow fungi towered thirty, fifty, eighty feet against a red-brown-green sky line of tangled brown vines, green lichens and bulbous, incredibly long, strong, reddish grass.

The ezwal had raged through other such dense matted wilderness with a solid, irresistible strength. For a man on foot, who dared not waste more than a fraction of the waning power of his gun, it was a pathless, a major obstacle to the simplest progress—the last place in the world he would have chosen for a last-ditch fight against anything. And yet—

In losing his temper he had hit on the only possible method of drawing his gun without giving the ezwal advance warning thoughts. At least, he was not being borne helplessly along to a great warship loaded with slimly, white Rulls and—

Rulls!

With a gasp, Jamieson leaped to his feet. There was a treacherous sagging of the ground under his feet, but he simply, instinctively stepped onto a dead patch of fungi; and the harsh, urgent tones of his voice were loud in his ears, as he said swiftly:

"We've got to act fast. The discharge of my gun must have registered on Rull instruments, and they'll be here in minutes. You've got to believe me when I tell you that your scheme of enlisting the Rulls as allies is madness.

"Listen to this: all the ships we sent into their galaxy reported that every planet of a hundred they visited was inhabited by—Rulls. Nothing else, no other races. They must have destroyed every other living, intelligent creature.

"Man has forty-eight hundred and seventy-four nonhuman allies. I admit all have civilizations that are similar to man's own; and that's the devil of the type of historyless, buildingless, ezwal culture. Ezwals cannot defend themselves against energies and machines. And, frankly, man will not leave Carson's Planet till that overwhelmingly important defense question has been satisfactorily mastered.

"You and your revolution. True, the simple people in their agony may flee in mad panic, but the military will remain, a disciplined, undefeatable organization, a hundred battleships, a thousand cruisers, ten thousand destroyers for that one base alone. The ezwal plan is clever only in its grasp of human psychology and because it may well succeed in causing destruction and death. But in that plan is no conception of the vastness of interstellar civilization, the responsibilities and the duties of its members.

"The reason I was taking you to Earth was to show you the complexities and honest problems of that civilization, to prove to you that we are not evil. I swear to you that man and his present grand civilization will solve the ezwal problem to ezwal satisfaction. What do you say?"

His last words boomed out eerily in the odd, deathly, late-afternoon hush that had settled over the jungle world of Eristan II. He could see the blur of sun, a misty blob low in the eastern sky; and the hard realization came:

Even if he escaped the Rulls, in two hours at most the great fanged hunters and the reptilian flesh-eaters that haunted the slow nights of this remote, primeval planet would emerge ravenous from their stinking hideaways, and seek their terrible surcease.

He'd have to get away from this damned fungi, find a real tree with good, strong, high-growing branches and, somehow, stay there all night. Some kind of system of intertwining vines, properly rigged up, should warn him of any beast intruder

—including ezwals.

He began to work forward, clinging carefully to the densest, most concealing brush. After fifty yards, the jungle seemed as impenetrable as ever, and his legs and arms ached from his effort. He stopped, and said:

"I tell you that man would never have gone into Carson's Planet the way he did, if he had known it was inhabited by intelligent beings. There are strict laws that govern even under military necessity."

Quite abruptly, answer came: "Cease these squalling, lying appeals. Man possesses no less than five thousand planets formerly occupied by intelligent races. No totality of prevarication can cover up or ever excuse five thousand cosmic crimes—"

The ezwal's thought broke off; then, almost casually: "Professor, I've just run across an animal that—"

Jamieson was saying: "Man's crimes are as black as his noble works are white and wonderful. You must understand those two facets of his character—"

"This animal," persisted the ezwal, "is floating above me now, watching me, but I am unable to catch a single vibration of its thought—"

"More than three thousand of those races now have self-government. Man does not long deny to any basically good intelligence the liberty and freedom of action which he needs so much himself—"

"Professor!" The thought was like a knife piercing, utterly urgent. "This creature has a repellent, worm-shaped body, and it floats without wings. It has no brain that I can detect. It—"

Very carefully, very gently, Jamieson swung himself behind a pile of brush and raised his pistol. Then softly, swiftly, he said:

"Act like a beast, snarl at it, and run like hell into the thickest underbrush if it reaches with one of those tiny, wormlike hands toward any one of the half a dozen notches on either side of its body.

"If you cannot contact its mind—we never could get in touch with it in any way—you'll have to depend on its character; as follows:

"The Rull hears only sounds between five hundred thousand and eight hundred thousand vibrations a second. That is why I can talk out loud without danger. That, also, suggests that its thought moves on a vastly different vibration level; it must hate and fear everything else, which must be why it is so remorselessly impelled on its course of destruction.

"The Rull does not kill for pleasure. It exterminates. It possibly considers the entire Universe alien which, perhaps, is why it eliminates all important creatures on any planet it intends to occupy. There can be no intention of occupying this planet because our great base on Eristan I is only five thousand light-years or twenty-five hours away by warship. Therefore it will not harm you unless it has special suspicions. Therefore be all animal."

He finished tensely: "What's it doing now?"

There was no answer.

The minutes dragged; and it wasn't so much that there was silence. Queer, little noises came out of nearness and remoteness: the distant crack of wood under some heavy foot, faint snortings of creatures that were not exactly near—but too near for comfort.

A memory came that was more terrible than the gathering night, a living flame of remembrance of the one time he had seen a Rull feeding off a human being.

First, the clothes were stripped from the still-living victim, whose nervous system was then paralyzed partially by a stinger that was part of the Rull's body. And then, the big, fat, white worm crawled into the body, and lay there in that abnormal, obscene embrace while thousands of little, cuplike mouths fed—

Jamieson recoiled mentally and physically. Abrupt, desperate, panicky fear sent him burrowing deeper into the tangle of brush. It was quiet there, not a breath of air touched him. And he noticed, after a moment, that he was soaked with perspiration.

Other minutes passed; and because, in his years, courage had never been long absent from him, he stiffened with an abrupt anger at himself—and ventured into the hard, concentrated thought of attempted communication:

"If you have any questions, for Heaven's sake don't waste time."

There must have been wind above his tight shelter of brush, for a fog heavily tainted with the smell of warm, slimy water drifted over him, blocking even the narrow view that remained.

Jamieson stirred uneasily. It was not fear; his mind was a clenched unit, like a fist ready to strike. It was that—suddenly—he felt without eyes in a world of terrible enemies. More urgently, he went on:

"Your very act of asking my assistance in identifying the Rull implied your recognition of our interdependence. Accordingly, I demand—"

"Very well!" The answering thought was dim and far away. "I admit my inability to get in touch with this worm ends my plans of establishing an antihuman alliance."

There was a time, such a short time ago, Jamieson thought drearily, when such an admission would have brought genuine intellectual joy. The poor devils on Carson's Planet, at least, were not going to have to fight Rulls as well as their own madness—as well as ezwals.

He braced himself, vaguely amazed at the lowness of his morale. He said almost hopelessly:

"What about us?"

"I have already repaid your initial assistance in that, at this moment, I am leading the creature directly away from you."

"It's still following you?"

"Yes! It seems to be studying me. Have you any suggestions?"

Weariness faded; Jamieson snapped: "Only on condition that you are willing to recognize that we are a unit, and that everything else, including what man and ezwal are going to do about Carson's Planet must be discussed later. Agreed?"

The ezwal's thought was scarcely more than a snarl: "You keep harping on that!"

Momentarily, the scientist felt all the exasperation, all the strain of the past hours a pressing, hurting force in his brain. Like a flame, it burst forth, a flare of raging thought:

"You damned scoundrel, you've forced every issue so far, and all of them were rooted in that problem. You make that promise—or just forget the whole thing."

The silence was a pregnant emotion, dark with bitter, formless thought. Around Jamieson, the mists were thinning, fading into the twilight of that thick jungle. Finally:

"I promise to help you safely across the Demon Straits; and I'll be with you in minutes—if I don't lose this thing first."

Jamieson retorted grimly: "Agreement satisfactory—but don't expect to lose a Rull. They've got perfect antigravity, whereas that antigravity raft of ours was simply a superparachute. It would eventually have fallen under its own weight."

He paused tensely; then: "You've got everything clear? I'll burn the Rull that's following you, then we'll beat it as fast as your legs can carry us."

"Get ready!" The answer was a cold, deadly wave. "I'll be there in seconds."

There was no time for thought. Brush crashed. Through the mist, Jamieson caught one flashing glimpse of the ezwal with its six legs. At fifty feet, its slate-gray, three-in-line eyes were like pools of light. And then, as he pointed his gun in a desperate expectation—

"For your life!" came the ezwal's thought, "don't shoot, don't move. There're a dozen of them above me and—"

Queerly, shatteringly, that strong flow of thought ended in a chaotic jumble as energy flared out there, a glaring, white fire that blinked on, and then instantly off.

The mist rolled thicker, white-gray, noxious stuff that hid what *must* be happening.

And hid him.

Jamieson lay stiff and cold—and waited. For a moment, so normal had mind-reading become in these hours, that he forgot he could only catch thoughts at the will of the ezwal, and he strained to penetrate the blackout of mind vibrations.

He thought finally, a tight, personal thought: The Rulls must have worked a psychosis on the ezwal. Nothing else could explain that incoherent

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termination of thought in so powerful a mind. And yet—psychosis was used mainly on animals and other uncivilized and primitive life forms, unaccustomed to that sudden interplay of dazzling lights.

He frowned bleakly. Actually, in spite of its potent brain, the ezwal was very much animal, very much uncivilized, and possibly extremely allergic to mechanical hypnosis.

Definitely, it was not death from a heavy mobile projector because there would have been sound from the weapon, and because there *wouldn't* have been that instantaneous distortion of thought, that twisting—

He felt a moment's sense of intense relief. It had been curiously unsettling to think of that mighty animal struck dead.

He caught his mind into a harder band: So the ezwal was captive not corpse. So—what now?

Relief drained. It wasn't, he thought blankly, as if he could do anything against a heavily armored, heavily manned cruiser—

Ten minutes passed; and then out of the deepening twilight came the thunderous roar of a solid bank of energy projectors. There was answering thunder on a smaller scale; and then, once again, though farther away now, the deep, unmistakable roar of a broadside of hundred-inch battleship projectors.

A battleship! A capital ship from the Eristan I base, either on patrol or investigating energy discharges. The Rulls would be lucky if they got away. As for himself—nothing!

Nothing but the night and its terrors. True, there would be no trouble now from the Rulls, but that was all. This wasn't rescue, not even the hope of rescue. For days and days, the two great ships would maneuver in space; and, by the time the battleship reported again to its base, there wouldn't be very much thought given to the why of the Rull cruiser's presence on or near the ground.

Besides, the Rull would have detected its enemy before its own position would be accurately plotted. That first broadside had easily been fifty miles away.

The problem of ezwal and man, that had seemed such an intimate, soluble pattern when he and the great animal were alone, was losing its perspective. Against the immeasurably larger background of space, the design was twisting crazily.

It became a shapeless thing, utterly lost in the tangle of unseen obstacles that kept tripping him, as he plunged forward into the dimming reaches of jungle.

In half an hour it was pitch dark; and he hadn't penetrated more than a few hundred yards. He would have blundered on into the black night, except that suddenly his fingers touched thick, carboniferous bark.

A tree!

Great beasts stamped below, as he clung to that precarious perch. Eyes of fire glared at him. Seven times in the first hour by his watch, monstrous things clambered up the tree, mewing and slavering in feral desire. Seven times his weakening gun flashed a thinner beam of destroying energy—and great, scale-armored carnivore whose approach shook the earth came to feed on the odorous flesh—and passed on.

One hour gone!

A hundred nights like this one, to be spent without sleep, to de defended against a new, ferocious enemy every ten minutes, and no power in his gun.

The terrible thing was that the ezwal had just agreed to work with him against the Rulls. Victory so near, then instantly snatched afar—

Something, a horrible something, slobbered at the foot of the tree. Great claws rasped on bark, and then two eyes, easily a foot apart, started with an astounding speed up toward him.

Jamieson snatched at his gun, hesitated, then began hastily to climb up into the thinner branches. Every second, as he scrambled higher, he had the awful feeling that a branch would break, and send him sliding down toward the thing; and there was the more dreadful conviction that great jaws were at his heels.

Actually, however, his determination to save his gun worked beyond his expectations. The beast was edging up into those thin branches after him when there was a hideous snarl below, and another greater creature started up the tree.

The fighting of animal against animal that started then was absolutely continuous. The tree shook, as saber-toothed beasts that mewed fought vast, grunting, roaring shapes. And every little while there would be a piercing, triumphant scream as a gigantic dinosaur-thing raged into the fight—and literally ate the struggling mass of killers.

Toward dawn, the continuous bellowing and snarling from near and far diminished notably, as if stomach after eager stomach gorged itself, and retired in enormous content to some cesspool of a bed.

At dawn he was still alive, completely weary, his body drooping with sleep desire, and in his mind only the will to live, but utterly no belief that he would survive the day.

If only, on the ship, he had not been cornered so swiftly in the control room by the ezwal, he could have taken antisleep pills, fuel capsules for his gun and—he laughed in sharp sardonicism as the futility of that line of reasoning penetrated—and a lifeboat which, of course, would by itself have enabled him to fly to safety.

At least there had been a few hundred food capsules in the control room—a month's supply.

He sucked at one that was chocolate flavored, and slowly climbed to the bloodstained ground.

There was a sameness about the day, a mind-wearing sameness! Jungle and sea, different only in the designs of land shape and in the way the water lapped a curving, twisting shore. Always the substance was unchanged.

Jungle and sea—

Everything fought him—and until midafternoon he fought back. He had covered, he estimated, about three miles when he saw the tree—there was a kind of crotch high up in its towering form, where he could sleep without falling, if he tied himself with vines.

Three miles a day. Twelve hundred miles, counting what he still had to cover of this jungle ocean, counting the Demon Straits—twelve hundred miles at three miles a day.

Four hundred days!

He woke up with the beasts of the Eristan night coughing their lust at the base of his tree. He woke up with the memory of a nightmare in which he was swimming the Demon waters, pursued by millions of worms, who kept shouting something about the importance of solving the ezwal problem.

"What," they asked accusingly, "is man going to do with civilizations intellectually so advanced, but without a single building or weapon or—anything?"

Jamieson shook himself awake; and then: "To hell with ezwals!" he roared into the black, pressing, deadly night.

For a while, then, he sat shocked at the things that were happening to his mind, once so stable.

Stable! But that, of course, was long ago.

The fourth day dawned, a misty, muggy replica of the day before. And of the day before that. And before that. And—

"Stop it, you idiot!" said Professor Jamieson aloud, savagely.

He was struggling stubbornly toward what seemed a clearing when a gray mass of creepers to one side stirred as in a gentle wind, and started to grow toward him. Simultaneously, a queer, hesitant thought came into his mind from—outside!

"Got them all!" it said with a madly calm ferociousness. "Get this—two-legged thing—too. Send creepers through the ground."

It was such an alien thought form, so unsettlingly different, that his brain came up from the depths to which it had sunk, and poised with startled alertness, abruptly, almost normally fascinated.

"Why, of course," he thought quite sanely, "we've always wondered how the Rytt killer plant

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could have evolved its high intelligence. It's like the ezwal. It communicates by mental telepathy."

Excitement came, an intense, scientific absorption in all the terrifically important knowledge that he had accumulated—about ezwals, about Rulls, and the way he had caught the Rytt plant's private vibrations. Beyond all doubt, the ezwal, in forcing its thoughts on him, had opened paths, and made it easier for him to receive all thoughts. Why, that could mean that he—

In a blaze of alertness, he cut the thought short; his gaze narrowed on the gray creepers edging toward him. He backed away, gun ready; it would be just like the Rytt to feint at him with a slow, open, apparently easily avoidable approach. Then strike like lightning from underground with its potent, needle-sharp root tendrils.

There was not the faintest intention in him to go back, or evade any crisis this creature might force. Go back where?—to what?

He skirted the visible creepers, broke through a fifty-foot wilderness of giant green ferns; and, because his control of himself was complete now, it was his military mind, the mind that accepted facts as they were, that took in the scene that spread before him.

In the near distance rested a two-hundred-foot Rull lifeboat. Near it, a dozen wanly white Rulls lay stiff and dead, each tangled in its own special bed of gray creepers. The creepers extended on into the open door of the lifeboat; and there was no doubt that it had "got them all!"

The atmosphere of lifelessness that hung over the ship, with all its promise of escape, brought a soaring joy, that was all the sweeter because of the despair of those days of hell—a joy that ended as the cool, hard thought of the ezwal struck into his brain:

"I've been expecting you, professor. The controls of this lifeboat are beyond my abilities to operate; so here I am waiting for you—"

From utter despair to utter joy to utter despair in minutes—

Cold, almost desolate, Jamieson searched for his great and determined enemy. But there was nothing moving in the world of jungle, no glimpse of dark, gleaming blue, nothing but the scatter of dead, white worms and the creeper-grown lifeboat to show that there ever had been movement.

He was only dimly aware of the ezwal's thoughts continuing:

"This killer plant was here four days ago when I landed from the antigravity raft. It had moved farther up the island when these Rulls brought me back to this lifeboat. I had already thrown off the effects of the trick-mirror hypnotism they used on me; and so I heard the human battleship and the Rull cruiser start their fight. These things seemed unaware of what was wrong—I suppose because they didn't hear the sounds—and so they laid themselves out on the wet, soggy ground.

"That was when I got into mental communication with the plant, and called it back this way—and so we had an example of the kink of co-operation which you've been stressing for so long with such passionate sincerity, only—"

The funny thing was that, in spite of all he had fought through, hope was finally dead. Every word the ezwal was projecting so matter-of-factly showed that, once again, this immensely capable being had proved its enormous capacity for taking care of itself.

Co-operation with a Rytt killer plant—the one thing on this primitive world that he had really counted on as a continuous threat to the ezwal.

No more; and if the two worked together against him— He held his gun poised, but the black thought went on:

It was obvious that man would never really conquer the ezwal. Point 135 psycho-friction meant there would be a revolution on Carson's Planet, followed by a long, bloody, futile struggle and— He grew aware that the ezwal was sending thoughts again:

"—only one fault with your reasoning. I've had four days to think over the menace of the Rulls, and of how time and again I had to co-operate with you. Had to!

"And don't forget, in the Rytt-intelligence, I've had a perfect example of all the worst characteristics of ezwals. It, too, has mental telepathy. It, too, must develop a machine civilization before it can hope to hold its planet. It's in an earlier stage of development, so it's even more stubborn, more stupid—"

Jamieson was frowning in genuine stark puzzlement, scarcely daring to let his hope gather. He said violently:

"Don't try to kid me. You've won all along the line. And now, of your own free will, you're offering, in effect, to help me get back to Carson's Planet in time to prevent a revolution favorable to the ezwals. Like hell you are!"

"Not my own free will, professor," came the laconic thought. "Everything I've done since we came to this planet has been forced on me. You were right in thinking I had been compelled to return for your aid. When I landed from the raft, this creeper-thing was spread across the entire peninsula here, and it wouldn't let me pass, stubbornly refused to listen to reason.

"It's completely ungrateful for the feast of worms I helped it get; and at this moment it has me cornered in a room of this ship.

"Professor, take your gun, and teach this damned creature the importance of—co-operation!"

THE END.

THE EAGLES GATHER

By Joseph E. Kelleam

● The mercenaries of the war lords had fought their last paying fight. They—the war lords—the civilization was bankrupt—

Illustrated by Schneeman

There were no stars. The ruined landing field was lit by dancing shadows from a huge bonfire. With forlorn, hollow eyes the broken towers looked down upon the field, the leaping flames, and the one battered space boat. Beyond the dancing fire the night waited threateningly.

In the shadow of one of the rickety towers a man huddled before a tiny flame and now and then turned his attention to a bubbling pot that hung from a forked stick above the coals. He was lean and broad-shouldered. The flickering coals occasionally lit up his thin face—the somber, gray eyes, the high cheekbones, the wide, sensitive mouth and the yellow curls that fell across a high forehead. The man seemed to be lost in thought, only turning his gaze away from the coals long enough to look up at the dark sky or to stir the pot of stew. When he moved to throw more wood upon the fire it was with the lithe grace of a cat, and even his tattered uniform took on a trim, military look from its wearer.

As the man stared into the fire he was listening

to the sound of an approaching ship, half-heard, far above him in the dark sky. The noise of a descending ship increased, changed from a whine to a scream, and from a scream to a roar.

There was a roar and a gush of flame. A long, billowing jet of fire swept over the landing field like a scythe, and another space boat glided across the weed-strewn field. It stopped near the silent space craft. Both the boats were small, battered, patched and repatched—little one-man boats that had gone buzzing about space like wasps—as though the planets and the asteroids were golden fruit ripe for the taking.

The man before the fire made no movement other than to hitch his belt around so that a lean bronzed hand rested upon the worn butt of a pistol. He sat there looking into the fire, though he could hear the sound of feet stumbling through the underbrush. The night was chill, and with his free hand he pulled his patched leather jacket across his chest.

"Hello." The visitor stood before him smiling a cold smile—a little man with wide, drooping shoulders and eyes as blue as chilled steel.

The man before the fire grunted and motioned with his head for the newcomer to be seated.

"Smells good," said the visitor as he sat down and looked into the steaming pot. "That was white of you to build the fire. I'd never 've landed without it. Not much power left, either." He sighed.

"That's O. K. I figured there would be more boats along. They're coming home now—those that have power enough in their engines to make the trip. My name's Duane, Jim Duane."

"They call me Captain," said the little man. "I've got other names, but mostly I answer to Captain. I'm a professional soldier." He added with a trace of a cold smile, "Like you."

"Yeah," Duane said wearily, "that's my work. "Fightin' for the highest bidder. But when the war lords ran short of uranium they sent me home." He added with a malicious grin, "Like you."

"And damned lucky to get home. Plenty of boys marooned up there." Captain jerked his chin upward toward the dark, mist-swept sky. "But they'll find more uranium. They'll call us back. Twenty years of fightin' can't end this way. The war lords aren't satisfied. There'll be more power for those crates, and guys like us will be gentlemen again, drawin' monthly wages in four figures."

Duane shook his head. "It's gone. They've hunted everywhere. Oh, they found plenty—enough for centuries. But they burned it up in twenty years. They blasted the worlds apart. They fought like mad dogs. An' now it's gone. An' I'm damned glad."

Captain's eyes narrowed. "You don't talk like a fightin' man."

Duane's hand tightened upon his gun. "A man don't talk fight. Want to see how I fight?"

The little man shrugged his broad shoulders. "I only fight for money. Perhaps we'll fight for different war lords some day."

The scuffling of boots through the undergrowth eased the tension between the two. Two figures stumbled toward the fire. Two men in tattered leather coats and ragged pants and worn boots stopped as one, and stood there with downcast eyes as though awaiting an invitation.

"Space-nuts," said Captain none too softly.

One of the men looked up and patted a bulge in his coat. "I got a can of tomatoes." He smiled timidly. He was a thin little man with a sunken chest and a long pointed nose. His sunken eyes were black and dull.

Duane had seen hundreds like the two. There were men who cracked up out there in space, men who broke under the strain of the screaming, bellowing, fire-blasting wars.

"Throw the tomatoes in the pot," he said carelessly. "Sit down and warm. My name's Duane. This is Captain—that's his name, he's not my captain."

The man drew a can opener from his pocket and produced the tin of tomatoes. As he sawed at the lid he said listlessly, "I'm Ted Shafer. Used to have my own ship. But I lost it. 'Bout a year ago I was shippin' on a freighter an' they marooned me here. Said I was nuts. I'm not nuts. You can see that I ain't nuts. Well, I been livin' around here for about a year—livin' off what I could find. There's a ruined town over there. Then I run into this feller about a week ago. His name is . . . say, what's your name? I keep forgettin'."

The fourth man, a squat, paunched fellow with a red nose and a thick unkempt beard, snorted. "The name's Belton. Bill Belton. You're gettin' crazier and crazier. I been around here for about six months. Only I wasn't marooned. I jumped ship. You guys got anything to drink?"

Captain swore. "Just a couple of bums. I oughta give 'em the toe of my boot—"

Duane's eyes narrowed. "It's my fire," he said softly.

"O. K., O. K. But they're full of lice, I bet—"

Shafer and Belton sat by the fire, their shoulders slumped forward.

Duane reached behind him into the shadows and brought out a roll of bedding. He produced four plates and four tin spoons and began to ladle out the mulligan. When he served, Shafer and Belton were profuse with their thanks. Captain was contemptuous.

"Mulligan," he swore. "Damn, I've sat at tables with war lords. Twenty courses on silver dishes and wine and liquor enough for all. And everybody dressed like hell."

Duane grinned. "Sorry I ain't a war lord. Maybe you'd like a punch in the nose."

Captain took the proffered plate sullenly. "I'm sorry. I keep forgettin'. Geez, I hope they dig up some more uranium soon. It's hard to take this when you've been used to a monthly salary that runs into four figures."

Duane looked up at the dark sky that was vacant save where a trailing mist tangled with the smoke from the fire.

"They won't find any more uranium. Not soon, anyway. I've thought a lot about it. We weren't ready to conquer space. We made a mess of it. Oh, we had the ships and the guns. Mechanically we were perfect. It was us who was wrong. We conquered space but we hadn't conquered ourselves. That will come some day."

"You sound like a parson," Captain jeered.

Little Shafer mouthed his food wolfishly, now and then drawing the back of his hand across his mouth and the tip of his long pointed nose. "What makes you think we won't find any more uranium?" he asked slyly.

Duane looked at him. The little man's fingers were trembling.

"Oh, we might find it," Duane said, "but there's no organization any more. It's been blown to hell. If we do find uranium, we'll lose it again. We're all washed up—for the time being, anyway. We'll have to dig in here on old Terra and start from scratch. Personally, I'm glad."

Captain snorted. "Nurts."

"There's uranium aplenty left," little Shafer said stubbornly.

Captain's eyes narrowed. "Know where it is, punk?"

Shafer avoided that steely glance. "Maybe I do and maybe I don't," he evaded.

Belton scraped the last bit of grease from his plate and belched contentedly. "I was rich once," he told the fire.

Captain sneered. "You ain't ever had the price of an extra drink in your pocket."

"I was rich once, just the same." Bill Belton looked from face to face pleadingly. A coal sputtered into the flame and lit the high color on his bulby nose and swollen cheeks. "I was rich once, richer than dirt."

"O. K.," Duane told him. "Maybe you were. Go ahead and tell your tale and get it off your mind. I'm not sleeping tonight, anyway."

"It'll be a rum-soaked, mangy lie that he dreamed up between panhandling and fightin' pink lizards." Captain yawned.

Belton looked hurt and lowered his eyes to the fire.

"I was rich once. I was runnin' a one-man mining boat out of Achilles. It wasn't much of a boat, but it was mine. An' all of a sudden I came across a freighter, a drifter. A meteor had torn about a fourth of her away, and she was driftin' and spinnin' alone out there in space with all the stars a-twinklin' down at her like diamonds sparklin' on black velvet.

"So I boarded her, and every bit of oxygen had been ripped from her, and there was all the poor boys there, dead and frozen in Old Father Time's icebox. Well, that ship was loaded with furs. She had been outward bound from Pallas, I reckon. An' those furs were all mine by rights of salvage. A king's ransom. I packed my boat with 'em until I hardly had room to move about it.

"An' then, just off Mars, a damned bunch of hellhounds boarded me and cleaned me out and set me adrift in one of those dinky little emergency boats. I've thought of it and thought of it. Those furs were mine. I was rich. They robbed me. But I got the name of that boat. I saw the name. Some day I'll catch some of those fellows. Or even one—"

While Belton was talking, little Shafer slowly slumped over the fire and held his hands over the coals. His fingers were shaking as though he had a chill. His dull, close-set eyes glanced this way and that furtively.

And two pairs of eyes were upon him, Captain's and Duane's. Captain reached into an inner pocket of his leather jacket and produced a flask. Slowly he uncorked it and held it toward the little man, then drew it back temptingly. Shafer's

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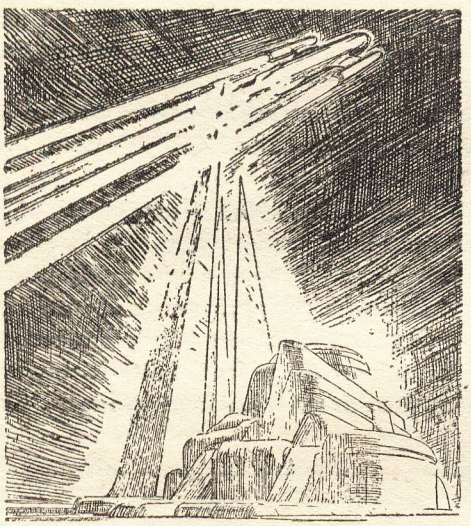
clutching, trembling fingers followed the flask.

"You seem like a good little guy," Captain said. "An' you look sick. Take it all. It's all I've got, but—" He shrugged his broad shoulders and smiled his cold smile.

Duane watched the little play before him. In his deep eyes was pity for this little derelict and contempt for the man who was leading him on.

"He thinks you know where some uranium is buried," he said mockingly. "He'll trade you a drink for a ton of uranium."

"Go to hell," Captain told him. And then to Shafer, "Go ahead. Drink her down. Don't mind this space lawyer."



The little man obliged. Belton watched, fascinated.

"Hell, don't I get a nip?" he objected.

"Not a drop," Captain's cold eyes were murderous. "Can't you see, this little fellow's a gentleman? I bet he's seen better days—"

"Haven't we all?" Duane interrupted.

"Leave the little guy alone." Captain thumped Shafer on the back lustily. The little man smiled timidly and tilted the flask again.

"Thanks." He drew the back of his hand across his mouth and held out the flask to Captain.

Captain waved it away airily.

"Nix, I can tell when a guy needs a drink better than I do. I bet you've seen better days. Bet you were richer than this mug who yaps about findin' a load of furs—like he was a damned scavenger."

Belton flushed. "Listen." One hand stole within his tattered jacket.

"Easy," Duane said, and patted the worn butt of his gun. Belton slumped back over the fire and began to mutter to himself.

Shafer had taken another pull at the flask. A feverish light was coming into his dull eyes.

"Furs," he snorted contemptuously. "Dirty, stinkin' furs! Who gives a damn about furs? Why, I got a corner on all the wealth in the world. The overlords will be beggin' after me some day. I'm richer than all the stars 'cause I got what everybody wants."

"I knew a guy who talked like that once," put in Duane softly. "He was singin' a tune just like that in a two-bit bar. But he didn't have money enough to pay for his last drink and they threw him out into the street."

"Shut up." Captain smiled, confident that Duane had played into his hand. "Never mind this cynic."

Shafer looked at Duane and tried to sneer. "Think I'm lyin', eh? Well, you'll see. I used to own my own boat, I did. An' I found a mine, a nice, floatin' mine. I didn't have to stake it, 'cause I'm the only one who knows where it is."

"Sure," said Captain.

"Tons and tons of uranium." Shafer turned the words over in his mouth as though they were bonbons.

"Sure," said Captain softly. "Enough for all. We'll live like kings."

Shafer straightened and looked about him, frightened. His eyes dulled again. "You're trying to get me to talk. No, it's mine. All mine. I found it. Nobody else knows where it is."

Again Captain patted Shafer's thin shoulders. "We were just interested in your story, weren't we, men?"

Duane grunted his contempt.

Little Shafer took another pull at the flask. "Yes, sir," he said dreamily. "I was cruisin' out there in space, 'way off the space lanes, when I bumped into it. A little asteroid not over half a mile across. And solid uranium. I chartered it. I figgered out its orbit to an inch. I used to could do that. An' it's mine. Over an' over I keep repeatin' those figures to myself.

"I may forget other things but I won't forget that orbit. An' I'll write it down when someone puts the cold cash in my hand."

He was silent for a moment. Then he took another drink and began to talk to himself. "Yes, sir, I found an asteroid that's solid uranium. There I was, down on my luck, an' cruisin' around in my own ship, the *Billikins*—"

His thin hand went to his mouth as though to stop the words. His eyes were filled with fear. A scream slipped between his bony fingers.

Bill Belton was on his feet, a groping hand within his coat.

"You," he screamed. "Damn it, I'd know the name of that ship in hell. It was your ship. You took my furs."

The little man's trembling hands were thrust out in protest.

"No!" he screamed. "No, no, no!"

Slowly Belton's hand came from his coat. His

stubby, grimy fist clutched a long knife. "It was you," he cried. He raised the knife in a shining arc.

Then little Shafer's fear changed to desperation. With a scream he jumped back and clawed at his coat. He was quick now. Fear had maddened him. A mean little pistol appeared in his hand. He fired point-blank at Belton's face.

Belton staggered and fell. His hands came up to a bleeding face that was a face no more. He screamed a wild, bubbly scream. Then he rolled into the fire, screamed again, struggled to his feet, and fell again—and lay still.

"You tricked me, damn you all." Shafer stood above the two seated men and brandished his gun. His eyes were burning now, little close-set pools of mad fire. His shaking hand steadied and lowered the gun toward Duane.

Duane's hand moved like a rattlesnake striking. Two stabs of flame lanced into the night. Shafer stumbled and fell.

Duane turned his attention to Captain. The little man was nursing a broken arm. A gun that had been leveled at Duane was slipping from deadened fingers.

"You fool," he cried. "You killed him. I believed that story. He knew where the uranium was."

Duane shrugged. "He was crazy. A killer. I know your kind, Captain. I knew what you were thinking when he hinted that he knew where a lode of uranium was. You were figuring then that only you and Shafer would go away from this fire. You had your gun on me just then, ready to polish me off if Shafer missed."

"Damned blundering idiot," Captain swore. "Oh, I wish I had some of my men here."

"Leave your gun and get out," Duane told him.

"But it's dark. I can't go out there in the dark without a gun."

"Get out!" Duane's words were like icy barbs. "Mornin' will be here soon."

Captain struggled to his feet. He was sobbing with fear and rage and pain. Slowly he moved away from the fire.

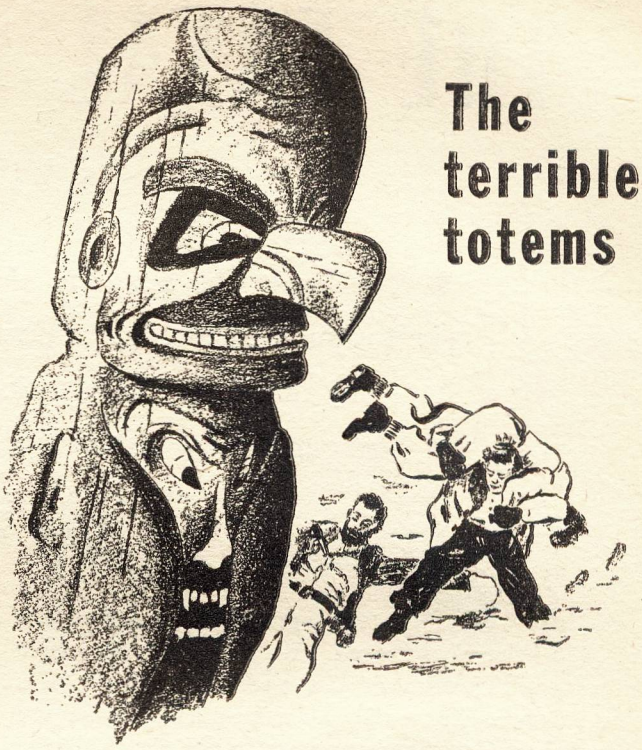
"And remember what I said," Duane called after him. "Men will conquer the stars some day—after they have conquered themselves."

Captain's retreating figure faded into the night. The sound of his stumbling footsteps died away.

Duane sat there before the little fire, staring intently into the coals, oblivious of the two fallen figures that lay there in the shadows. At length he arose. In the east a bit of silver was appearing. As he watched, the silver grew brighter; and long spars of purple and rose stretched across the sky.

And as morning dawned the sweeping mists faded and disappeared. The sky was empty—but clear and shining with promise.

THE END.



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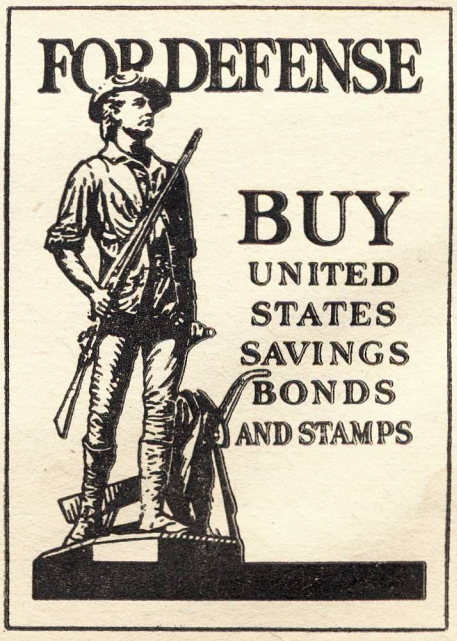


THE FATAL COLORATION

By Willy Ley

● We know the size, the shape, and even the diet of the giant reptiles of the Age of Saurians. But one thing we don't have any direct way of learning is—their color. And modern reptiles can display astonishing ranges of poster-bright color—

Illustrated by Schneeman

A little over a century ago—to be precise, late in 1824—there appeared in Paris a book which later was regarded as the opening chapter of a new science. It was by no means a big tome and although it described marvels it hid them behind a dry and unobtrusive title which read: *"Recherches Sur Les Ossemens Fossiles"*—in translation: "Researches On Fossil Bones." Its author was a young French scientist by the name of Georges François Cuvier. This was the work which founded the science of paleontology.

Fossil bones had come to light long before Cuvier, of course. When a swift river gnawed its way through sand and soil "petrified bones" came to light every once in a while. When a cellar was dug by workmen such bones occasionally made them stop in their work and spend some time with superstitious chatter. And when slabs of slate were cleaved for a roof covering they were often found to show impressions of fish, small and large, or of other creatures for which there were no names.

In short: fossils had not been lacking prior to Cuvier. What had been lacking was a proper conception of what they were and what they implied. Because of the lack of such a conception they were dubbed "crystalline formations" or *lusae naturae* or other things—terms that were mostly poor Latin, that always sounded impressive and that never meant a thing. Only when the fossil bones surpassed the size of human bones a more concrete guess seemed permissible; *then* they were the bones of dragons or of the giants who slew them.

Georges François Cuvier established that all these fossils were remains of animals that once had been alive. Even in that he was not the first man to think that way. He had a few predecessors among whom the Swiss naturalist Johann Jacob Scheuchzer is most widely known. The difference between Cuvier and Scheuchzer is most important, however. Scheuchzer thought of animals that had died—Cuvier spoke of animals that had become *extinct.* Bearing in mind that this was an entirely novel thought, it is easy to see that the book was much more than "Researches On Fossil Bones." It was a description of a journey of exploration, a journey—and the first one—which did not lead to a faraway corner of the earth, but to long-gone periods of time. It was, as I termed it in one of my books, the first crossing of the time barrier which revealed the fact that earth has had a long and varied past.

Another Frenchman, Jules Verne, must have felt the same way about Cuvier's "new frontiers" when he, only a few decades later, wrote his novel about the "Journey to the Center of the Earth." The explorers, descending through the burned-out crater of an Icelandic volcano, at first pass strata of rock laid down during former geological periods, showing remains of saurians and, later, of trilobites. But then the men enter a gigantic cave filled by a subterranean sea, illuminated dimly and eerily by light emanating from the compressed atmosphere itself, and in that sea long-necked plesiosaurs and sharp-toothed ichthyosaurs battle for life while beyond the sea, at the edge of a weird jungle a herd of mastodons is feeding quietly.

Just about the time that novel was being written the real paleontological discoveries began to crowd the pages of the scientific journals. For a while it seemed as if it were impossible to build a railroad or a highway, to bore a tunnel, to regulate a river, to excavate for a foundation of a building or in general to turn a stone without coming across fossils of one sort or another. Half a dozen small towns in Europe, with names known just about as far as one could see from their church towers, suddenly acquired world-wide fame in interested circles because they marked sites

rich in fossils. But the combined fame of all of them paled to almost nothing when Professor O. C. Marsh informed the world about the monsters which had come to light on American soil.

Some sculptors and artists discovered a new and intriguing field. No famous human face, no historical or mythological event and even no monstrous demigod of Hellenic or Oriental mythology proved as fascinating to them as O. C. Marsh's brontosaurus from the Badlands, or the megatherium—giant ground sloth—from Argentina or even the more humble fishlike ichthyosaurians from southern England or southwest Germany.

A flood of pictures, very weird but not at all accurate, was the result. The next result was that the artists who had created them, and who had hoped or expected to be admired by the scientists, found themselves the targets of many unfriendly remarks. Whereupon those who did not simply feel or act insulted took their sketchbooks and went to see the paleontologists for advice. They got all the advice they wanted, and more, but after details of shape and size, of posture and proportions had been settled to the mutual satisfaction of both parties, a most embarrassing question came up. The artists then wanted to know what colors they were supposed to give to the various animals with names ending in "saurus" and "therium."

This was the point where science ceased to provide a clear and definite answer. The coloration of extinct animals—save for such rare cases as the woolly mammoth, cadavers of which have been found frozen in Siberian glaciers—was simply not known. Nor did it seem knowable. The best scientists were able to do was to make a few general suggestions—just *how* general can best be shown by discussing them a little.

If the extinct animal was a mammal, two colors could be ruled out with a fair measure of certainty. They are blue and green. No living mammal shows a definite blue or green in its fur, although a bluish or greenish sheen may be observed as a rarity; in fact, such a bluish sheen makes the pelts of some fur-bearing animals rare and consequently expensive. But some monkeys demonstrate clearly how loudly blue naked parts of the skin can be even if the fur is a modest yellow or gray. As to the pattern it could be suggested that the back would be darker than the under parts of the body. Even this is only a general rule as there are numerous exceptions. Many mammals show the same color of fur all over and all around, and one or two have reversed color schemes, dark along the underside and light above.

Living relatives of extinct mammals sometimes provide a clue, but it is not very reliable. If we did not have those frozen cadavers of *Elephas primigenius*—and drawings made by Pleistocene Man—we would certainly reconstruct these extinct relatives of the living elephants as hairless and slate-gray in color. Actually they bore a long fur of a deep reddish brown, about the color of the bark of the Big Trees of California. To advise an artist about the coloration of extinct ancestors of the horse is anything but easy—did they look dun-colored like certain horselike animals of today or did they possess the loud stripes of the zebras. They are all rather closely related, and one choice is as justified as another. I would not even dare to make suggestions about the color scheme of an extinct giraffe. One living type, the true giraffe, is spotted somewhat like a leopard. The other living type, the okapi, is partly dun-colored and partly zebra-striped. And the Babylonians, who were usually ultra-careful when they pictured actual animals, left us a picture of a long-necked giraffe of uniform lion-yellow without any

spots or stripes. It seems that two thousand years ago there still existed such a uniformly colored giraffe.

As regards birds, things are even more confused and uncertain.

While the fur—not the skin—of mammals seems to be incapable of producing a bright blue and a violent green there seem to be no limitations of any kind when it comes to bird feathers. Just look at a collection of parrots if you are inclined to disagree with this statement. Nor do birds follow any logic of any kind in their color schemes. True, a number of them show protective coloration and even mimicry, aping pieces of lichen-covered bark or similar inedible matter. But then you find the black of the raven and the red of the cardinal, without any rhyme or reason. Nor is there any perceptible climatic influence. As a rule the birds of northern Europe are a dull-colored lot, but there is a small sparrowlike bird which is so colorful that folklore invented the legend that it had been forgotten during creation and that the Lord, when the mistake was discovered in the end, did not have enough of any color left so that the little bird was smeared with remains squeezed from all the tubes. And two others of these European birds are so brightly blue and blue-and-green that harmless city people who chance to see a specimen invariably wonder whether they are escaped parrots. Incidentally, parrots which actually escaped brave the European winter without flinching; they are "fruitful and multiply" as if they were at home.

Small wonder that the Swedish ornithologist Gerhard Heilman did not hesitate to adorn his book *"Fuglenes Afstamning"*—"Origin of the Birds"—with a frontispiece showing a painting of *Archaeopteryx*—the earliest known bird from the Jurassic period—with a bright cobalt blue as the prevailing color. He painted the picture himself, knowing perfectly well that he could make Archaeopteryx look as beautiful as he wanted to, without fear of successful contradiction.

The most impressive of all extinct animals are the dinosaurs—reptilian vertebrates, as every schoolboy knows. Just what color possibilities did they have? In principle any color is possible on a reptile. In fact, that lack of any limitations which characterized the bird feather is not original with birds; they inherited that from their reptilian ancestors because feathers are remodeled scales. Nor is this one of the cases where anything is possible in principle but where certain things do not actually occur.

The living reptiles run the gamut of all colors of the visible spectrum and a little of the invisible spectrum, too, as has recently been discovered. And they do it better and more thoroughly than any other class of living creatures. A mammal may have a fur with a greenish sheen; a bird may have feathers that are yellowish green or bluish green. But a green lizard or a green tree snake is definitely and most decidedly *green.* And when a lizard decides to be red-headed that head is intolerably and poisonously *red!* The chameleon makes the whole problem even more interesting in being capable of assuming all the colors in the paint box individually. I have seen a so-called green chameleon in its "true" color, just before it began to pale to a bright lemon-yellow. When I came back to its cage half an hour or so later it had undergone another change of mind and looked like black velvet.

Needless to emphasize that information of this kind is not very helpful to an artist who wishes to show his carefully reconstructed dinosaurs in their "natural" colors.

It is not surprising, therefore, that the paintings and water colors of dinosaurs show a tendency toward the extremes. Many artists depicted dinosaurs as of slate-gray, sand-yellow or loam-brown color, transposing the colorations of the fossil bones to the reconstruction of the skin. A good deal of them look as if their models had just been caught in some dimly lit underworld of the Jules Verne type, a world in which all colors fade away until only that of protective mud-soup is left. Some artists, on the other hand, have gone all-out for rhapsodic surrealist color smashes—since principally anything might be true.

I am thinking mainly of a painting done in 1905 or 1906 and published by Dr. K. Gunther. It shows a landscape of the late Jurassic period, with a forest consisting mainly of tree ferns and araucarias and a bay of the European Sea in the background. A few ichthyosaurs, playing like dolphins and porpoises, can be seen in the water. Not only their shape is like that of a dolphin, but also their coloration—glistening wetly dark on the back with a whitish belly. This is the natural color scheme of marine animals, so that they blend with the usually dark bottom—or simply the depth itself, which is *always* dark—when seen from above and the usually light "sky" when seen from below.

So far, so good.

A pterodactylus, flying across the water, is as colorful as if it had been sketched by Disney in one of his wilder moments. Yellow and blue it shows, with some screaming red dabbed in on odd spots. The artist and his advisers—I do not recall their names—probably had the coloration of the "flying dragon"—*Draco volans*—of the Sunda Archipelago in mind. These small four-inch "parachute lizards" glory in a display of bright peacock colors; green and yellow are the predominant colors of the body. But the head of some varieties and the neck and throat of others are purplish red, while the skin parachute is a bright orange, overlaid with two grids, one rose-red, the

other velvet-black, with, literally, a silver lining.

Such coloration, like some bright bird colors, is a little hard to explain. One might say that so much color is overwhelmingly confusing to the eye of an enemy; one might also say that those lizards and birds have few natural enemies in their habitat and that they, therefore, could afford to stay as colorful as a mutation once made them.

In any event, such examples of bright coloration do exist.

But to go on with the description of the painting I was talking about. The main figures are three biped dinosaurs emerging from the forest. One of them is a carnivorous saurian, Megalosaurus; the two others, chased by him, are iguanodons. All three of them biped and measuring some twenty-five feet from snout to tip of the tail.

Megalosaurus is pictured as yellowish green with dark-green zebra stripes. The two iguanodons show lemon-yellow bellies, tails that are striped yellow and green in wide bands, while rows of colorful circles, somewhat like the tail feathers of a peacock or the wing ornaments of some butterflies, run along the back.

Most artists, however, did not dare to go to such extremes, although they recognized the need for coloration, unless they were careful and just stuck to pencil or pen and ink. Luckily there were two fields where the choice was rather easy. All marine forms could be painted according to the scheme demonstrated by most fishes and most marine mammals: brownish black, bluish black or just black on top and white, whitish or faintly yellow below. The other field was the desert. Desert forms usually show desert colors, a grayish or brownish yellow. Even here I have come across an amusing mistake.

A famous dinosaur of the European Triassic goes by the name of Chirotherium. The word is derived from the Greek *cheiros* for "hand," and it is the only word that could have served. It so happens that fossil bones of chirotherium are still completely unknown; the only thing known about this animal is a superabundance of fossilized tracks. And these tracks look very much like the impression of a human hand. How the general shape of chirotherium could be reconstructed from these tracks alone is a very interesting story, but it does not belong in this article. Suffice to say that it must have looked like a long-legged lizard—it was on the verge of becoming a biped —with a heavy tail and a neck of medium length. Now, chirotherium was a desert form, consequently one artist pictured it with desert colors, which is quite correct. But he made the mistake of having the picture of the Sahara Desert in mind. Actually the Triassic desert of the chirotherium layers was not yellowish, but was red, a darkly burning red. If chirotherium had the color of its surroundings, it must have been red—the impressive red of iron oxides coloring sand.

When it came to land dinosaurs of the late Jurassic and Cretaceous periods these rules did not apply. Proceeding with care, artists chose a dirty white or indistinct light yellow for the ventral parts of the body with equally indistinct dirty brownish and greenish tints for the back and the limbs.* The model for this color scheme is evident. It is the crocodile, which, as largest living reptile of our time, gives the impression of being something surviving from the Mesozoic Era. That impression, incidentally, is correct, even though the crocodiles did not amount to very much as long as the real dinosaurs were alive.

And with this sentence we have touched upon the second embarrassing question which invariably came up in all the discussions that referred to the reconstruction of dinosaurs and the proper way of doing it.

It was the question why the dinosaurs, after millions of years of absolute predominance, had finally died out.

Until very recently no answer to that question existed. Natural catastrophes like floods, earthquakes, volcanic eruptions and hurricanes might destroy animal life. But such catastrophes are localized and repeatedly modern examples have shown that specimens from outside the devastated area quickly repopulate it so that after as short an interval as only ten years nobody could tell that anything had ever happened in that area. Unless such a catastrophe happens to hit an area which is the last refuge of an already receding species it does not produce lasting changes.

The extinction of the dinosaurs, therefore, was either not due to any general cause or else it must have been caused by an unknown type of natural catastrophe. Cuvier himself, in one of his books —not the one mentioned—adopted the latter point of view and invented a special kind of world-wide catastrophes which he termed cataclysms. One of Cuvier's cataclysms destroyed *all* life on earth *by definition*, which is to say that a catastrophe which failed to destroy *all* life just wasn't a cataclysm. Cuvier thus wanted to account for the succession of geological periods, assuming a new and special creation at the beginning of each new period.

Everybody knows now that Cuvier's cataclysms are untenable. So are more recent similar attemps of "explanations"—explanations which are no explanations because they do not explain the facts but try to explain them away. It looked, therefore, as if the extinction of the dinosaurs had no general cause. This opinion received much

* I recall having seen a nice evasion of the whole problem, the picture of a dinosaur with a small brownish-green head, the entire body being heavily caked with mud.

support from the fact that the extinction of a number of forms could be explained as a special case.

The ichthyosaurs have been mentioned repeatedly in this article and it so happens that they are one of these cases. They were marine reptiles, looking like dolphins. Their ancestors had been coastal forms, generally crocodilian in appearance. Incidentally, the ichthyosaurians, all through their evolution, remained within the general dimensions of crocodiles. The abundant varieties measured from six to eight feet, with an occasional specimen of a giant thirty-foot variety. The first step in the evolution of the ichthyosaurs —the term, from Greek *ichthys,* fish, and Greek *sauros,* lizard, simply means "fish-lizard"—had been the change of feet into flippers. The ancestors probably had some skin armor. The skin of the later ichthyosaurs was smooth, one of the few things we do know with certainty.

The diet consisted—we do know that, too—mainly of octopi of all kinds. And it is here where a vicious circle started. The octopi of the Jurassic period grew less clumsy, more slender, in one word: faster.

The ichthyosaurs became faster, too, as their prey demanded higher speed. But that prey did not offer any noticeable resistance once it was caught. The originally heavy toothy armament became superfluous and gradually receded; the late variety of ophthalmosaurus is all but toothless. This was very early in the Cretaceous period. But just then two types of formidable beasts appeared in the seas. The sharks evolved several gigantic varieties and a group of ancient monitor lizards that followed the adaptation of the ichthyosaurs grew into ferocious "sea serpents," the mosasaurs. Combined, they spelled the end of the ichthyosaurs, which were then only fast, but neither armed nor armored. The mosasaurs became the undisputed masters of the sea and succumbed in the end because of that fact. Pathological changes of many of the bones of late mosasaurs are proof of that; having no competitors, each weak and diseased individual could still grow up —until there were no healthy ones left.

Thus it seemed as if the extinction of each variety of dinosaurs needed a special explanation which had to be found if the available material permitted to do so.

But recent investigations seem to indicate—to phrase it as cautiously as possible—that there was a general cause for the extinction of the large land dinosaurs. The theory, advanced by Raymond B. Cowles of the University of California in Los Angeles, might be termed the theory of the heat-death of the dinosaurs. As this term indicates, the theory works with climatic factors.

A climatic explanation for the extinction of the dinosaurs is in itself no novelty. Novel, however, are the reasons advanced by Cowles. They are not only novel, but also surprising and convincing, because they are based on principles of the organization of the reptilian body.

Reptiles are commonly known as "cold-blooded." This term is correct only if it is taken to mean that reptiles do not produce any warmth of their own. The temperature of their blood varies with that of the atmosphere, while the temperature of a mammal remains constant within very narrow limits.

The body mechanism which accomplishes this miracle should not be compared, as has sometimes been done, to a stove that is lighted whenever the house gets too cold. It has to be compared with something much more refined and modern. The furnace is going all the time, but there is also an

air-conditioning mechanism, consisting of a skin with millions of pores through which perspiration can be exuded. This perspiration cools the body through evaporation whenever the outer temperature rises too high; roughly, when it rises beyond a point about ten degrees centigrade below blood temperature. It is a method which consumes much fuel—food—and water, but it is the most effective method nature has found in a billion years of constant experimentation. The fact that it protects mammals in almost any kind of climate existing on the surface of our planet is proof for its effectiveness.

Reptiles do not possess that mechanism. Their advantage is that they consume much smaller quantities of food—everybody knows for how long snakes and other reptiles can go hungry. The disadvantage is that the blood temperature is not kept at a constant level. And reptiles decidedly do not feel comfortable at any temperature deviating from an optimum.

The investigations made by Raymond B. Cowles originally had the purpose of establishing the optimum blood temperature of reptiles. It was found to be around thirty-seven to thirty-eight degrees centigrade, almost the same as our own. It seems that the machinery of the body functions best at that temperature, no matter what kind of a body it is.

The reptilian body, while lacking the means of cooling itself by way of perspiration, does possess some devices for adding heat, if circumstances are appropriate. The most famous case is that of *Python molurus,* one of the East Indian pythons. The females of this large snake actually hatch their eggs. During the period of incubation, which lasts from eight to ten weeks, the temperature of the python's blood is between eight and nine degrees centigrade above "normal," which is to say above what it would be if the snake were not hatching eggs. During this period the snakes move about as little as possible, they are extremely irritable and give the impression of suffering marked discomfort. It has been said that they are undergoing a period of "love-fever," which may be taken as the beginning of the internal furnace that became a permanent feature of mammals and of birds.

Other reptiles failed to progress to such a stage of internal heat generation but many of them, mostly lizards, have discovered another means of gathering outside heat. It is an application of the well-known physical principle that a dark-colored body absorbs more heat than a light-colored body. Various lizards, like reptiles, have taken advantage of this principle by having melanin—a black pigment—in their skin. In the morning, when the air is still cold and the rays of the sun are still feeble, they appear almost black, all the melanin-bearing cells being expanded for heat absorption. Later in the day, when the air is warm, the same lizards look gray or grayish white; there is enough heat available and the body does not want any more of it.

These expanding and contracting cells represent the beginning of a heat-regulating mechanism as well as the beginning of the chameleon's ability to assume different colors for protection—the potential furnace has been adapted for the laying of smoke screens for camouflage. Camouflage, adaptation to the colors of the surroundings, is no doubt the most important reason for the color changes of the chameleons. Some color changes which are decidedly not adaptations seem to have emotional reasons, and judging by them the emotional stability of a chameleon must be slight indeed. It might be doubted now, however, whether all the color changes which are not adaptations to the colors of the environment have to be taken as expressions of emotions. It is likely enough that some of them might also be adaptations, not to the colors of the environment, but to the prevailing temperature.

As regards the original question about the coloration of the dinosaurs, all this does not help much. The fact that the reptilian skin has—or may have—a heat-regulating function contributes little but additional confusion and uncertainty to that problem. Not only that the skin and scales of reptiles can and do produce any color under the sky, not only that some reptiles change their colors with the seasons and others with the environment—now the whole host of them is also potentially able to change color with the thermometer!

But Raymond B. Cowles' experiments do go a long way in answer to that other question, the question why the dinosaurs became extinct after so many millions of years of prosperity.

Remember the starting point: Cowles set out to establish "reptilian thermal tolerance." He found that they feel most comfortable when their blood is warmed to about thirty-seven to thirty-eight degrees centigrade—ninety-eight to one hundred degrees Fahrenheit. When it is cooler they become sluggish and those that are equipped for it try to gather more outside heat by darkening the color of their skin.

Now, this color mechanism can work in one direction only; it can gather heat or stop doing it—but it is powerless to do anything if the blood is too warm as it is. And what happens to a reptile when the blood does get too warm?

The answer is simple and definite: usually it dies!

Dr. Cowles, in his first paper in *Science,* stated his findings as follows:

> The most surprising fact relative to high temperatures is the characteristic reptilian inability to endure body heat much above the optimum, an increase of only two

degrees C. causing marked discomfort which seldom, if ever, will be tolerated voluntarily. Short exposures to higher temperatures cause death in from sixty seconds to an hour, the time element depending on ground heat, intensity of radiation, capacity for color change and volume of the lizard. Toward low temperatures these animals exhibit a far greater latitude, although twenty-eight degrees C.—about eighty-three degrees Fahrenheit—appears to be the lowest voluntarily tolerated temperature.

Since reptiles prefer just a little higher temperatures than we do, they have acquired the reputation of being extreme sun worshipers. This notion is definitely wrong; it seems as if nobody who ever noticed snakes or lizards on a hot stone during a sunny day ever took the trouble of observing how long they stayed there. Or whether they were still alive. That the latter is most doubtful in such cases can be gathered from the examples observed by Dr. Cowles and Dr. Bogert in the Californian desert.

The observations were made during a moderately hot sunny day, with an air temperature of close to one hundred degrees Fahrenheit in the shade and a ground temperature of some one hundred and thirty-five degrees in the sun. The two scientists first liberated a Granite Night Lizard. This was done in the shade of the shelter. "Instantly it fled from us, scampered into the sun where it stopped abruptly, opened its mouth and succumbed almost immediately."

Other lizards, not of nocturnal habits, fared no better. "Within not quite two minutes a Rock Uta was breathing rapidly; it opened its mouth, attempted to move, but through impairment of the nervous system this already was impossible. Within less than two minutes it was paralyzed." A specimen of the large Granite Scaly Lizard "seemed to absorb heat even more rapidly and showed extreme discomfort and finally paralysis in even less time."

The larger lizards like the Chuckwalla and the Desert Iguana proved somewhat more resistant, being able to endure the direct sunlight for fifteen or even twenty minutes. But their body temperature climbed steadily, and when one hundred and seventeen degrees Fahrenheit was reached they succumbed.

The obvious conclusion, substantiated by direct observation, is that none of the so-called desert reptiles dares to expose itself to direct sunlight for any length of time. They hide in shadowy crevices and do their foraging either very early or very late in the day, when the sun's rays are not powerful. C. M. Bogert was fortunate in observing a method of evasion of sunlight, as practiced by a Chuckwalla.

Cautiously the lizard emerged from a crevice and paused for a few minutes, apparently to warm himself. Then he retired to a sanctum among the boulders. Soon he emerged again, hurriedly bit off the heads of some yellow flowers and again sought shelter. For hours I watched, as back and forth across an exposed rock surface this large lizard ambled, snatching a bit of food and retiring, but never remaining in the open for more than five minutes at a time. This was the solution to his cooling problem!

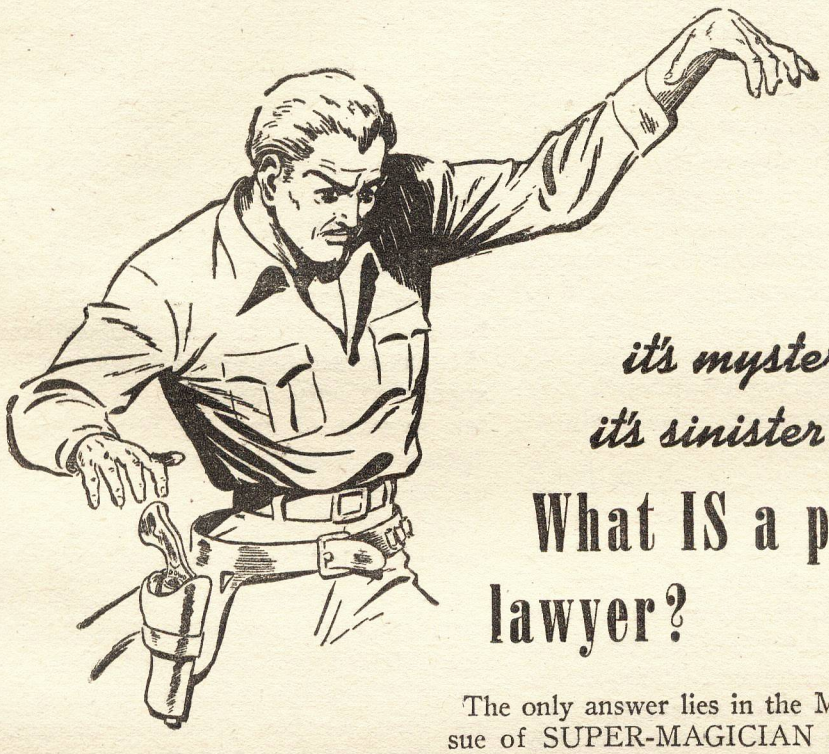
It was known, however, that a proverbially fast snake, the Red Racer, is often encountered in the desert at high noon. The two scientists decided to test the abilities of this apparent exception and liberated a Red Racer in the middle of a dry lake bed where there were no holes that would offer shelter.

The air measured one hundred and four degrees in the shade; the ground, one hundred and twenty-two degrees in the sun. The Red Racer began to crawl away at a moderate speed, changing direction after about forty yards. After it had crawled a total of eighty-six yards it stopped and looked as if it were gasping. This was four minutes after liberation. After six minutes it ceased to move its head; half a minute later it appeared to be dead, although the heart continued to beat for another eight and a half minutes. The blood temperature was at one hundred and fifteen degrees when it died. Even the Red Racer has to find shelter after not more than three minutes of exposure to the sunlight of its normal habitat.

A Sidewinder, released with the air at one hundred degrees Fahrenheit and the ground at one hundred and twenty-nine degrees, died after twelve minutes, with its blood at one hundred and thirteen degrees.

All this proved conclusively that direct sunlight of any intensity is a relentless and efficient foe of reptilian life. It also offered the long-sought explanation for a story that had persistently emanated from India and from Africa, especially the latter. That story concerned crocodiles and the only method of obtaining their skin intact. It is a matter of record that crocodiles are very hard to kill. Even after having received frightful wounds, which would kill the most ferocious mammal instantly and many times over, they still show very definite signs of life for a long time. In fact, many good crocodile skins were ruined for commercial purposes because it was necessary to kill the original wearer first. But some practiced men insisted that this was all wrong. What had to be done was to rope a crocodile, drag it into the sun and tie it down. Half an hour later the hide could be gotten intact if the hunter would wait for it.

Now we know why—and it is extremely significant that the hunter *can* afford to wait for it; that he, if he so chooses, can sit next to it while it dies. Those scientists who conducted the experiments in the Californian desert also could watch their



it's mysterious..
it's sinister...but

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AT ALL NEWSSTANDS

specimens die. To them the day was only mildly uncomfortable.

It is extremely significant because it offers more than just a hint as to the general cause of the extinction of the large dinosaurs at the end of the Cretaceous period. You recall that paleontologists had given up hope of discovering such a general cause, that they had more or less agreed that each variety probably succumbed to a specific cause which was not valid for other varieties. Only rarely did somebody suggest timidly that they all died out together due to a general cause; say that the dragons succumbed most ingloriously to the attacks of a very virulent form of bacteria which, however, was harmless to mammals and to birds.

Such suggestions were disregarded and the extinction of the large dinosaurs was explained with something of which there were recognizable signs: with a slight change in climate.

During the latter part of the Cretaceous period the North American continent was a perfect paradise for large dinosaurs. Much of the continent was covered with immense shallow lakes, most of them fresh-water lakes, full of lush vegetation and full of long-necked dinosaurs like brontosaurus. They thrived in this environment. They were herbivorous and knew no food shortage. The water helped them to carry the immense burden of their gigantic bodies; with their long necks they could always reach the surface to breathe. And the climate was uniformly pleasant and warm.

Fossil tracks that have been discovered recently in Texas prove that even these large herbivorous dinosaurs could and did walk on land. In all probability it was safe for them to do so; it seems now likely that the largest varieties of the carnivorous dinosaurs, among them and especially *Tyrannosaurus rex,* were carrion eaters. Even if this recent opinion should be proved wrong again, it is not very likely that full-grown specimens of Apatosaurus, Brontosaurus, Diplodocus or any of the other very large sauropod dinosaurs were subject to attack. In fact, many years ago a European scientist suggested that they may have been coal-black in color for this reason, a sign saying: "I belong to the very large varieties, too big to attack."

The ground separating the large and shallow dinosaur lakes was covered with dense jungle, a perfect hiding place for the smaller varieties. And the sky above this landscape was covered with clouds most of the time, clouds which ceaselessly moistened the steamy jungle.

The paradise of the dinosaurs came to an end when the climate changed, one of the small factors which make the atmosphere retain the heat from the sun got out of order. The sky cleared up, rain became a rare phenomenon, the large lakes dried up. The lush vegetation disappeared consequently and the herbivorous dinosaurs with them. And after the walking fleshpots had gone the predators had to go, too.

It was a fair explanation, substantiated mainly by the fact that the dinosaurs had become extinct. Furthermore, there were signs of a climatic change at the end of the Cretaceous period, even though the climate of the following Tertiary period had been nice and warm, too.

Still, one could wonder why the saurians failed to adapt themselves. The whole change must have taken quite a number of millenniums, even if it came "suddenly." And plant life did not disappear; it only changed. However, there was a fair amount of mystery left, which caused that occasional hypothesis of the inglorious death due to disease.

This mystery has now been dispelled by Professor Cowles' investigations.

The dinosaurs probably could have adapted themselves to a new plant diet—I know of a captive African monitor lizard which developed a special liking for chocolate pudding, thus indicating whatever you please to assume. But they could not adapt themselves to the missing protection of the water, to the disappearing cloud layer and to the thinning jungle. Present-day reptiles survive by leading a nocturnal life hiding during the day, or, if not nocturnal, by hiding intermittingly. This is precisely what the dinosaurs could not do, they were simply too large to hide in the shadow of a thinning jungle. Exposed to sunlight, they had to succumb, robber and victim alike; all the more quickly if they were really coal-black. And those others, which may have been reptile-green or brownish or wildly colorful, had to go, too, having probably fixed colors that could not pale. And it is more than doubtful whether paling would have helped in the long run.

When the climate changed at the end of the Cretaceous period—the climate, not the temperature—and when sunlight got free access to the surface, the reptiles that were too large to hide had to die. Not because a new mutant-bacillus made them succumb in an inglorious manner, but even more ingloriously—because they could not perspire!

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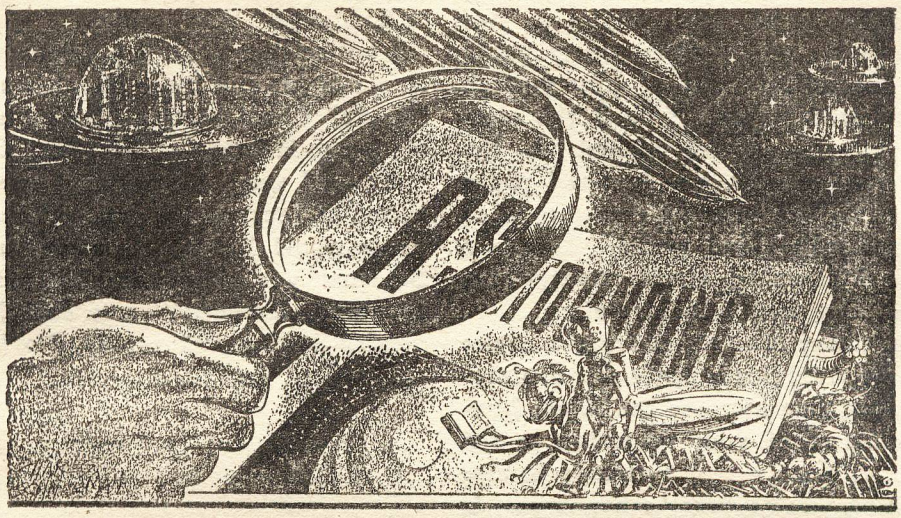
THE END.



BRASS TACKS

The nice thing about "Bootstrap" was that it was so complicated nobody seems to be able to find any holes in it—

Dear Mr. Campbell:

What do you think you are doing, changing Astounding's size? I protest! It is not right. As you must know by now, my collection of Astoundings is my pride and joy. And it doesn't look good to have various size bulges all over the bookcase. I realize it gives fandom more to read for only one additional nickel, but— Oh, well, what's the use of setting up a big howl?

Man, what a cover! There wasn't much detail, but it really caught the eye. And no printing on it. If I can pick up an extra copy, one of the covers is going on the wall, in a frame!

A person who is missed is Schneeman. And he is your best artist. Too bad, too bad.

If you overwork Kramer, his drawings are going to fail.

Kidnap Dold. Do anything, just so long as you get his art work back. Do the same with Wesso.

Here's my ratings and comments on the December issue:

1. "Second Stage Lensmen," by E. E. Smith, Ph. D. No comments.

2. "Defense Line," by Vic Phillips. If it had been made into a novel, it would have been *extra* good.

3. "Bullard Reflects," by Malcolm Jameson. Convenient of that jade to be there, wasn't it? But without it there wouldn't have been any story, so—

4. "Operation Successful," by Robert Arthur. It was quite a success, come to think of it.

5. "Homo Saps," by Webster Craig. So now the ships of the desert are telepaths. Ha-ha.

That's about all for the ratings and comments.

After reading Mr. Daniel's letter in Brass Tacks I decided to read "By His Bootstraps" again. I still say that story was slightly batty. Wilson went into the future and came back to the present so many times I finally gave the whole thing up.— Bill Watson, 1299 California Street, San Francisco, California.

Smith is a cereal chemist; his specialty is making flour bake instead of turning to paper hanger's paste.

Dear Sir:

Please accept my apologies for a letter I sent you last month in which I accused the increase in size as only five thousand words or so. I got my figures wrong. To give some that I have checked to make sure, within limits, of their accuracy, here they are.

In the small size, after excluding advertisements and illustrations, you had left about one hundred thirty pages. In the new size, you have left about one hundred pages. One hundred thirty pages of two fifty-line columns was good if it had seventy-two thousand words. In the new size one hundred pages of two or three sixty-line columns yields ninety-seven thousand three hundred words. If you used only three columns you could get ninety-nine thousand words. An increase of around twenty-five thousand words. A little short of what you said in your editor's page, but not enough to gripe about.

However, I found some interesting facts. With the size type used for the synopses of preceding installments for serials; the small size, two sixty-line columns for one hundred thirty pages results in the theoretical total of ninety-seven thousand five hundred words. This is the same increase as the increase in size yielded. In the new size, with smaller type, one hundred pages of three seventy-two-line columns gave a total of one hundred twenty thousand words. This is a further increase in number, about twenty-three thousand words. But that is incidental.

Now wouldn't it have been easier for you to use the old size, one hundred thirty pages of two sixty-line columns rather than increase the size? I realize that the chances of your returning to the small size are *not*, since a major change in size is seldom the thing you do every other issue. It took a long time to decide to change and you won't turn back now. But it will remain a fond hope of mine. I prefer the book size. The price is still below the value of the contents. You probably have this data already, but it helps me to write of it.

I would like to see a series of reprints in magazine form, small or large. Small would now be preferable since the increase in size of the monthly, and with the smaller type to enable more words to the copy. This series could come out at any interval you saw fit, be it bi-monthly, quarterly, annually, but I would like to see it. And don't pull the old one, "But we have annual size already." It is too simple. The criteria used to select these stories is up to you. Only the NOVA stories. Or the best stories of the best authors, say Heinlein, MacDonald, or Smith, et cetera. Or only those voted in first place each month in the Analytical Lab. But do this, won't you?

For the Analytical Lab:

1. Second Stage Lensmen. I waited till I had all issues to read it.
2. Starting Point.
3. There Shall Be Darkness.
4. The Revels.
5. The Sorcerer of Rhiannon.
6. Medusa.
7. The Editor's Page. It would rate higher if it were longer.
8. The-Long-tailed Huns.
9. Brass Tacks. Tell Sam Salant that he is all wet about Smith. And what trilogy ever had more than one plot. The guy is nuts.

I would like to know more about E. E. Smith. Where and in what he got his Ph.D.? What does he do for a living? The salient features of his life? His stories and which have rated NOVA?

Smith does right well. His hero is not invincible. Kinnison is no superman. When he needs help, he calls for Mentor, the Council of Scientists, a multi-way hookup between all Lensmen, or Cardynge. What a Man!

I notice that there is a similarity in some characters of his and those of other authors. Smith's "Storm" Cloud, vortex blaster, is in many ways similar to Heinlein's "Slipstick" Libby.

Again I want to say that I would like to see a series of reprints by you. Those readers that I know would like to see something of that kind. So, won't you please consider it and do something about it?—Herbert Warren Felkel, Box 2363, University Station, Gainesville, Florida.

I hope to hear from C. L. Moore more frequently henceforth.

Dear Mr. Campbell:

I'm one of those dopes who make a hobby of reading science-fiction, who buys every one of the mags featuring that type of story, and who clutters up the joint with all the copies of those mags he's been able to hoard in the past seven or eight years. Sometimes I wonder why I do it, why I don't give it all up in favor of stamp collecting, cross-word puzzles, or some other more sensible hobby. Then I come across a story like "There Shall Be Darkness," and I have the answer.

The high quality of this story was unexpected. Sure, I knew Miss Moore wrote excellent fantasy, but so what? I don't particularly care for fantasy. Now it seems that Miss Moore can also write exceptional science-fiction. I'm not certain whether or not this story has "Universe," your best tale of 1941, beaten; it takes a month or two to decide something like that. But it is certainly the best story since then.

"There Shall Be Darkness" is that most rare of all things, a science-fiction story with neither plot nor writing weakness. All too often, a good, strong, reasonable plot is accompanied by a devil-may-care attitude in regards to characterization and other fine points of writing; and many an otherwise fine story comes to grief when the action gets away from the writer, who works his way out with the aid of incredible and unexplainable instruments and events. "The Sorcerer of Rhiannon," for example, starts out to be a very good story, then loses its way in a maze of implausibilities. It was good, but it was no "There Shall Be Darkness." At any rate, Miss Moore's masterpiece walks off with first place for the issue, and any story that can be rated above an E. E. Smith epic has to be good.

"Second Stage Lensmen" can, of course, rate no lower than second. But it was, after all, no more

than a repetition of "Galactic Patrol" and "Gray Lensmen." A bit more colossal, a trifle bigger, perhaps, but essentially the same story. The Smith writing technique is improving, though. This current example is vastly superior to the earlier "Skylarks." Just read 'em gaain if you doubt it.

Really, this is an issue without a single bad story. It's hard to separate the remaining four tales, but for the Analytical Lab it shall be done.

"Medusa" comes third, and, on second thought, does stand quite a bit above the others.

"The Rebels" comes next. This is one of my favorite series. The first of them, "The Idealist," is one of the most unforgettable bits of writing I've ever come across.

"Starting Point" shades "The Sorcerer of Rhiannon" by a small margin, and both were well above average!

The De Camp article, was, naturally, excellent. But, one discordant note, for once I didn't care for the Rogers cover.—Lynn Bridges, 7730 Pitt, Detroit, Michigan.

Smith's stories too super?

Dear JWC, Jr.:

The second big issue of Astounding isn't merely not as good as the first, it's not as good as the average Astounding of the past year or two. Mainly, I think, the trouble is in a marked change of material from the technical or pseudo-technical to the fantastic—which last, if it's not good, should be sent back to its authors, and if it is good, should be reserved for *Unknown Worlds*.

First place, then, to "Starting Point," which is in the Tradition, though not by any means the best story of its kind. Second place, and that by a narrow margin to "Medusa." The insanity angle was interesting, and the living-world business, which is old, was used in a subdued fashion, almost apologetically, which saves it from the ridicule which a more blatant "Good lord, boys, it's *alive*" method of presentation would have deserved.

If you insist on ranking articles on a par with the stories, demote the two above to second and third places respectively, and put de Camp's "Longtailed Huns" in first place. Your articles are consistently good—I'm waiting for you to collect a book or two of them—your own series on the Solar System, for instance, certainly deserves separate publication, falling as it does somewhere halfway between the general coverage of the usual textbooks and the occupation-with-detail of the usual scientific papers. I've used those articles constantly, as sources of information more explicit and more up to date than any text or "popular" book on astronomy which I have yet seen.

A good and a bad example of the misplaced fantastic tale, are "There Shall Be Darkness," and "The Sorcerer of Rhiannon." The first is excellently written, and worth a careful reading for the beauty of the scenes it presents, though for little else. The towering mountains with their constant landslides, the many little cascades, the clouds, the odd half-lights, all are very real to Miss (or Mrs.) Moore, and she makes them very real to us. Her Venusian natives are real, too, though somehow a little too, well, Oriental. This story belonged in *Unknown*—if there wasn't room for it there, and if there was nothing better at hand to put in Astounding, I'm glad you printed it.

"The Sorcerer," on the other hand, belongs in neither magazine. There is no element of the tale that hasn't previously been worn threadbare. Jack Williamson is your best writer of this type of story, though the best of his work is far superior to this in atmosphere, in style, and in unhackneyed plotting. Waste space.

And now Dr. Smith. I have a sort of personal stake in the Lensman trilogy, since I rather half suspect myself of being two-thirds of Wild Bill Williams, Wild Bill being the monicker under which I wrote several letters to the stf. magazines in the dear dead days of my teens, back about 1934. While I feel properly grateful to Mr. Smith for having thus incorporated me in an interstellar myth, along with so many other fascinating monsters, I have not a bone but a whole abattoir full of bones to pick with the doctor over his latest effusion.

Dr. Smith has, I think, written himself out on a limb. A galactic limb, of course—light-centuries away from Washington, D. C., where it all started when Dick Seaton's steam-bath flew out the window. Dr. Smith has been receding from the Earth ever since, very much like that steam-bath, with his viewpoint expanding after the pattern set for our universe. The first two Skylark stories had a findable frame of reference in things human, but from "Skylark III" on, things have been too darn galactic in scope.

Contrast the opening chapters of the first "Skylark," with the beginning of the Lensman series. On the one hand, Seaton and Crane, Dottie Vaneman and her violin, an understandable world with, actually, motorcycles and tennis courts, scheming corporations and bad men, who, trying hard to be big and evil, seem to Dr. Smith and the reader to be only a little ridiculous. Perkins & Co. From this completely human world, and at a velocity only a few times that of light, the *Skylark's* crew go a-voyaging, deliciously, uncovering new ideas on every hand. A Dark Star. An unattached planet with a chlorine atmosphere. A galaxy whose principal metal seems to be copper instead of iron, and where salt is more precious than radium. The whole affair is wonderful, real, be-

cause it is pedestaled solidly on the *world we know.*

Seaton had a bath on Osnome, and we all sympathized when the water turned out to have been not merely cooled, but *iced.* Kinnison, on the other hand, probably doesn't have to bother with baths—he probably spends two seconds a day under a selective disintegrator which removes not merely dirt but dead tissues, ingrown hair, and warts, finishing up with a complete manicure. Neither the light-year nor the parsec is any longer an adequate yardstick for the distances covered in the course of a Smith yarn—the diameter of the First Galaxy might be a more manageable unit. The weird inhabitants of other worlds are as convincing in the latest Smith Saga as in the earliest, though with one or two exceptions their *viewpoints* are becoming more stylized—possibly a result of the spread of intergalactic civilization. But, Ye Gods, the *people!*

Mr. Smith's only convincing villain vanished when DuQuesne became a thought-wave. His heroes fared better, "Spacehounds" and "Triplanetary" both containing reasonably convincing characterizations, and Seaton and Crane, above all, remaining more or less human and interesting through four-fifths of the Skylark series. His heroines have, up until now, been useless props acting as resonators for his heroes. For my own opinion of Superman Kinnison, see the letter in the February Astounding by Sam Salant.

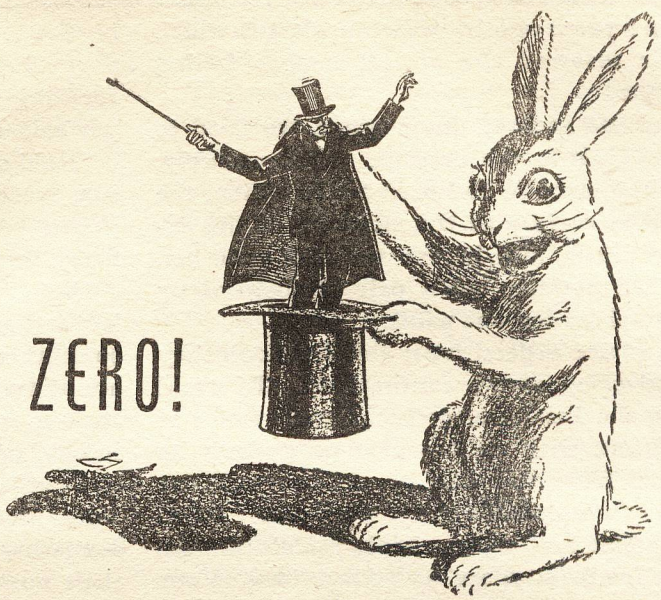
I concede two improvements. Smith has, in the Lensman series, discovered that a female can, in fact, once in a while, get in there and *do* something. And he's discovered that love scenes, particularly between two perfect and therefore, doubtless, perfectly moral beings, can be better imagined than described. *Much* better.

What is needed is a collaboration between Dr. Smith, who will furnish the machinery and the extra-terrestrial inhabitants, and L. Sprague de Camp, who will provide the merely human beings to whom the Smithian adventures are to happen. The essential fallacy in Smith's character-drawing is his unworkable black-and-white treatment of Good and Evil. Most of us are a beautiful salt-and-pepper mixture, the Evil held in check by fear of our fellows or the law, the Good called forth by a desire to magnify ourselves in the eyes of our fellow men. Freaks of circumstance make us heroes or villains, and most villains have their lovable characteristics, and most heroes have their unheroic moments.

I suggest two possible policies for future Smith yarns. 1—Draw a circle around the Solar System, just outside the orbit of Neptune, and tell Dr. Smith that this circle represents the boundary of a spherical zone of force, impenetrable by any means within the power of the Smith imagination. No matter how many light-centuries per second his ships will go, they'll stop dead when they hit that zone—so he might as well settle down, invent the rocket, and visit the Martians. 2—Tell Dr. Smith that since, for some time now, there has been nothing human about his men and women, he might as well drop his reference to the Solar System altogether, and start from a new and completely inhuman plane of reference. I give you the world Beong, peopled by rhomboid crystals who have a sense of perception and an overwhelming desire to explore all the worlds of their known universe, their purpose being to bring Beongian culture to every planet they touch. On the far side of their Galaxy, behold Zythrin, whose people are furry black woolly-worms who communicate by telepathy plus an acute olfactory sense. The Zythrines also want to bring the blessings of their civilization to the Galaxy, considering themselves the smell-bringers of Destiny. The Beongians are an absolute anarchy, every Beongian being so pure and so well-trained that his own moral code takes the place of all external compulsion. The Zythrines, on the other hand, are an absolute monarchy, their boss a solid purple worm who feeds on the souls of his subjects when they don't behave, and who is, in general, a perfect *fiend.* It's obvious which side I'm on. Both sides, by the way, are monosexual, so love hasn't been heard about. Now, Dr. Smith, take over. Trace the spread of these two civilizations. Three epics, at least, perhaps one from each viewpoint and then one bifocal but biased, when the Beongians finally exterminate the Zythrines. But don't bring 'em anywhere near *us.* We've been having enough trouble with people who differ from us only by such minor features as notions.

There! That's about enough on Smith. When Stravinsky discovered that in order to make more racket, he'd have to use bigger orchestras, he recognized his dead end, so back he went to music for four or five instruments. It's a lucky man who recognizes his dead-end street before he drives into the river. For a final crack at the current issue of Astounding, which, several hundred pages back, I was writing about: The Kilkenny cats can't finish the job on themselves too soon to suit me. I haven't liked them from the beginning. Once more, improbable people, and here no plot at all, just Adventures, like waves, happening to an oyster. I don't give two hoots whether Fagan—swiped from Barney Google—bosses the world from now on, or eventually gets wiped out by Lensman Gailbraith. I skip every other story in this endless series, knowing that the next one will bring me up to date. Mr. Campbell, if things don't look better next month, you and Don Stuart will have to go back into production in self-defense, to keep the magazine on top. I could wish for that.—W. B. Hoskins, nee "Wild Bill," 285 Taylor Place, Morgantown, West Virginia.

PROBABILITY ZERO!



SOME CURIOUS EFFECTS OF TIME TRAVEL

By L. Sprague de Camp

The truly formidable host of paradoxes involved in time travel was something I had never appreciated until I accompanied the expedition of the Drinkwhiskey Institute on their journey to the Siwalik Pleistocene in 1932. To be more accurate, the expedition was *in* the Siwalik Hills and *from* 1932.

The purpose of this enterprise was to bring back, besides the usual information on fauna, flora, meteorology, et cetera, a pair of wugugs, *Vugugus jonesiii;* a kind of mammalian tortoise known only from a few fragmentary specimens, by means of which we hoped to persuade the Grand Duchy of Liechtenstein to pay for the expedition.

In the early spring of 1932 we arrived at Swettypore, India, near which town the remains of *Vugugus jonesiii* had been unearthed. To effect our transition to the Pleistocene, we secured the services of a local Yogin, who asserted that he could send our astral bodies back seven hundred and fifty thousand years by simple contemplation of his coccyx. He agreed to demonstrate his powers by sending his own astral body back for a reconnaissance.

All went well, except that the Yogin's astral body failed to return to the present at the appointed time. Instead, the Yogin received a piece of bark on which was scratched the following message in the Devanagari alphabet:

Dear Shri:

So sorry, but I have met my soul mate. I have fallen in love with a Java woman, and shall never return to your loathsome materialistic century.

A rividerci,
Your A. B.
#
His Mark

On receipt of this message the Yogin became much distressed, refused to co-operate any longer with the expedition, and soon left Swettypore to become a professional solitaire player.

The representatives of the Drinkwhiskey Institute were thus forced to fall back on their own resources. Fortunately their ingenuity proved equal to the task, and within forty-eight hours we had invented, designed and assembled a chronomobile. I won't weary you with the details, save to remark that it operated by transposing the seventh and eleventh dimensions in a hole in space, thus creating an inverse ether-vortex and standing the space-time continuum on its head. (The space-time continuum later complained of a headache.)

A curious feature of time travel back from the present is that one gets younger and younger, becoming successively a youth, a child, an embryo and finally nothing at all. Fortunately the process does not stabilize here, for the traveler immediately reappears after his disappearance, and thenceforth ages as rapidly as he had previously youthed, or whatever the word should be. He discovers, however, that he is a mirror image of his former self, with the heart on the right side.

As expected, I went through my disappearance as we passed the year 1907, in which I was born. By the time we passed 1882 I had returned to the somatic condition in which I had left the present, and thenceforth aged rapidly. Needless to say by the time we reached 750,000 B. C. we were all exceedingly old men. Fortunately the personnel of the expedition had been selected for longevity.

The most disconcerting feature of having a negative age is that not only one's body but one's memory-chains are mirror images of what they would normally be. To get along with a mirror-image of a memory takes practice, as a professor

proved some years ago by wearing glasses which inverted or reversed the optical images falling upon his eyes.

When we had secured our wugugs, we tried to bring them back to the present. Unfortunately, once the chronomobile had been set in action, the beasts aged as rapidly as the members of the expedition youthed, and before we had gone ten years we had nothing but a pair of fine wugug skeletons to show for our pains.

We had strict orders from the Drinkwhiskey Institute covering such a contingency. To avoid committing the Institute to the heavy expense of the expedition, with no prospect of getting its money back from the sale of the wugugs, we stopped our chronomobile in the year 1931. Then, when 1932 rolled around, we simply refrained from setting out for Swettypore, as we had done on our previous cycle. The expedition, therefore, never took place.

PIG TRAP

By Malcolm Jameson

Someone had just finished a yarn about the bitter cold on the dark hemisphere of Uranus and the skittering, ghostly animals there.

"The most elusive creature in the whole Solar System," remarked old Admiral Womstock casually, "is the Iapetan kangothru. Nobody ever has caught one."

"I thought they were about the same thing as a kangaroo," chirped up a young lieutenant on the staff of the chief of astronautics.

"They are—sort of," admitted the admiral, gazing blandly at the ceiling. There was a hushed pause as a couple of older officers exchanged solemn winks. The youngster had never been to Luna Club before and couldn't know that, while old Womstock knew everything, most of it had never happened.

"Yes," murmured the admiral, "elusive is the word. They are marsupials, of course, but slightly different from the terrestrial kind. You see, they have a very bizarre sort of pouch. Corner one and it promptly pops its head into the bag—"

"And then?" asked the subaltern eagerly.

"Well, it just goes on in—all of it. There's nothing left to catch."

The lieutenant blushed as a ripple of chuckles ran round the room. After that there was a pained silence for a moment until Bullard spoke up. Captain Bullard rarely had time to attend those bullfests, but tonight he was relaxed and in a reminiscent mood.

"Speaking of cold and elusive animals," he said, "I seem to remember running into both together. That was on Pluto when I was a fresh-caught ensign on the old *Asia*. You talk about cold—if Pluto was a tenth of a degree colder it wouldn't be there. It's that close to absolute zero. But about the vacuum hogs. We were down and stuck for long repairs and ran out of grub. The skipper said to go out and catch some—"

"Hold on, Bullard," interrupted Captain Hackleson, "vacuum hogs aren't fit to eat. I've tried 'em. When you've thawed them out all you have is filthy, stinking stuff like watery jelly."

"Sure," agreed Bullard, "that's because you shot 'em and gave 'em a chance to freeze. They freeze so instantly and so hard that all their molecules are disrupted—even the bones and teeth. You have to catch 'em alive and then pop 'em in the icebox and let 'em cook. If you don't keep 'em at room temperature so long they burn up, they roast nicely in the refrigerator. At that it is somewhere about three hundred degrees above their normal. There is no better meat anywhere. The ham from a nice, fat vacuum hog—"

"What makes them fat, Captain Bullard?" asked the subaltern. "I always thought Pluto was pretty barren."

"It is, youngster," the skipper of the *Pollux* answered, "pretty, pretty barren—just smooth, solid helium, no sun, no light, no air, nothing. But they do get fat—and how."

"But, sir, if there is only vacuum—" persisted the aide.

"Quite so," said Bullard hurriedly, "but look how much there is of it."

The chief of astronautics glared at his junior and gulped hard. At that point Bullard seemed to lose all interest. He was busy peeling the shuck from a Venusian cheroot.

"Is that all?" asked someone. "You said something about their elusiveness."

"Oh, yes—their elusiveness! I wouldn't go so far as to say they are as elusive as the admiral's kangothrus, but they are sufficiently so. They could outrun anything *we* had, except a bullet, and I have already explained why bullets won't do. First and last we must have spent thirty days trying to catch one by using roundups, nets, traps and everything else. But nothing worked. Then one day the skipper sent for me. He had been getting sorer and sorer. He says to me, 'Bullard, I want one of those pigs for supper tonight and I can't eat alibis.' Just like that. Well, it sorta put it up to me. When I was a kid I used to fall for that kind of stimulus."

Somebody snickered.

"Anyhow, I sat down and scratched my head. What was faster than a pig, but wouldn't hurt him? The only harmless thing I could think of was light, and all of us know that is plenty fast. Then I thought of light in connection with the temperature outside—if you can call it temperature when you have to read the bottommost graduation on the thermometer with a high-power lens and a vernier. But it was a good hunch. I doped

out a way to catch those porkers alive. I was so sure of it I went right to the galley and told the chef to start heating plenty of water right away—"

"Now, now, Bullard," reproached Hackleson, "you just said they'd burn to a crisp at ordinary room temperatures. Now you propose to boil them. You can't have it both ways, you know—"

"I'll come to that. The hot water was for something else. After that I climbed to the conning tower and turned on the searchlight. It's virtually pitch-dark on Pluto, but the moment I cast around with the light, I saw pigs all over the place. They stopped dead in their tracks the instant the light hit 'em and never moved again."

"Looking at you, eh? Fascinated by the light, I suppose. Gad! Why didn't we think of that?" Hackleson was quite serious. He knew Pluto and had seen the hogs.

"Not at all," said Bullard evenly. "I turned out the light for a while, but when I turned it on again, they were still there, stuck like flies on fly paper. That was all I wanted to know. It confirmed my theory. I sent a party of bluejackets out—mostly for the hell of it, as I knew *they* couldn't bring 'em in. At least, unless they had cleavers and did some foot amputations."

"This gets thicker and thicker," observed old Admiral Womstock. "But go on."

"Cookie and I filled up a big thermos jug with boiling water, hoping it wouldn't freeze before we got to the pigs. It stayed liquid is all I can say, but even that passes for hot on Pluto. Just as I anticipated, when we reached the first pig we found all the sailors huddled around it, heaving and hauling, and from the contortions of the pig's snout I judged it to be grunting and squealing. But they couldn't pull it loose. It was not until I poured water on the ground on the side away from the ship that the animal came free."

"I am afraid I do not quite follow," said the admiral with a frown.

"Elementary, my dear admiral. Our searchlight made the pig cast a shadow—the first it had ever had—and the shadow promptly froze to the ground. As I said, it's cold out there. After that all we had to do was soften up the shadow, pry it loose, then wrap the pig in it and carry him back to the ship."

The admiral's only comment was a deep, deep sigh.

TIME PUSSY

By George E. Dale

This was told me long ago by old Mac, who lived in a shack just over the hill from my old house. He had been a mining prospector out in the Asteroids during the Rush of '37, and spent most of his time now in feeding his seven cats.

"What makes you like cats so much, Mr. Mac?" I asked him.

The old miner looked at me and scratched his chin. "Well," he said, "they reminds me o' my leetle pets on Pallas. *They* was something like cats—same kind of head, sort o'—and the cleverest leetle fellers y' ever saw. All dead!"

I felt sorry and said so. Mac heaved a sigh.

"Cleverest leetle fellers," he repeated. "They was four-dimensional pussies."

"Four-dimensional, Mr. Mac? But the fourth dimension is time." I had learned that the year before in the third grade.

"So you've had a leetle schooling, hey?" He took out his pipe and filled it slowly. "Sure, the fourth dimension is time. These pussies was about a foot long and six inches high and four inches wide and stretched somewheres into middle o' next week. That's four dimensions, ain't it? Why, if you petted their heads, they wouldn't wag their tails till next day, mebbe. Some o' the big ones wouldn't wag till day after. Fact!"

I looked dubious, but didn't say anything.

Mac went on: "They was the best leetle watchdogs in all creation, too. They had to be. Why, if they spotted a burglar or any suspicious character, they'd shriek like a banshee. And when one saw a burglar today, he'd shriek yesterday, so we had twenty-four hours notice every time."

My mouth opened. "Honest?"

"Cross my heart! Y' want to know how we used to feed them. We'd wait for them to go to sleep, see, and then we'd know they was busy digesting their meals. These leetle time pussies, they always digested their meals exactly three hours before they ate it, on account their stomachs stretched that far back in time. So when they went to sleep, we used to look at the time, get their dinner ready and feed it to them exactly three hours later."

He had lit his pipe now and was puffing away. He shook his head sadly. "Once, though, I made a mistake. Poor leetle time pussy. His name was Joe, and he was just about my favorite, too. He went to sleep one morning at nine and somehow I got the idea it was eight. Naturally, I brought him his feed at eleven. I looked all over for him, but I couldn't find him."

"What had happened, Mr. Mac?"

"Well, no time pussy's insides could be expected to handle his breakfast only *two* hours after digesting it. It's too much to expect. I found him finally under the tool kit in the outer shed. He had crawled there and died of indigestion an hour before. Poor leetle feller! After that, I always set an alarm, so I never made that mistake again."

There was a short, mournful silence after that, and I resumed in a respectful whisper: "You said they all died, before. Were they all killed like that?"

Mac shook his head solemnly. "No! They used to catch colds from us fellers and just die anywhere from a week to ten days before they caught them. They wasn't too many to start with, and a year after the miners hit Pallas they wasn't but about ten left and them ten sort o' weak and sickly. The trouble was, leetle feller, that when they died, they went all to pieces; just rotted away fast. Especially the little four-dimensional jigger they had in their brains which made them act the way they did. It cost us all millions o' dollars."

"How was that, Mr. Mac?"

"Y' see, some scientists back on Earth got wind of our leetle time pussies, and they knew they'd all be dead before they could get out there next conjunction. So they offered us all a million dollars for each time pussy we preserved for them."

"And did you?"

"Well, we tried, but they wouldn't keep. After they died, they were just no good any more, and we had to bury them. We tried packing them in ice, but that only kept the outside all right. The inside was a nasty mess, and it was the inside the scientists wanted.

"Natur'lly, with each dead time pussy costing us a million dollars, we didn't want that to happen. One of us figured out that if we put a time pussy into hot water when it was about to die, the water would soak all through it. Then, after it died, we could freeze the water so it would just be one solid chunk o' ice, and *then* it would keep."

My lower jaw was sagging. "Did it work?"

"We tried and we tried, son, but we just couldn't freeze the water fast enough. By the time we had it all iced, the four-dimensional jigger in the time pussy's brain had just corrupted away. We froze the water faster and faster but it was no go. Finally, we had only one time pussy left, and he was just fixing to die, too. We was desperate—and then one of the fellers thought o' something. He figured out a complicated contraption that would freeze all the water just like that—in a split second.

"We picked up the last leetle feller and put him into the hot water and hooked on the machine. The leetle feller gave us a last look and made a funny leetle sound and died. We pressed the button and iced the whole thing into a solid block in about a quarter of a second." Here Mac heaved a sigh that must have weighed a ton. "But it was no use. The time pussy spoiled inside o' fifteen minutes and we lost the last million dollars."

I caught my breath. "But, Mr. Mac, you just said you iced the time pussy in a quarter of a second. It didn't have *time* to spoil."

"That's just it, leetle feller," he said heavily. "We did it *too* doggoned fast. The time pussy didn't keep because we froze that hot water so derned fast that *the ice was still warm!*"

IN TIMES TO COME

And that, gentlemen, is to suggest what I want for "Probability Zero." The little items preceding were concocted, of course, by a sound trio of first-class, professional liars. In a length of this sort—some five hundred to seven hundred and fifty words—I think that there ought to be a number of excellent amateur liars, though. There may or may not be a "Probability Zero" department next month; the succeeding issue, however, will certainly have one—one concocted by amateurs and professionals alike. This month's supply of examples were bought at our standard space-rates; hereafter "Probability Zero" will be conducted as an open contest, wherein anyone equipped with a good, round prevarication is welcome. Readers will be invited to vote for the best of those published; the author of the winner will get twenty dollars, second place acquires ten, and third gets our check for five. Checks will be mailed as soon as the issue is decided.

To define the essence of the thing: We want science-fictional masterpieces that sound almost possible, but which are, as the department title states, "Probability Zero"—impossible by reason of known scientific law or by definition. They must be typed, double-spaced, and on one side of the usual size typewriter paper.

The old gag about truth being stranger than fiction is founded soundly; many an actual truth is highly implausible. We're looking for the exact reverse—something that's absolutely untrue, but highly plausible sounding.

For instance, it's a fact that a powerful jet of air—a real, roaring blast of air—will not blow a ball away; it will hold even a solid, fairly dense ball like a billiard ball supported in midair, pulling it back into the hardest, fastest part of the air-blast if it tries to waver out. That is obviously implausible; it happens to be true. It is also true that if you have a rope or chain running rapidly over two pulleys, with a considerable amount of slack in the chain, you can bend the chain's course into a loop—and have the loop stay there after removing the original deflecting force. The rapidly-moving chain will faithfully trace a course around the obstacle long after it has been removed, following a complicated S course, even though under considerable tension. That's a rather implausible fact.

If facts can be that implausible, a good plausible lie should be fairly easy.

The Editor.

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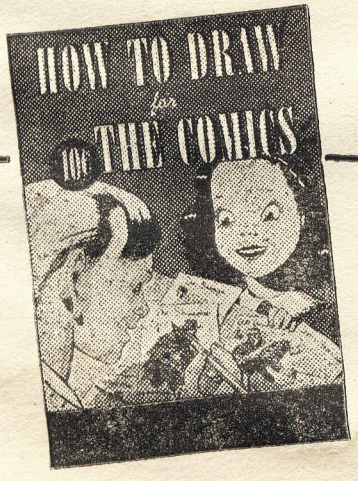

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Illustrated by Kolliker

"That all, chief? Gonna quit now?"

Brian Hanson looked disgustedly at Pete Brent, his lanky assistant. That was the first sign of animation he had displayed all day.

"I am, but you're not," Hanson told him grimly. "Get your notes straightened up. Run those centrifuge tests and set up the still so we can get at that vitamin count early in the morning."

"Tomorrow morning? Aw, for gosh sakes, chief, why don't you take a day off sometime, or better yet, a night off. It'd do you good to relax. Boy, I know a swell blonde you could go for. Wait a minute, I've got her radiophone number somewhere—just ask for Myrtle."

Hanson shrugged himself out of his smock.

"Never mind Myrtle, just have that equipment set up for the morning. Good night." He strode out of the huge laboratory, but his mind was still on the vitamin research they had been conducting, he barely heard the remarks that followed him.

"One of these days the chief is going to have his glands catch up with him."

"Not a chance," Pete Brent grunted.

Brian Hanson wondered dispassionately for a moment how his assistants could fail to be as absorbed as he was by the work they were doing, then he let it go as he stepped outside the research building.

He paused and let his eyes lift to the buildings that surrounded the compound. This was the administrative heart of Venus City. Out here, alone, he let his only known emotion sweep through him, pride. He had an important role in the building of this great new city. As head of the Venus Consolidated Research Organization, he was in large part responsible for the prosperity of this vigorous, young world. Venus Consolidated had built up this city and practically everything else that amounted to anything on this planet. True, there had been others, pioneers, before the company came, who objected to the expansion of the monopolistic control. But, if they could not realize that the company's regime served the best interests of the planet, they would just have to suffer the consequences of their own ignorance. There had been rumors of revolution among the disgruntled older families.

He heard there had been killings, but that was nonsense. Venus Consolidated police had only powers of arrest. Anything involving executions had to be referred to the Interplanetary Council on Earth. He dismissed the whole business as he did everything else that did not directly influence his own department.

He ignored the surface transport system and walked to his own apartment. This walk was part of a regular routine of physical exercise that kept his body hard and resilient in spite of long hours spent in the laboratory. As he opened the door of his apartment he heard the water running into his bath. Perfect timing. He was making that walk in precisely seven minutes, four and four-fifths seconds. He undressed and climbed into the tub, relaxing luxuriously in the exhilaration of irradiated water.

He let all the problems of his work drift away, his mind was a peaceful blank. Then someone was hammering on his head. He struggled reluctantly awake. It was the door that was being attacked, not his head. The battering thunder continued persistently. He swore and sat up.

"What do you want?"

There was no answer; the hammering continued.

"All right! All right! I'm coming!" He yelled, crawled out of the tub and reached for his bathrobe. It wasn't there. He swore some more and grabbed a towel, wrapping it inadequately around him; it didn't quite meet astern. He paddled wetly across the floor sounding like a flock of ducks on parade.

Retaining the towel with one hand he inched the door cautiously open.

"What the devil—" He stopped abruptly at the sight of a policeman's uniform.

"Sorry, sir, but one of those rebels is loose in the Administration Center somewhere. We're making a check-up of all the apartments."

"Well, you can check out; I haven't got any blasted rebels in here." The policeman's face hardened, then relaxed knowingly.

"Oh, I see, sir. No rebels, of course. Sorry to have disturbed you. Have a good— Good night, sir," he saluted and left.

Brian closed the door in puzzlement. What the devil had that flat-foot been smirking about? Well, maybe he could get his bath now.

Hanson turned away from the door and froze in amazement. Through the open door of his bedroom he could see his bed neatly turned down as it should be, but the outline under the counterpane and the luxuriant mass of platinum-blond hair on the pillow was certainly no part of his regular routine.

"Hello." The voice matched the calm alertness of a pair of deep-blue eyes. Brian just stared at her in numbed fascination. That was what the policeman had meant with his insinuating smirk.

"Just ask for Myrtle." Pete Brent's joking words flashed back to him. Now he got it. This was probably the young fool's idea of a joke. He'd soon fix that.

"All right, joke's over, you can beat it now."

"Joke? I don't see anything funny, unless it's you and that suggestive towel. You should either abandon it or get one that goes all the way round."

Brian slowly acquired a complexion suitable for painting fire plugs.

"Shut up and throw me my dressing gown." He gritted.

The girl swung her legs out of bed and Brian blinked; she was fully dressed. The snug, zippered overall suit she wore did nothing to conceal the fact that she was a female. He wrapped his bathrobe austerely around him.

"Well, now what?" she asked and looked at him questioningly.

"Well, what do you think?" he burst out angrily. "I'm going to finish my bath and I'd suggest you go down to the laboratory and hold hands with Pete. He'd appreciate it." He got the impression that the girl was struggling heroically to refrain from laughing and that didn't help his dignity any. He strode into the bathroom, slammed the door and climbed back into the bath.

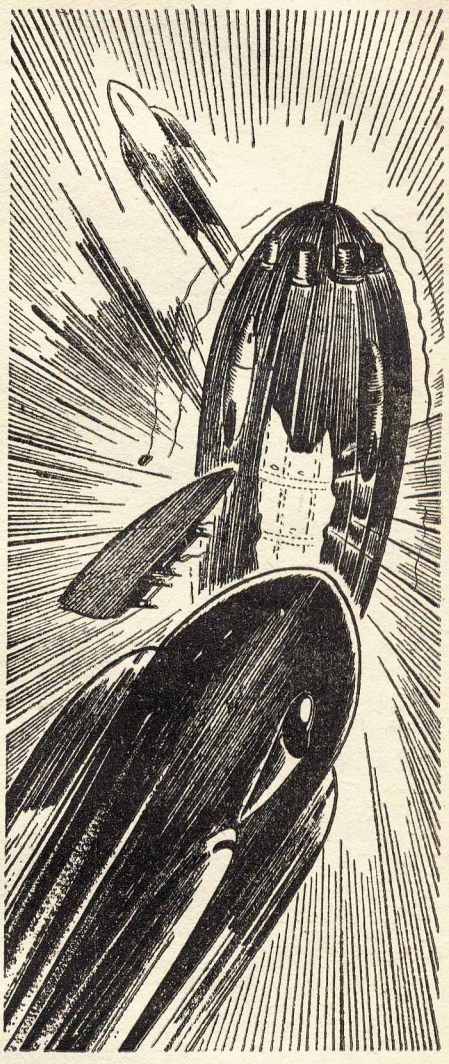
The door opened a little.

"Well, good-by now." The girl said sweetly. "Remember me to the police force."

"Get out of here!" he yelled and the door shut abruptly on a rippling burst of laughter. Damn women! It was getting so a man had to pack a gun with him or something. And Pete Brent. He thought with grim satisfaction of the unending extra work that was going to occur around the laboratory from now on. He sank back into the soothing liquid embrace of the bath and deliberately set his mind loose to wander in complete relaxation.

A hammering thunder burst on the outer door. He sat up with a groan.

"Lay off, you crazy apes!" he yelled furiously, but the pounding continued steadily. He struggled out of the bath, wrapped his damp bathrobe clammily around him and marched to the door with a seething fury of righteous anger burning within him. He flung the door wide, his mouth all set for a withering barrage, but he didn't get a chance. Four police constables and a sergeant swarmed into the room, shoving him away from the door.



"Say! What the—"

"Where is she?" the sergeant demanded.

"Wherethehell'swho?"

"Quit stallin', bud. You know who. That female rebel who was in here."

"Rebel? You're crazy! That was just . . . Pete said . . . rebel? Did you say rebel?"

"Yeah, I said rebel, an' where is she?"

"She . . . why . . . why . . . she left, of course. You don't think I was going to have women running around in here, do you?"

"She wuz in his bed when I seen her, sarge," one of the guards contributed. "But she ain't there now."

"You don't think that I—"

"Listen, bud, we don't do the thinkin' around here. You come on along and see the chief."

Brian had had about enough.

"I'm not going anywhere to see anybody. Maybe you don't know who I am. You can't arrest me."

Brian Hanson, Chief of Research for Venus Consolidated, as dignified as possible in a damp bathrobe, glared out through the bars at a slightly bewildered Pete Brent.

"What the devil do you want? Haven't you caused enough blasted trouble already?"

"Me? For gosh sakes, chief—"

"Yes, you! If sending that damn blonde to my apartment and getting me arrested is your idea of a joke—"

"But, my gosh, I didn't send anybody, chief. And this is no joke. That wasn't Myrtle, that was Crystal James, old man James' daughter. They're about the oldest family on Venus. Police have been after her for months; she's a rebel and she's sure been raising plenty of hell around here. She got in and blew out the main communications control panel last night. Communications been tied up all day." Pete lowered his voice to an appreciative whisper, "Gosh, chief, I didn't know you had it in you. How long have you been in with that bunch? Is that girl as good-looking as they say she is?"

"Now listen here, Brent. I don't know—"

"Oh, it's all right, chief. You can trust me. I won't give you away."

"There's nothing to give away, you fool!" Brian bellowed. "I don't know anything about any damn rebels. All I want is to get out of here—"

"Gotcha, chief," Brent whispered understandingly. "I'll see if I can pass the word along."

"Come here, you idiot!" Brian screamed after his erstwhile assistant.

"Pipe down there, bud," a guard's voice cut in chillingly.

Brian retired to his cell bunk and clutched his aching head in frustrated fury.

For the nineteenth time Brian Hanson strode to the door of his cell and rattled the bars.

"Listen here, guard, you've got to take a message to McHague. You can't hold me here indefinitely."

"Shut up. Nobody ain't takin' no message to McHague. I don't care if you are—"

Brian's eyes almost popped out as he saw a gloved hand reach around the guard's neck and jam a rag over his nose and mouth. Swift shadows moved expertly before his astonished gaze. Another guard was caught and silenced as he came around the end of the corridor. Someone was outside his cell door, a hooded figure which seemed, somehow, familiar.

"Hello, pantless!" a voice breathed.

He knew that voice!

"What the devil are you doing here?"

"Somebody by the name of Pete Brent tipped us off that you were in trouble because of me. But don't worry, we're going to get you out."

"Damn that fool kid! Leave me alone. I don't want to get out of here that way!" he yelled wildly. "Guards! Help!"

"Shut up! Do you want to get us shot?"

"Sure I do. Guards! Guards!"

Someone came running.

"Guards are coming," a voice warned.

He could hear the girl struggling with the lock.

"Damn," she swore viciously. "This is the wrong key! Your goose is sure cooked now. Whether you like it or not, you'll hang with us when they find us trying to get you out of here."

Brian felt as though something had kicked him in the stomach. She was right! He had to get out now. He wouldn't be able to explain this away.

"Give me that key," he hissed and grabbed for it.

He snapped two of the coigns off in the lock and went to work with the rest of the key. He had designed these escape-proof locks himself. In a few seconds the door swung open and they were fleeing silently down the jail corridor.

The girl paused doubtfully at a crossing passage.

"This way," he snarled and took the lead. He knew the ground plan of this jail perfectly. He had a moment of wonder at the crazy spectacle of himself, the fair-haired boy of Venus Consolidated, in his flapping bathrobe, leading a band of escaping rebels out of the company's best jail.

They burst around a corner onto a startled guard.

"They're just ahead of us," Brian yelled. "Come on!"

"Right with you," the guard snapped and ran a few steps with them before a blackjack caught up with him and he folded into a corner.

"Down this way, it's a short cut." Brian led the way to a heavily barred side door.

The electric eye tripped a screaming alarm, but the broken key in Brian's hands opened the complicated lock in a matter of seconds. They were outside the jail on a side street, the door closed and the lock jammed immovably behind them.

Sirens wailed. The alarm was out! The street suddenly burst into brilliance as the floodlights snapped on. Brian faltered to a stop and Crystal James pushed past him.

"We've got reinforcements down here," she said, then skidded to a halt. Two guards barred the street ahead of them.

Brian felt as though his stomach had fallen down around his ankles and was tying his feet up. He couldn't move. The door was jammed shut behind them, they'd have to surrender and there'd be no explaining this break. He started mentally cursing Pete Brent, when a projector beam slashed viciously by him. These guards weren't fooling! He heard a gasping grunt of

pain as one of the rebels went down. They were shooting to kill.

He saw a sudden, convulsive movement from the girl. A black object curved out against the lights. The sharp, ripping blast of an atomite bomb thundered along the street and slammed them to the ground. The glare left them blinded. He struggled to his feet. The guards had vanished, a shallow crater yawned in the road where they had been.

"We've got to run!" the girl shouted.

He started after her. Two surface transport vehicles waited around the corner. Brian and the rebels bundled into them and took away with a roar. The chase wasn't organized yet, and they soon lost themselves in the orderly rush of Venus City traffic.

The two carloads of rebels cruised nonchalantly past the Administration Center and pulled into a private garage a little beyond.

"What are we stopping here for?" Brian demanded. "We've got to get away."

"That's just what we're doing," Crystal snapped. "Everybody out."

The rebels piled out and the cars pulled away to become innocuous parts of the traffic stream. The rebels seemed to know where they were going and that gave them the edge on Brian. They followed Crystal down into the garage's repair pit.

She fumbled in the darkness a moment, then a darker patch showed as a door swung open in the side of the pit. They filed into the solid blackness after her and the door thudded shut. The beam of a torch stabbed through the darkness and they clambered precariously down a steep, steel stairway.

"Where the dickens are we?" Brian whispered hoarsely.

"Oh, you don't have to whisper, we're safe enough here. This is one of the air shafts leading down to the old mines."

"Old mines? What old mines?"

"That's something you newcomers don't know anything about. This whole area was worked out long before Venus Consolidated came to the planet. These old tunnels run all under the city."

They went five hundred feet down the air shaft before they reached a level tunnel.

"What do we do? Hide here?"

"I should say not. Serono Zeburzac, head of McHague's secret police will be after us now. We won't be safe anywhere near Venus City."

"Don't be crazy. That Serono Zeburzac stuff is just a legend McHague keeps up to scare people with."

"That's what you think," Crystal snapped. "McHague's legend got my father and he'll get all of us unless we run the whole company right off the planet."

"Well, what the dickens does he look like?" Brian asked doubtfully.

"I don't know, but his left hand is missing. Dad did some good shooting before he died," she said grimly.

Brian was startled at the icy hardness of her voice.

Two of the rebels pulled a screening tarpaulin aside and revealed one of the old-type ore cars that must have been used in the ancient mines. A brand-new atomic motor gleamed incongruously at one end. The rebels crowded into it and they went rumbling swiftly down the echoing passage. The lights of the car showed the old working, rotten and crumbling, fallen in in some places and signs of new work where the rebels had cleared away the debris of years.

Brian struggled into a zippered overall suit as they followed a twisting, tortuous course for half an hour, switching from one tunnel to another repeatedly until he had lost all conception of direction. Crystal James, at the controls, seemed to know exactly where they were going.

The tunnel emerged in a huge cavern that gloomed darkly away in every direction. The towering, massive remains of old machinery, eroded and rotten with age crouched like ancient, watching skeletons.

"These were the old stamp mills," the girl said, and her voice seemed to be swallowed to a whisper in the vast, echoing darkness.

Between two rows of sentinel ruins they came suddenly on two slim Venusian atmospheric ships. Dim light spilled over them from a ragged gash in the wall of the cavern. Brian followed Crystal into the smaller of the two ships and the rest of the rebels manned the other.

"Wait a minute, how do we get out of here?" Brian demanded.

"Through that hole up there," the girl said matter-of-factly.

"You're crazy, you can't get through there."

"Oh, yeah? Just watch this." The ship thundered to life beneath them and leaped off in a full-throttled take-off.

"We're going to crash! That gap isn't wide enough!"

The sides of the gap rushed in on the tips of the stubby wings. Brian braced himself for the crash, but it didn't come. At the last possible second, the ship rolled smoothly over. At the moment it flashed through the opening it was stood vertically on edge.

Crystal held the ship in its roll and completed the maneuver outside the mountain while Brian struggled to get his internal economy back into some semblance of order.

"That's some flying," he said as soon as he could speak.

Crystal looked at him in surprise. "That's nothing. We Venusians fly almost as soon as we can walk."

"Oh—I see," Brien said weakly and a few moments later he really did see. Two big, fast, green ships, carrying the insignia of the Venus Consolidated police, cruised suddenly out from a mountain air station.

An aërial torpedo exploded in front of the rebel ship. Crystal's face set in grim lines as she pulled the ship up in a screaming climb. Brian got up off the floor.

"You don't have to get excited like that," he complained. "They weren't trying to hit us."

"That's what you think," Crystal muttered. "Those children don't play for peanuts."

"But, girl, they're just Venus Consolidated police. They haven't got any authority to shoot anyone."

"Authority doesn't make much difference to them," Crystal snapped bitterly. "They've been killing people all over the planet. What do you think this revolution is about?"

"You must be mistak—" He slumped to the floor as Crystal threw the ship into a mad, rolling spin. A tremendous crash thundered close astern.

"I guess that was a mistake!" Crystal yelled as she fought the controls.

Brian almost got to his feet when another wild maneuver hurled him back to the floor. The police ship was right on their tail. The girl gunned her craft into a snap Immelmann and swept back on their pursuers, slicing in close over the ship. Brian's eyes bulged as he saw a long streak of paint and metal ripped off the wing of the police ship. He saw the crew battling their controls in startled terror. The ship slipped frantically away and fell into a spin.

"That's them," Crystal said with satisfaction. "How are the others doing?"

"Look! They're hit!" Brian felt sick.

The slower rebel freight ship staggered drunkenly as a torpedo caught it and ripped away half a wing. It plunged down in flames with the white flowers of half a dozen parachutes blossoming around it. Brian watched in horror as the police ship came deliberately about. They heard its forward guns go into action. The bodies of the parachutists jerked and jumped like crazy marionettes as the bullets smashed into them. It was over in a few moments. The dead rebels drifted down into the mist-shrouded depths of the valley.

"The dirty, murdering rats!" Brian's voice ripped out in a fury of outrage. "They didn't have a chance!"

"Don't get excited," Crystal told him in a dead, flat voice. "That's just normal practice. If you'd stuck your nose out of your laboratory once in a while, you'd have heard of these things."

"But why—" He ducked away instinctively as a flight of bullets spanged through the fuselage. "They're after us now!"

Crystal's answer was to yank the ship into a rocketing climb. The police were watching for that. The big ship roared up after them.

"Just follow along, suckers," Crystal invited grimly.

She snapped the ship into a whip stall. For one nauseating moment they hung on nothing, then the ship fell over on its back and they screamed down in a terminal velocity dive, heading for the safety of the lower valley mists. The heavier police ship, with its higher wing-loading, could not match the maneuver. The rebel craft plunged down through the blinding fog. Half-seen, ghostly fingers of stone clutched up at them, talons of gray rock missed and fell away again as Crystal nursed the ship out of its dive.

"Phew!" Brian gasped. "Well, we got away that time. How in thunder can you do it?"

"Well, you don't do it on faith. Take a look at that fuel gauge! We may get as far as our headquarters—or we may not."

For twenty long minutes they groped blindly through the fog, flying solely by instruments and dead reckoning. The needle of the fuel gauge flickered closer and closer to the danger point. They tore loose from the clinging fog as it swung firmly to "Empty." The drive sputtered and coughed and died.

"That's figuring it nice and close," Crystal said in satisfaction. "We can glide in from here."

"Into where?" Brian demanded. All he could see immediately ahead was the huge bulk of a mountain which blocked the entire width of the valley and soared sheer up to the high-cloud level. His eyes followed it up and up—

"Look! Police ships. They've seen us!"

"Maybe they haven't. Anyway, there's only one place we can land."

The ship lunged straight for the mountain wall!

"Are you crazy? Watch out—we'll crash!"

"You leave the flying to me," Crystal snapped.

She held the ship in its glide, aiming directly for the tangled foliage of the mountain face. Brian yelped and cowered instinctively back. The lush green of the mountainside swirled up to meet them. They ripped through the foliage—there was no crash. They burst through into a huge, brilliantly lighted cavern and settled to a perfect landing. Men came running. Crystal tumbled out of her ship.

"Douse those lights," she shouted. "The police are outside."

A tall, lean man with bulbous eyes and a face like a startled horse, rushed up to Crystal.

"What do you mean by leading them here?" he yelled, waving his hands.

"They jumped us when we had

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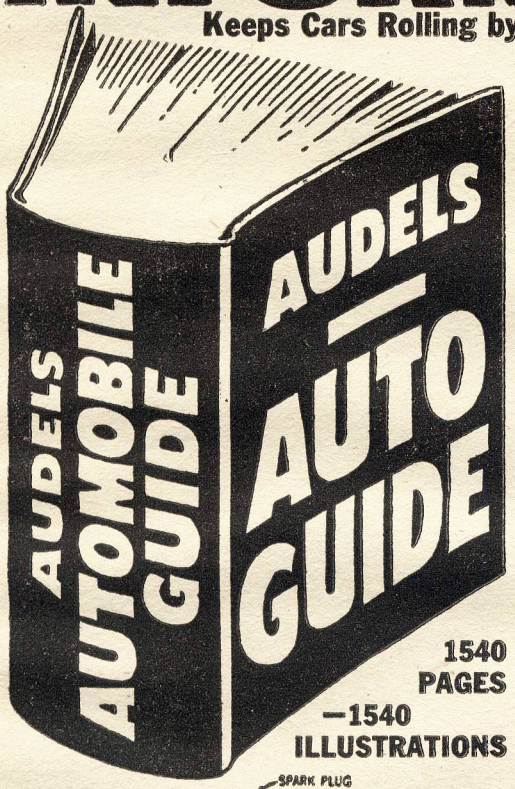

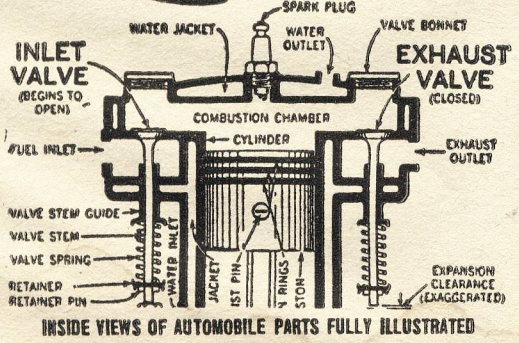

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no fuel, and quit acting like an idiot."

The man was shaking, his eyes looked wild. "They'll kill us. We've got to get out of here."

"Wait, you fool. They may not even have seen us." But he was gone, running toward a group of ships lined up at the end of the cavern.

"Who was that crazy coot and what is this place?" Brian demanded.

"That was Gort Sterling, our leader," the girl said bitterly. "And this is our headquarters." One of the ships at the back of the cavern thundered to life, streaked across the floor and burst out through the opening Crystal's ship had left. "He hasn't got a chance! We'll be spotted for sure, now."

The other rebels waited uncertainly, but not for long. There was the crescendoing roar of ships in a dive followed by the terrific crash of an explosion.

"They got him!" Crystal's voice was a moan. "Oh, the fool, the fool!"

"Sounded like more than one ship. They'll be after us, now. Is there any other way of getting out of this place?"

"Not for ships. We'll have to walk and they'll follow us."

"We've got to slow them down some way, then. I wonder how the devil they traced us? I thought we lost them in that fog."

"It's that Serono Zeburzac, the traitor. He knows these mountains as well as we do."

"How come?"

"The Zeburzacs are one of the old families, but he sold out to McHague."

"Well, what do we do now? Just stand here? It looks like everybody's leaving."

"We might as well just wait," Crystal said hopelessly. "It won't do us any good to run out into the hills. Zeburzac and his men will follow."

"We could slow them down some by swinging a couple of those ships around so their rocket exhausts sweep the entrance to the cavern," Brian suggested doubtfully. She looked at him steadily.

"You sound like the only good rebel left. We can try it, anyway."

They ran two ships out into the middle of the cavern, gunned them around and jockeyed them into position—not a moment too soon.

Half a dozen police showed in brief silhouette as they slipped cautiously into the cavern, guns ready, expecting resistance. They met a dead silence. A score or more followed them without any attempt at concealment. Then Brian and Crystal cut loose with the drives of the two ships.

Startled screams of agony burst from the crowded group of police as they were caught in the annihilating cross fire of roaring flame. They crisped and twisted, cooked to scorched horrors before they fell. A burst of thick, greasy smoke rushed out of the cavern. Two of the police, their clothes and flesh scorched and flaming, plunged as shrieking, living torches down the mountainside.

Crystal was white and shaking, her face set in a mask of horror, as she climbed blindly from her ship.

"Let's get away! I can smell them burning," she shuddered and covered her face with her hands.

Brian grabbed her and shook her.

"Snap out of it," he barked. "That's no worse than shooting helpless men in parachutes. We can't go, yet; we're not finished here."

"Oh, let them shoot us! I can't go through that again!"

"You don't have to. Wait here."

He climbed back into one of the ships and cut the richness of the fuel mixture down till the exhaust was a lambent, shuddering stutter, verging on extinction. He dashed to the other ship and repeated the maneuver, fussing with the throttle till he had the fuel mixture adjusted to critical fineness. The beat of the stuttering exhaust seemed to catch up to the other and built to an aching pulsation. In a moment the whole mass of air in the cavern hit the frequency with a subtle, intangible thunder of vibration.

Crystal screamed. "Brian! There's more police cutting in around the entrance."

Brian clambered out of the ship and glanced at the glowing points in the rock where the police were cutting their way through outside the line of the exhaust flames. The pulsating thunder in the cavern crescendoed to an intolerable pitch. A huge mass of stalactites crashed to the floor.

"It's time to check out," Brian shouted.

Crystal led the way as they fled down the escape tunnel. The roaring crash of falling rock was a continuous, increasing avalanche of sound in the cavern behind them.

They emerged from the tunnel on the face of the mountain, several hundred yards to the east of the cavern entrance. The ground shook and heaved beneath them.

"The whole side of the mountain's sliding," Crystal screamed.

"Run!" Brian shoved her and they plunged madly through the thick tangle of jungle away from the slide.

Huge boulders leaped and smashed through the matted bush around them. Crystal went down as the ground slipped from under her. Brian grabbed her and a tree at the same time. The tree leaned and crashed down the slope, the whole jungle muttered and groaned and came to life as it joined the roaring rush of the slide. They were tumbled irresistibly downward, riding the edge of the slide for terrifying minutes till it stilled and left them bruised and shaken

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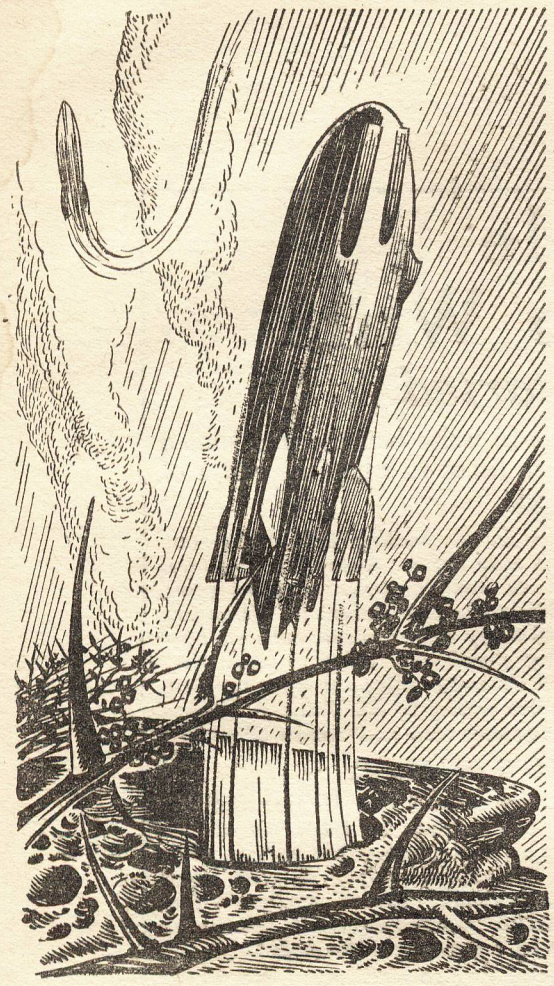

in a tangle of torn vegetation.

The remains of two police ships, caught without warning in the rush as they attempted to land, stuck up grotesquely out of the foot of the slide. The dust was settling away. A flock of brilliant blue, gliding lizards barking in raucous terror, fled down the valley. Then they were gone and the primeval silence settled back into place.

Brian and Crystal struggled painfully to solid ground. Crystal gazed with a feeling of awe at the devastated mountainside.

"How did you do it?"

"It's a matter of harmonics," Brian explained. "If you hit the right vibratory combination, you can shake anything down. But now that we've made a mess of the old homestead, what do we do?"

"Walk," Crystal said laconically. She led the way as they started scrambling through the jungle up the mountainside.

"Where are we heading for?" Brian grunted as he struggled along.

"The headquarters of the Carlton family. They're the closest people we can depend on. They've kept out of the rebellion, but they're on our side. They've helped us before."

Two days later, Crystal and Brian, weary, bedraggled and bushworn, stumbled on a rocky trail that twisted up through a narrow valley toward the Carlton place. Trails were scarce in the terrific Venusian mountain country where nearly all communication was by air.

Crystal knew this path.

"We're almost there," she said, and they pushed along faster.

"Listen! What's that?" Brian stopped and they both heard the sound of aircraft taking off. The pulsing roar of the rocket drives approached and a V formation of five ships swept by overhead.

Crystal looked at Brian with dawning horror behind her eyes. "Police!"

"Good. They're just leaving; they were probably just checking up on the Carltons."

Crystal shivered. "When Serono Zeburzac checks up on someone, there usually isn't much left. Come on." She started at a run down the trail.

They slowed at the sight of a clearing ahead. A faint sound reached them, a sobbing, inarticulate moan of unexpressible agony that froze them in their tracks.

"What's that?" Brian gasped.

Crystal's face was dead-white as they moved cautiously forward. They stared out into the clearing in dumb horror. The huge, rambling Carlton mansion was a smoking heap of ruins. A giant Venus thorn bush in front of the house was scorched and charred by the flames. One of its murderous, yard-long spikes carried a terribly gruesome burden. Crystal whimpered and stumbled forward before Brian could stop her. She collapsed in a sobbing heap in front of the gray-haired man impaled on the giant thorn. The figure stirred feebly.

"He's alive," Brian muttered. "Crystal! Snap out of it. Get up and give me a hand. We'll cut him down."

With Crystal's help Brian hacked off the thorn and gently eased the frail, old man to the ground. His breath fluttered out between lips flecked with pink-tinged froth. His eyes tried to smile his thanks through their haze of pain.

Crystal held the weakly gripping hands. "Who did this to you?"

The gray lips moved and worked, struggling painfully to form words. The whisper was almost inaudible:

"Serono . . . Zeburzac."

Crystal's face hardened to a mask of vicious cruelty as she fought her emotions down.

"We'll get him."

"No." The elder Carlton seemed to gather strength. "Get away—escape."

Crystal gripped his hands and seemed to hold him back from the edge of Eternity by sheer strength of will.

"Where? Where can we go?"

The eyes fluttered open again, the shadow of death lurked in their depths. "Go . . . the place where the Five Valleys meet . . . beware . . . Zeburzac."

His breath drifted out in an effortless sigh. The tortured body was still. Crystal rose unsteadily to her feet. She turned blindly and Brian took her in his arms, trying to comfort her as her wild sobbing got out of con-

trol. He patted her shoulder awkwardly.

"Take it easy, kid," he muttered helplessly. His laboratory experience hadn't covered any such contingency as this.

"Brian, take me away. I can't stand this. Hide me somewhere before that fiend comes back."

"I thought we were part of a revolution that was going to clean them off the planet," Brian reminded her grimly.

"We can't fight this. We haven't got a chance. Zeburzac has everything."

"He hasn't got us yet. Where's this Five Valleys place? Can we get there?"

"Yes, but it will be no use. I want to quit now."

Brian's arms tightened around her. His voice was bleak and cold. "I'm not quitting. I'm going to get Serono Zeburzac."

The girl in his arms was still for a moment. Then she let go a long, trembling sigh of weary resignation.

"All right, I'm with you. Let's start traveling."

"The place where Five Valleys meet." Crystal waved her arm out toward the tremendous green bowl of emptiness that curved away all round them.

The sides of the gigantic cup had been cracked and split by some cataclysmic upheaval in the turbulent youth of the young planet. They stood at the mouth of one of the sheer, ragged slashes that had given the place its name. The other four were streaks of darker green against the distant walls. Beneath the eternal-nigh cloud level the air was clear.

Directly across from them a tremendous, sharp-prowed promontory sheered up from the depths. Capping it, against the somber green of the valley walls, the snow-white structure of a dream palace rose in airy splendor. In the dark setting, the walls were radiant with breath-taking beauty, so perfect in balance and line that it concealed the huge massiveness of the buildings, postponed for a moment the realization that the great structure was a glorious ruin.

Brian let his breath go. "I didn't know there was anything like that on Venus," he said in open admiration. "Who built it?"

"The Martins. They used to operate the mines in this district, but they were worked out years ago and the family scattered. They still own this place. Nobody lives in it officially, but there must be some help here or Grenville Carlton wouldn't have told us to come. Maybe the rebels are using the old hangars."

"Well, there's only one way to find out. We gotta climb."

"There's somebody here, all right," Brian said as they entered the great courtyard through a ruined gateway. "Look, there's a couple of ships over there."

"And they're our people, too." There was a lilt in Crystal's voice. "That far ship is Jimmy Thornton's—I'd know it anywhere." They approached the huge main doors of the great, white mansion.

One door swung partly open and a swarthy, powerful man stepped hastily out. He carried an atomic projector.

"Halt!" he commanded. "Who are you?"

"Oh, you don't need to get excited, we're rebels, too," Crystal told him. "Who's here?"

"Who is it, Max?" a pleasant voice inquired from the dim hallway.

"Two more of the rebels, sir," the guard replied woodenly.

"Oh—rebels? Oh, yes, of course. Show them in, Max." The guard stood respectfully aside as Crystal and Brian entered the huge, echoing chamber.

"To your right," the guard directed and they entered a small, exquisite room. The man behind the desk seemed to fit perfectly into this cultured setting, he was small and neat, silver hair frosted his temples, framing gentle, delicate features. He smiled with pleasant, disarm-

ing frankness as he rose to greet them.

"You'll have to excuse Max, we didn't know you were coming, of course. Just make yourselves at home. Young Jim Thornton arrived a short while ago. You'll be able to see him presently. You'll be hungry, of course. Max, bring some refreshment."

"Have many of us arrived?" Crystal asked anxiously.

"I'm sorry to say, very few. Just Jim Thornton and his party and you and Mr. Hanson."

Brian started. "How do you now my name?" he asked in surprise.

"Oh, we've all heard of you, Mr. Hanson, and how you got Miss James out of Venus City. Brilliant work, I must say, and the way you routed the police in the caverns was truly a remarkable accomplishment. But—what made you come to this place? We've not been established here long."

"Grenville Carlton told us about it," Crystal said briefly.

"Carlton? Old Grenville. How is he?"

"He's dead." Crystal's face hardened to a white mask of hatred at the memory. "We found him impaled on a thorn bush in front of the ruins of his own house." Her words were brutally blunt with the tremendous surge of emotion behind them.

"Impaled . . . *tut tut tut* . . . my goodness, how terrible! Do you know who could have done it?"

"Yes. We found Carlton before he died. It was that rat Serono Zeburzac who killed him."

"Oh—do you know what this Serono Zeburzac looks like?"

"We've never seen him," Crystal cut in grimly, "but my father did, over the sights of an atomic flame projector. Serono Zeburzac has no left hand."

"Oh—" The gray-haired man behind the desk was interrupted by a terrible scream of human agony.

"No . . . NO—" The words rose in a tortured frenzy. "Oh, God! . . . Not that again. . . . AAAAaaaaa—"

Crystal leaped to her feet.

"Jim—that was Jim Thornton! What's happened—" Her eyes turned in startled question to the slight, calm figure behind the desk. His benign expression of quiet peace had not been disturbed in the slightest by the soul-rending cry. He placed his fingertips precisely together.

"Are you sure Zeburzac was missing his left hand?"—he flexed the fingers of his own left hand for emphasis—"and not—his right?" There was a sickening click in the sudden, dead stillness of the room as he twisted at his right hand. It came away at the wrist, the thumb dropped lifelessly down. The fingers of his left hand curled around it. The wrist of the severed member was pointed toward them. In fascinated horror they stared down the muzzle of a tiny, short-range, atomic projector concealed in the artificial hand.

Crystal recoiled, one faltering step.

"Serono—Grenville was trying to warn us!"

Brian caught her before she fell.

"There is no cause for excitement. Sit down, please." The quiet courtesy of Serono's voice did not alter, but the steel thread of command was subtly woven into his words. "You have been very clever, Hanson, too clever. I thought, almost, you had escaped me, but no one ever does. My enemies are delivered into my hands; soon there will be none on Venus."

The moment of shock passed. Brian's superlatively keen faculties keyed acutely to the emergency. They needed time first.

"How do we rate as your enemies?" he stalled.

"Mr. Hanson, we are not children. You know why you are my enemy. I recognized you years ago, you are far too brilliant a man to have against me, and you would never be with me. Your loyalty to Venus Consolidated made you dangerous."

"My loyalty? What about yours? I thought you were working with McHague and the company."

"Oh, of course, as long as it suits my purpose."

"Suppose someone got word to the Earth Council. You wouldn't last long, then."

"Perhaps not, but Venus Consolidated controls all communication with Earth and soon I will control Venus Consolidated. But I'm sure you must be tired. Max will show you to your quarters." The guard ushered them out with the muzzle of a projector.

They started across the huge, ruined hall. Crystal stumbled blindly over a fragment of broken masonry. She sagged to her knees. The guard stopped abruptly.

"Don't try nothin', you guys," he snarled warningly.

"Quit being a fool, you idiot," Brian barked to cover Crystal's quick whisper of instructions. "This girl's sick. Give me a hand. You take her feet," he directed, as he lifted her shoulders. The guard hesitated doubtfully; his instructions didn't cover this.

"O. K., but just don't try nothin'." He hung the projector on his belt and bent down. One startled yelp gurgled and died in his throat as Crystal's feet slammed into his jaw and Brian's clenched hands rabbit-punched down on the back of his neck.

"That ought to hold him," Crystal muttered as she struggled to her feet.

Brian picked up the projector. He recognized it; it was a new model, two of this type had been sent to his laboratory for testing before the company invested in them.

"Well, what are we waiting for? C'mon, we'll go shoot Serono's other hand off," Crystal suggested grimly.

"D'you think that'd stop them? Us with one projector against what they've got?"

"Well, it would make it interesting for a while. You don't think we have a chance of getting away from here, do you?"

"I don't know," Brian said thoughtfully. "But when we were testing this model projector one of them kind of blew up in our face. I think it developed a short that converted it into the old-type regenerative circuit. We never were sure about it; there wasn't enough left to find out. Those old regeneratives are always dangerous, they were liable to heat up and explode at any time if you didn't watch them. If we'd been testing the model with a full charge of fuel, I wouldn't be here in this mess now." He slid back the inspection cover of the projector's compactly complicated ignition circuit and started poking experimentally at the system of tiny coils and delicate wires.

"Damn!" He swore briefly as a white-hot spark jabbed at his fingers, but he held on and the wires fused together. "That should do it. Now we're all set. Where's a hole to get out through?"

"How do you like that one?" Crystal suggested, indicating a ragged gap in the broken, ancient wall of the hall. "That's big enough to fly through and there's two guards out there in the courtyard with nice, shiny, new projectors ready to make smoke out of us. Want to go and interview them?"

"No. If we make enough noise here, they'll come and see us," Brian muttered as he closed the firing switch of the projector. There was no stab of flame from the muzzle. He heaved the weapon back into the middle of the hall. "As soon as that warms up there should be considerable distraction taking place in here."

"Why? What's going to happen?" Crystal asked.

"C'mon. Get over by the wall and be ready to run."

They started for the gap in the wall. A dull, heavy rumble got under way behind them. It built to a terrific, thundering crash as the universe split in a sheet of roaring flame. They were lifted and hurled bodily outward. They sprawled in a tangled heap on the pavement. Brian struggled to his feet in a choking swirl of dust and yanked Crystal with him. The progressive explosion of the projector's fuel battered the ancient structure, the wall bulged and cracked. The startled guards gawped stupidly at the two figures that had erupted so violently.

Masonry crashed to the pavement. The guards climbed over each other in a mad scramble to escape. Crystal and Brian staggered groggily after them, heading for Jim Thornton's ship. Brian boosted Crystal in, scrambled after her and slammed the hatch shut. The drive spluttered and roared to life, the ship ripped crazily into the air.

Arnold McHague, Director in Chief of Venus Consolidated, swung his heavy body around in fearful expectancy. Just a faint snick as though a lock had sprung, but there was no door on that wall. A panel slipped noiselessly aside.

"Serono—" The half-voiced question hung on a note of fear.

"No, it's not Serono, McHague." A tall, ragged figure, followed by a smaller one, stepped from the opening.

"Hanson!" A surge of relief sounded in McHague's voice, then died out. Brian Hanson was a rebel. He fumbled vaguely for the panel of call buttons on his desk, but his hand froze as

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he saw the projector trained on his expansive middle.

"I couldn't miss your stomach from here," Brian told him softly.

"What do you want?"

"I want to get to Earth and I want your private getaway ship."

"I don't know anything about any ship."

"It's no good, McHague. The drive tests for that ship were run in my laboratory."

"There's no fuel on board. It's in no condition to fly," McHague said hopelessly.

"It had better be ready to take off. Serono doesn't trust you any more than you trust him. About your only chance of living is for me to get to Earth and bring enough of the Planetary Patrol to head Serono off."

"I can't help you. I'm in this with Zeburzac. If the police get him, they've got me."

"You can be on our side. The way I'll tell it on Earth you were just stringing Serono along till I could get clear."

McHague shook his head. "I wouldn't live for a day if I helped you. You don't know Zeburzac. His family ran Venus in the old days. He means to restore that rule with himself as absolute dictator. I wouldn't be safe even on Earth."

"You'll just have to take that chance."

"We're wasting time," Crystal cut in sharply anxious. "Come on."

Her words brought McHague reluctantly to his feet. "I'll do it," he muttered thickly. "Come with me."

The misty gloom of a Venusian night shrouded the jungle as three figures forced their way along an almost completely overgrown trail. The lights of Venus City gleamed dimly through the night murk behind them. McHague stumbled and swore in the lead as the trail twisted down the steepness of the ridge. He came to a halt on a long, level bench.

"This is the place."

"I don't see anything," Crystal said doubtfully.

"You didn't think I was going to leave the ship where Zeburzac could find it, did you?"

McHague scrabbled around in the roots of a bush, found what he wanted, a metal lever hardly distinguishable in the tangle, and yanked it up. His action was followed by a slight vibration underfoot, a heavy, dull ripping of roots sounded in front of them as the ground parted before their eyes. Two balanced sections tilted upward, away from each other, revealing the Stygian blackness of a pit.

"It's a ventilating shaft of one of the old mines. The ship's down there about two hundred feet. It's got a Nordenfeldt control panel. Can you handle it?"

"Sure, but how can I get down?"

"There's a ladder—but wait a minute, Hanson." McHague's heavy-jowled face was ghastly in the dim light. "You've got to play this straight, see. I'm giving you a chance and you've got to stand by me. If Serono knew I was doing this— You've got to get those police here—"

"Don't worry," Brian told him grimly. "Serono is no friend of mine, either. Where's this ladder?"

"Just over the edge on this side."

Crystal laid her hand on Brian's arm.

"Good luck." She started to smile encouragingly, but she couldn't quite make it. "Brian—" Her voice choked up. "Oh, Brian, be careful—" It was almost a sob. Then she was in his arms. He held her for a moment and buried his face in the soft, silver glory of her hair.

"I'll be all right. You take care of yourself till I get back. I won't be long, then we'll get this mess cleaned up."

He disengaged himself gently. Crystal watched in silence as Brian clambered over the edge and disappeared into the blackness of the shaft. Minutes dragged slowly by.

"Oh, I hope he makes it," Crystal murmured.

"He probably will. Mr. Hanson is a very resourceful man."

The soft, quiet voice was just behind her. Crystal turned in slow, hopeless terror.

"Serono—"

McHague's breath sucked in in a startled gasp of horror.

"Zeburzac!"

"But, of course. I wanted to be here to wish Mr. Hanson *bon voyage*. I hope he has a pleasant flight—although it will be a short one."

"What do you mean?" McHague whispered.

"Why, McHague, my dear friend, you didn't think I would overlook a simple think like this?"

"You knew?"

"Oh, yes. I visited this place several times. I supposed you might be leaving me some time, so, of course, I made arrangements." The silky softness of Serono's voice, changed to a sinister rasp, "That ship will be blown apart fifty seconds after it takes off!"

"No—" Crystal screamed, "Brian!" She turned and stumbled toward the shaft, then staggered back as a tremendous, roaring rush of flame fountained madly upward behind the screaming flight of the escaping ship. The exhaust trail towered magnificently into the night, arching gracefully over as the ship swung smoothly into its first acceleration orbit.

"Brian . . . Brian—" Crystal sobbed hopelessly.

The burning streak of fire traced steadily across the sky—then abruptly it ended in a bursting nova of flaming incandescence. The light faded slowly into the twilight darkness.

"He's gone," McHague whimpered.

Serono laughed softly.

"Oh, don't sound so disappointed, McHague. You'll soon be with him." The dry click of

Serono's artificial hand crisped in McHague's ears.

"No . . . no . . . Serono . . . wait . . . wait a minute—" McHague babbled. Half paralyzed with terror, he sidled desperately away from the hideous weapon in Serono's hand. "He held a gun on me . . . I had to—" McHague's stumbling words trailed off as he read "Death" in Serono's eyes. His terrified scream ripped out as he turned blindly and plunged down the yawning blackness of the shaft.

Serono's dry chuckle stirred like the rustling wings of a bat.

"And now, Crystal James—" He turned. There was nothing but the impassive stillness of the jungle; the girl was not in sight.

"—and that, gentlemen, completes my report on the present status of Venus. This folder contains the vital statistics for the period since your last inspection. You will find there the reason for me presenting this report instead of Governor McHague. He was killed, together with Mr. Hanson, Chief of Research for Venus Consolidated, in an explosion during an experiment in rocketry which Mr. Hanson was conducting."

"Ah, thank you, Zeburzac." Chief Inspector Nathan accepted the final folio of the voluminous annual report on Venus. He sat with the other members of the Board of Inspection in the governor's offices as they carefully sorted through the stacks of report form and record sheets. "Hm-m-m—I see you have a Crystal James listed here as killed in an aircraft accident. Was she one of the old Venusian family of James?"

Serono nodded regretfully. "Yes, I believe she was the last of them. I knew them well."

"That is too bad," Inspector Nathan said softly. "They were a fine, old family. Well, that cleans up the report, Zeburzac; everything seems to be perfectly in order."

"Thank you, inspector." Of course, it was. He had spent three months on those reports and everything had run smoothly on schedule. In a few more hours this inquisitive crew of inspectors would be gone and Venus would be his.

The mild gentleness of Serono's face revealed nothing of his dictatorial intentions as he listened to Inspector Nathan's closing remarks. In a moment they would be offering him the governorship, legalizing the power he already possessed. With Venus in his hands to be forged into a weapon, the easy-going democracy of Earth would be no serious obstacle. What one clever man could do—Nathan was speaking.

"There is one item here, however, that seriously affects several of these reports. This Mr. Hanson—"

"Hanson? Yes, I think I mentioned, he died. A very violent explosion."

Chief Inspector Nathan's formal politeness melted abruptly in the sudden fire of his rage.

"Explosion? I know all about that explosion, you blundering murderer. Come in here, Hanson!"

"Hanson!" Serono stared in shocked unbelief at the grim figure of a man who should have died, but only for a moment. Then he leaned back and relaxed, his fingertips met and tapped rhythmically.

"Mr. Hanson—hm-m-m—this is almost unbelievable."

"Next time you plant a time bomb in a ship, don't connect it through the lighting circuit, it shows on the ammeter," Brian told him grimly. "And if you want to keep people on Venus, you should watch your freight ships more closely."

"Oh, I wasn't as careless as you might think. That trap was set for McHague. I would have made other arrangements if I had known you were to be pres-

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By A. E. van Vogt

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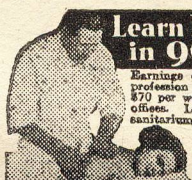
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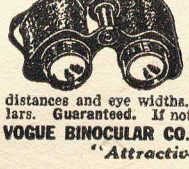
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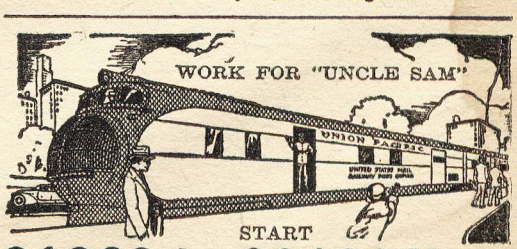

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ASYLUM by A. E. van Vogt
In
ASTOUNDING SCIENCE-FICTION
for May, 1942.

ent. As it was I thought I had got you. However, I can remedy that slight omission almost immediately."

Serono twisted abruptly to his feet. His right hand snatched at his left. The spluttering crackle of a projector flame lashed out. Serono screamed as he dropped the red-hot wreckage of his artificial hand.

"We'd been told about that, too, and I can still shoot," Inspector Nathan growled.

Serono stared stupidly at the empty socket on his left arm. His face grayed lividly. He staggered against the desk, threw out his hand for support and vanished. There was a moment of stunned silence in the room.

"It's a trapdoor!" Brian yelled and leaped for the opening. He caught a glimpse of a descending chute as the section of floor swung solidly back into place.

"Where does that lead to?" Nathan barked.

Brian didn't answer; he was already on his way. Nathan and the rest of the Board of Inspectors pounded along behind him. They thudded down two flights of stairs.

"There he goes!" The pack of inspectors let out a howl and raced down the corridor behind Brian.

Zeburzac, racing for his life, started to draw away from them. They saw him stop. There were men in the corridor ahead of him, half a dozen of them. They were on him!

Serono screamed terribly, once, as a swinging knife ripped him open. He was slammed to the floor, his head beaten in by the vicious blows of his assailants. One of them lunged viciously at the prostrate form. Brian felt sick as he saw the crushed and bloody form of Zeburzac stabbed through the middle with the yard-long spike of a giant Venusian thorn bush.

Having finished their business the killers calmly faced the projectors in the hands of Inspector Nathan and his crew.

"Who are you?" Nathan demanded.

"My name's Carlton. We're rebels. You better hurry up and shoot, it'll save you trouble."

"These men are all right," Brian defended hastily. "Serono murdered some of the Carltons."

Nathan grunted. "Well, thanks, boys. You saved us a job." He slipped his atomic projector back into its holster. "We're inspectors from Earth. We'll have to arrest you for murder, but I guess it's up to Governor Hanson here to decide what to do with you."

"Governor?"

"Yeah. That was decided before we left Earth. Where was Zeburzac heading? Where does this corridor lead to?"

"To his apartments. Maybe he had something there. I'll go and see." Brian started down the corridor.

Governor! Governor of this young, green frontier planet. There should have been a thrill in it somewhere but he felt as though he had come to the end of a pointless journey. He opened the door of Serono's apartment and stepped inside.

There was no one in the luxurious room. Brian's scalp tingled; he felt that he was not alone. He shuddered as he remembered Serono's ghastly death, then stepped quickly to the bedroom door. He opened it cautiously, then moved in and shut it noiselessly behind him. He stiffened as something prodded him in the middle of his spine.

"Don't move!" The voice was thin and vicious with hate. It stopped incredulously—"Brian!"

He swung around in amazement, and in synchronism as perfect as a trained chorus, he and Crystal James cried: "You! I thought you were dead!"

Their next moves were in perfect synchronism, too.

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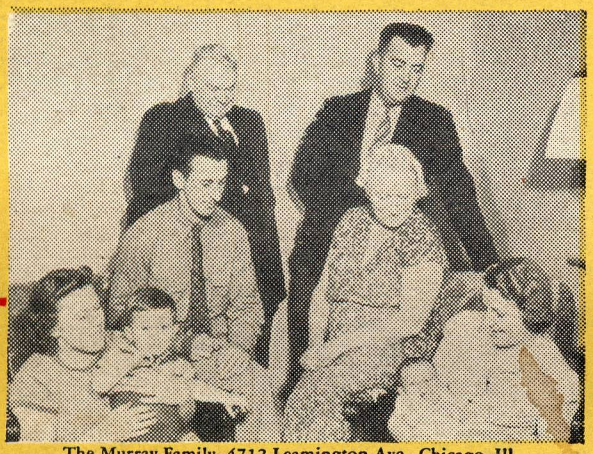

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