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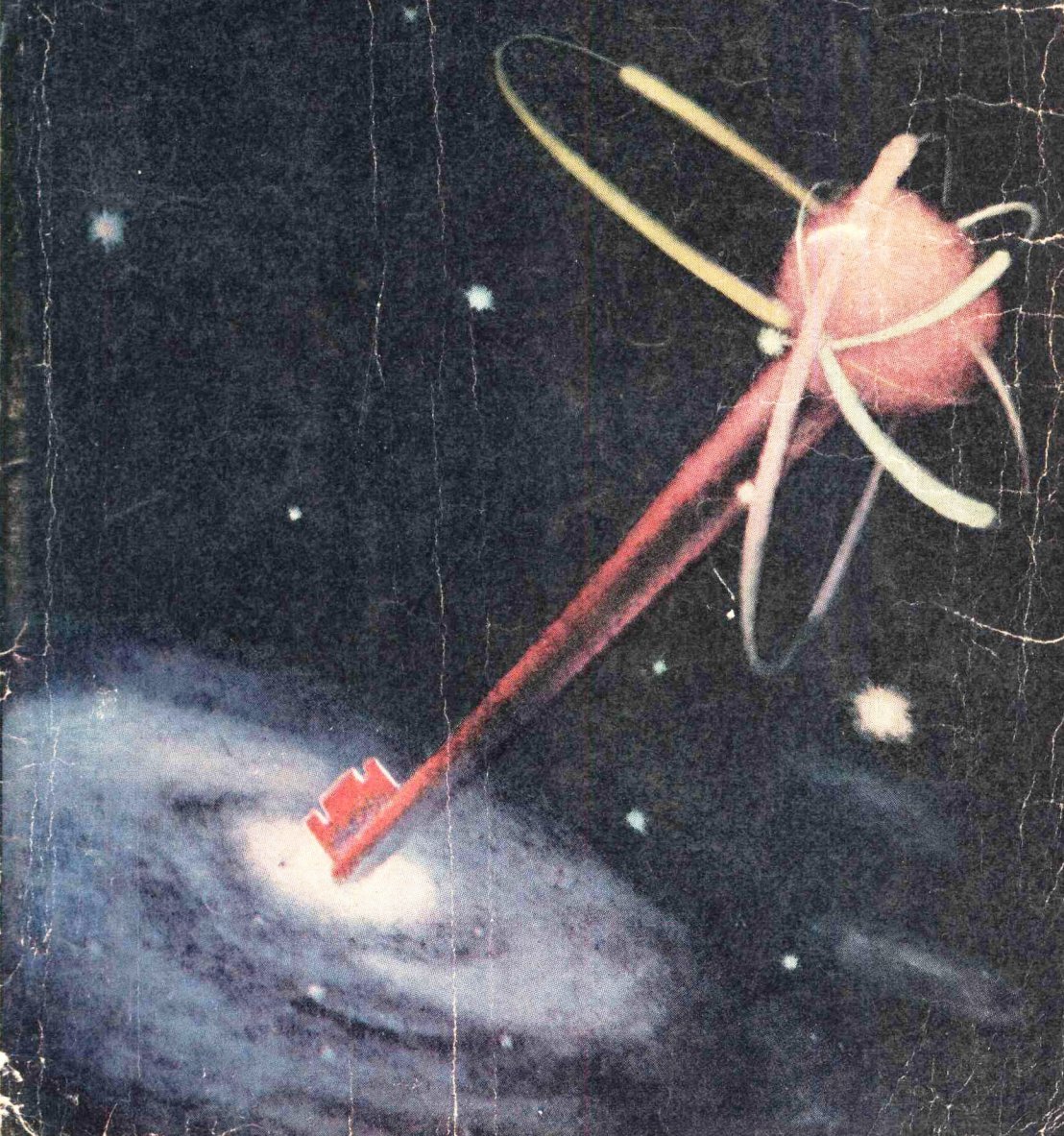

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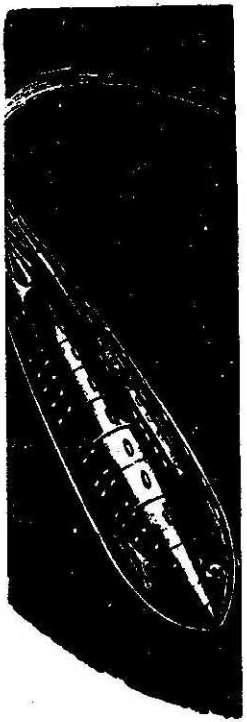

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Reg. U. S. Pat. Off.

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Illustrations by Cartier, Orban and Timmins

Editor
JOHN W. CAMPBELL, JR.

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NEXT ISSUE ON SALE AUGUST 17, 1948

THE ATOMIC SECRET

Most of the great things of science are ultimately reduced to physically simple devices. Fifty years of extremely difficult research, topped off by the Manhattan Project, has reduced the secret of releasing atomic energy to a degree of ultimate simplicity almost unrealized. Literally and actually, the release of atomic energy requires only that pure natural uranium be dissolved in heavy water. The unit need be only about the size of a household bread box. It is inherently capable of releasing energy at any rate whatsoever—from a milliwatt to a million megawatts, so long as you can devise means for carrying away the energy as it is generated.

And that is the full secret of *releasing* atomic energy—a small fish tank of heavy water, with a few pounds of natural uranium in solution. There is no need to separate the uranium isotopes. There is no need for elaborate design of uranium slugs and graphite spacing. Just dissolve the pure uranium salt in pure heavy water.

The graphite pile cannot be as simple; heavy hydrogen is the most perfect of all moderators, so efficient that elaborate spacing arrangements are not needed. The oxygen in the heavy water has almost zero neutron absorption, and is a fair moderator itself. Heavy water is the only moderator that can make natural uranium release its atomic energy in a chain fission reaction in an homogeneous reactor; graphite, being less efficient as a moderator, must be used in a nonhomogeneous —i.e., scattered-lumps type—reactor.

But while the *release* of atomic energy has been reduced to the ultimate simplicity, the problem of harnessing atomic energy to produce something other than pure heat is not so simply solved.

Our parlor fish tank-size heavy-water uranium solution is capable of releasing energy at a million megawatt rate; no heat-transfer system known to, or imagined by man can absorb any such immense amount of power from so small a volume. Yet so inordinately efficient is the heavy-water moderator that if a natural uranium solution is made with a size of, say, fifteen feet on a side, the reactivity would be uncontrollable unless the solution were diluted below optimum strength. The larger a volume of uranium-moderator is used, the less

neutron-loss through the surfaces in proportion to the neutron-generation in the volume. Hence the increased reactivity of the large uranium-heavy water pile. The problem of extracting the enormous energy generation from the pile, not the energy capability of the pile itself, is the stumbling block.

It is literally true that, if you can absorb the heat generated at an unlimited rate, *any pile capable of functioning at all can generate heat at any rate you name.* The minimum size required for a functionable pile is incredibly small. For example, the figures on energy-release of the Bikini bombs show that approximately three pounds of U-235 or Plutonium-239 actually fissioned. The published figures on efficiency of fission in the bombs indicate those three pounds represented about ten per cent of the total. Be conservative, and say fifty pounds of U-235 were required. Because of the startlingly high density of the metal, a cube *4.25 inches* on *a side* contains just about fifty pounds of uranium.

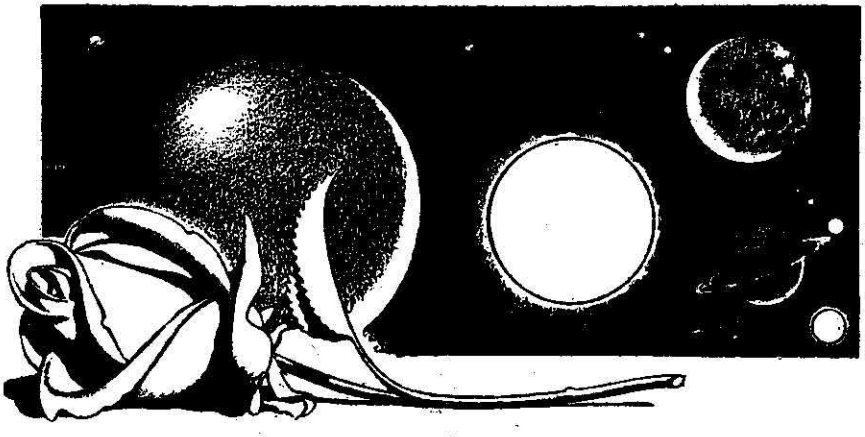
It's a little difficult to use atomic bombs to run power plants, but you can dissolve that uranium in heavy water, converting it to a controlled reaction. The usable heavy-water pile using enriched uranium—natural uranium with added U-235 or Pu-239—can be smaller and lighter than an automobile storage battery. Atomically, it is capable of releasing 1,000,000,000,000 horsepower. We haven't the slightest notion of how any such immense energy generation could be absorbed from any such small source fast enough to prevent the heavy-water from simply vanishing in a puff of heavy-steam, leaving a dried crust of uranium salts in the dry tank—and automatically stopping the reaction completely.

Our atomic engines will be big, not because the atomic requirements force that on us, but because we can't absorb and utilize energy fast enough in small equipment. Atoms are too concentrated for us.

And, of course, in this discussion of the atomic energy release mechanism, we have overlooked two other items that are very important practical considerations, but not properly atomic problems. One is the little item that human beings don't function long, or well, in a dense field of gamma ray and neutron radiation. The fish tank pile will work, but no man near it will—or live, either. There must be thick, multi-layer shielding for human safety. (Although robots, of course, wouldn't mind the working conditions around an unshielded pile.)

The second item of major practical importance is that, even after the heat energy is extracted from the pile, we will be faced with the normal problem of converting heat into useful mechanical or other energy. The fish tank may supply 1,000,000 horsepower, but we don't have a fish tank-size steam turbine that will yield that much power. So we're back to the old problem; we need a new type of engine, not just a new way of hitching our old engines to the atom.

The Editor.



TIME TRAP

BY CHARLES HARNESS

***The** nasty part about such a set-up was that those inside the circle of the times couldn't possibly do anything to get out. Which made it just right for its purpose—*

Illustrated by Cartier

The Great Ones themselves never agreed whether the events constituting Troy's cry for help had a beginning. But the warning signal did have an end. The Great Ones saw to that. Those of the Great Ones who claim a beginning for the story date it with the expulsion of the evil Sathanas from the Place of Suns, when he fled, horribly wounded, spiraling evasively inward, through stereochronia without number, until, exhausted, he sank and lay hidden in the crystallizing magma of a tiny new planet at the galactic rim.

General Blade sometimes felt that leading a resistance movement was far exceeding his debt to decent society and that one day soon he would allow his peaceful nature to override his indignant pursuit of justice. Killing a man, even a very bad

man, without a trial, went against his grain. He sighed and rapped on the table.

"As a result of Blogshak's misappropriation of funds voted to fight the epidemic," he announced, "the death toll this morning reached over one hundred thousand. Does the Assassination Subcommittee have a recommendation?"

A thin-lipped man rose from the gathering. "The Provinarch ignored our warning," he said rapidly. "This subcommittee, as you all know, some days ago set an arbitrary limit of one hundred thousand deaths. Therefore this subcommittee now recommends that its plan for killing the Provinarch be adopted at once. Tonight is very favorable for our plan, which, incidentally, requires a married couple. We have thoroughly catasynthesized the four bodyguards who will be with him on this shift and have provided irresistible scent and sensory stimuli for the woman. The probability for its success insofar as assassination is concerned is about seventy-eight per cent; the probability of escape of our killers is sixty-two per cent. We regard these probabilities as favorable. The Legal Subcommittee will take it from there."

Another man arose. "We have retained Mr. Poole, who is with us tonight." He nodded gravely to a withered little man beside him. "Although Mr. Poole has been a member of the bar but a short time, and although his pre-legal life—some seventy years of it—remains a mystery which he does not explain, our catasynthesis laboratory indicates that his legal knowledge is profound. More important, his persuasive powers, tested with a trial group of twelve professional evaluators, sort of a rehearsal for a possible trial, border on hypnosis. He has also suggested an excellent method of disposing of the corpse to render identification difficult. According to Mr. Poole, if the assassinators are caught, the probability of escaping the devitalizing chamber is fifty-three per cent."

"Mr. Chairman!"

General Blade turned toward the new speaker, who stood quietly several rows away. The man seemed to reflect a gray inconspicuousness, relieved only by a gorgeous rosebud in his lapel. Gray suit, gray eyes, graying temples. On closer examination, one detected an edge of flashing blue in the grayness. The eyes no longer seemed softly unobtrusive, but icy, and the firm mouth and jutting chin seemed polished steel. General Blade had observed this phenomenon dozens of times, but he never tired of it.

"You have the floor, Major Troy," he said.

"I, and perhaps other League officers, would like to know more about Mr. Poole," came the quiet, faintly metallic voice. "He is not a member of the League, and yet Legal and Assassination welcome him in their councils. I think we should be provided some assurance that he has no associations with the Provinarch's administration. One traitor could sell the lives of all of us."

The Legal spokesman arose again. "Major Troy's objections are in some degree merited. We don't know who Mr. Poole is. His mind is absolutely impenetrable to telepathic probes. His fingerprint and eye vein patterns are a little obscure. Our attempts at identification"—he laughed sheepishly—"always key out to yourself, major. An obvious impossibility. So far as the world is concerned, Mr. Poole is an old man who might have been born yesterday! All we know of him is his willingness to co-operate with us to the best of his ability—which, I can assure you, is tremendous. The catasynthesizer has established his sympathetic attitude beyond doubt. Don't forget, too, that he could be charged as a principal in this assassination and devitalized himself. On the whole, he is our man. If our killers are caught, we must use him."

Troy turned and studied the little lawyer with narrowing eyes; Poole's face seemed oddly familiar. The old man returned the gaze sardonically, with a faint suggestion of a smile.

"Time is growing short, major," urged the Assassination chairman. "The Poole matter has already received the attention of qualified League investigators. It is not a proper matter for discussion at this time. If you are satisfied with the arrangements, will you and Mrs. Troy please assemble the childless married couples on your list? The men can draw lots from the fish bowl on the side table. The red ball decides." He eyed Troy expectantly.

Still standing, Troy looked down at the woman in the adjacent seat. Her lips were half-parted, her black eyes somber pools as she looked up at her husband.

"Well, Ann?" he telepathed.

Her eyes seemed to look through him and far beyond. "He will make you draw the red ball, Jon," she murmured, trancelike. "Then he will die, and I will die. But Jon Troy will never die. Never die. Never die. Nev—"

"Wake up, Ann!" Troy shook her by the shoulder. To the puzzled faces about them, he explained quickly, "My wife is something of a secress." He 'pathed again: "Who is *he?*"

Ann Troy brushed the black hair from her brow slowly. "It's all confused. *He* is someone in this room—" She started to get up.

"Sit down, dear," said Troy gently. "If I'm to draw the red ball, I may as well cut this short." He slid past her into the aisle, strode to the side table, and thrust his hand into the hole in the box sitting there.

Every eye was on him.

His hand hit the invisible fish bowl with its dozen-odd plastic balls. Inside the bowl, he touched the little spheres at random while he studied the people in the room. All old friends, except—Poole. That tantalizing face. Poole was now staring like the rest, except that beads of sweat were forming on his forehead.

Troy swirled the balls around the

bowl; the muffled clatter was audible throughout the room. He felt his fingers close on one. His hands were perspiring freely. With an effort he forced himself to drop it. He chose another, and looked at Poole. The latter was frowning. Troy could not bring his hand out of the bowl. His right arm seemed partially paralyzed. He dropped the ball and rolled the mass around again. Poole was now smiling. Troy hesitated a moment, then picked a ball from the center of the bowl. It felt slightly moist. He pulled it out, looked at it grimly, and held it up for all to see.

"Just 'path that!" whispered the jail warden reverently to the night custodian.

"You know I can't telepath," said the latter grumpily. "What are they saying?"

"Not a word all night. They seem to be taking a symposium of the best piano concertos since maybe the twentieth century. Was Chopin twentieth or twenty-first? Anyhow, they're up to the twenty-third now, with Darnoval. Troy reproduces the orchestra and his wife does the piano. You'd think she had fifty years to live instead of five minutes."

"Both seem nice people," ruminated the custodian. "If they hadn't killed the Provinarch, maybe they'd have become famous 'pathic musicians. She had a lousy lawyer. She could have got off with ten years sleep if he'd half tried." He pushed some papers across the desk. "I've had the chamber checked. Want to look over the readings?"

The warden scanned them rapidly. "Potential difference, eight million; drain rate, ninety vital units/minute; estimated period of consciousness, thirty seconds; estimated durance to nonrecovery point, four minutes; estimated durance to legal death, five minutes." He initialed the front sheet. "That's fine. When I was younger they called it the 'vitality drain chamber.' Drain rate was only two v.u./min. Took an hour to drain them to unconsciousness. Pretty hard on the condemned people. Well, I'd better go officiate."

When Jon and Ann Troy finished the Darnoval concerto they were silent for a few moments, exchanging simply a flow of wordless, unfathomable perceptions between their cells. Troy was unable to disguise a steady beat of gloom. "We'll have to go along with Poole's plan," he 'pathed, "though I confess I don't know what his idea is. Take your capsule now."

His mind registered the motor impulses of her medulla as she removed the pill from its concealment under her armpit and swallowed it. Troy then perceived her awareness of her cell door opening, of grim men and women about her. Motion down corridors. Then the room. A clanging of doors. A titanic effort to hold their fading contact. One last despairing communion, loving, tender.

Then nothing.

He was still sitting with his face

buried in his hands, when the guards came to take him to his own trial that morning.

"This murder," announced the Peoples' advocate to the twelve evaluators, "this crime of taking the life of our beloved Provinarch Blogshak, this heinous deed—is the most horrible thing that has happened in Niork in my lifetime. The creature charged with this crime" —he pointed an accusing finger at the prisoner's box—"Jon Troy has been psyched and has been adjudged integrated at a preliminary hearing. Even his attorney"—here bowing ironically to a beady-eyed little man at counsels' table—"waived the defense of nonintegration."

Poole continued to regard the Peoples' advocate with bitter weariness, as though he had gone through this a thousand times and knew every word that each of them was going to say. The prisoner seemed oblivious to the advocate, the twelve evaluators, the judge, and the crowded courtroom. Troy's mind was blanked out. The dozen or so educated telepaths in the room could detect only a deep beat of sadness.

"I shall prove," continued the inexorable advocate, "that this monster engaged our late Provinarch in conversation in a downtown bar, surreptitiously placed a lethal dose of *skon* in the Provinarch's glass, and that Troy and his wife—who, incidentally, paid the extreme penalty herself early this—"

"Objection!" cried Poole, springing to his feet. The defendant, not his wife, is now on trial."

"Sustained," declared the judge. "The advocate may not imply to the evaluators that the possible guilt of the present defendant is in any way determined by the proven guilt of any past defendant. The evaluators must ignore that implication. Proceed, advocate."

"Thank you, your honor." He turned again to the evaluators' box and scanned them with a critical eye. "I shall prove that the prisoner and the late Mrs. Troy, after poisoning Provinarch Blogshak, carried his corpse into their sedan, and that they proceeded then to a deserted area on the outskirts of the city. Unknown to them they were pursued by four of the mayor's bodyguards, who, alas, had been lured aside at the bar by Mrs. Troy. Psychometric determinations taken by the police laboratory will be offered to prove it was the prisoner's intention to dismember the corpse and burn it to hinder the work of the police in tracing the crime to him. He had got only as far as severing the head when the guards' ship swooped up and hovered overhead. He tried to run back to his own ship, where his wife was waiting, but the guards blanketed the area with a low-voltage stun."

The advocate paused. He was not getting the reaction in the evaluators he deserved, but he knew the fault was not his. He was puzzled; he would have to conclude quickly.

"Gentlemen," he continued gravely, "for this terrible thing, the

Province demands the life of Jon Troy. The monster must enter the chamber tonight." He bowed to the judge and returned to counsels' table.

The judge acknowledged the retirement and turned to Poole. "Does the defense wish to make an opening statement?"

"The defense reiterates its plea of 'not guilty' and makes no other statement," grated the old man.

There was a buzz around the advocates' end of the table. An alert defense with a weak case always opened to the evaluators. Who was this Poole? What did he have? Had they missed a point? The prosecution was committed now. They'd have to start with their witnesses.

The advocate arose. "The prosecution offers as witness Mr. Fonstile."

"Mr. Fonstile!" called the clerk.

A burly, resentful-looking man blundered his way from the benches and walked up to the witness box and was sworn in.

Poole was on his feet. "May it please the court!" he croaked.

The judge eyed him in surprise. "Have you an objection, Mr. Poole?"

"No objection, your honor," rasped the little man, without expression. "I would only like to say that the testimony of this witness, the bartender in the Shawn Hotel, is probably offered by my opponent to prove facts which the defense readily admits, namely, that the witness observed Mrs. Troy entice the four bodyguards of the deceased to another part of the room, that the present defendant surreptitiously placed a powder in the wine of the deceased, that the deceased drank the wine and collapsed, and was carried out of the room by the defendant, followed by his wife." He bowed to the judge and sat down.

The judge was nonplussed. "Mr. Poole, do you understand that you are responsible for the defense of this prisoner, and that he is charged with a capital offense?"

"That is my understanding, your honor."

"Then if prosecution is agreeable, and wishes to elicit no further evidence from the witness, he will be excused."

The advocate looked puzzled, but called the next witness, Dr. Warkon, of the Provincial Police Laboratory. Again Poole was on his feet. This time the whole court eyed him expectantly. Even Troy stared at him in fascination.

"May it please the court," came the now-familiar monotone, "the witness called by the opposition probably expects to testify that the deceased's finger prints were found on the wineglass in question, that traces of deceased's saliva were identified in the liquid content of the glass, and that a certain quantity of *skon* was found in the wine remaining in the glass."

"And one other point, Mr. Poole," added the Peoples' advocate. "Dr. Warkon was going to testify that death from *skon* poisoning normally occurs within thirty sec-

onds, owing to syncope. Does the defense concede that?"

"Yes."

"The witness is then excused," ordered the judge.

The prisoner straightened up. Troy studied his attorney curiously. The mysterious Poole with the tantalizing face, the man so highly recommended by the League, had let Ann go to her death with the merest shadow of a defense. And now he seemed even to state the prosecution's case rather than defend the prisoner.

Nowhere in the courtroom did Troy see a League member. But then, it would be folly for General Blade to attempt his rescue. That would attract unwelcome attention to the League.

He had been abandoned, and was on his own. Many League officers had been killed by Blogshak's men, but rarely in the devitalizing chamber. It was a point of honor to die weapon in hand. His first step would be to seize a blaster from one of the guards, use the judge as a shield, and try to escape through the judge's chambers. He would wait until he was put on the stand. It shouldn't be long, considering how Poole was cutting corners.

The advocate was conferring with his assistants. "What's Poole up to?" one of them asked. "If he is going on this far, why not get him to admit all the facts constituting a prima facie case: Malice, intent to kill, and all that?"

The advocate's eyes gleamed. "I think I know what he's up to now," he exulted. "I believe he's forgotten an elementary theorem of criminal law. He's going to admit everything, then demand we produce Blogshak's corpse. He must know it was stolen from the bodyguards when their ship landed at the port. No corpse, no murder, he'll say. But you don't need a corpse to prove murder. We'll hang him with his own rope!" He arose and addressed the judge.

"May it please the court, the prosecution would like to ask if the defense will admit certain other facts which I stand ready to prove."

The judge frowned. "The prisoner pleaded not guilty. Therefore the court will not permit any admission of the defense to the effect that the prisoner did kill the deceased, unless he wants to change his plea." He looked inquiringly at Poole.

"I understand, your honor," said Poole. "May I hear what facts the learned prosecutor wishes me to accede to?"

For a moment the prosecutor studied his enigmatic antagonist like a master swordsman.

"First, the prisoner administered a lethal dose of *skon* to the deceased with malice aforethought, and with intent to kill. Do you concede that?"

"Yes."

"And that the deceased collapsed within a few seconds and was carried from the room by the defendant and his wife?"

"We agree to that."

"And that the prisoner carried the

body to the city outskirts and there decapitated it?"

"I have already admitted that."

The twelve evaluators, a selected group of trained experts in the estimation of probabilities, followed this unusual procedure silently.

"Then your honor, the prosecution rests." The advocate felt dizzy, out of his depth. He felt he had done all that was necessary to condemn the prisoner. Yet Poole seemed absolutely confident, almost bored.

"Do you have any witnesses, Mr. Poole," queried the judge.

"I will ask the loan of Dr. Warkon, if the Peoples' advocate will be so kind," replied the little man.

"I'm willing." The advocate was beginning to look harassed. Dr. Warkon was sworn in.

"Dr. Warkon, did not the psychometer show that the prisoner intended to kill Blogshak in the tavern and decapitate him at the edge of the city?"

"Yes, sir."

"Was, in fact, the deceased dead when he was carried from the hotel?"

"He had enough *skon* in him to have killed forty people."

"Please answer the question."

"Well, I don't know. I presume he was dead. As an expert, looking at all the evidence, I should say he was dead. If he didn't die in the room, he was certainly dead a few seconds later."

"Did you feel his pulse at any time, or make any examination to determine the time of death?"

"Well, no."

Now, thought the advocate, comes the no corpse, no murder. If he tries that, I've got him.

But Poole was not to be pushed.

"Would you say the deceased was dead when the prisoner's ship reached the city limits?"

"Absolutely!"

"When you, as police investigator, examined the scene of the decapitation, what did you find?"

"The place where the corpse had lain was easily identified. Depressions in the sand marked the back, head, arms, and legs. The knife was lying where the prisoner dropped it. Marks of landing gear of the prisoner's ship were about forty feet away. Lots of blood, of course."

"Where was the blood?"

"About four feet away from the head, straight out."

Poole let the statement sink in, then:

"Dr. Warkon, as a doctor of medicine, do you realize the significance of what you have just said?"

The witness gazed at his inquisitor as though hypnotized. "Four feet . . . jugular spurt—" he muttered to no one. He stared in wonder, first at the withered, masklike face before him, then at the advocate, then at the judge. "Your honor, the deceased's heart was still beating when the prisoner first applied the knife. The poison didn't kill him!"

An excited buzz resounded through the courtroom.

Poole turned to the judge. "Your honor, I move for a summary judgment of acquittal."

The advocate sprang to his feet, wordless.

"Mr. Poole," remonstrated the judge, "your behavior this morning has been extraordinary, to say the least. On the bare fact that the prisoner killed with a knife instead of with poison, as the evidence at first indicated, you ask summary acquittal. The court will require an explanation."

"Your honor"—there was a ghost of a smile flitting about the prim, tired mouth—"to be guilty of a crime, a man must intend to commit a crime. There must be a *mens rea*, as the classic expression goes. The act and the intent must coincide. Here they did not. Jon Troy intended to kill the Provinarch in the bar of the Shawn Hotel. He gave him poison, but Blogshak didn't die of it. Certainly up to the time the knife was thrust into Blogshak's throat, Troy may have been guilty of assault and kidnaping, but not murder. If there was any murder, it must have been at the instant he decapitated the deceased. Yet what was his intent on the city outskirts? He wanted to mutilate a corpse. His intent was not to murder, but to mutilate. We have the act, but not the intent —no *mens rea*. Therefore the act was not murder, but simply mutilation of a corpse—a crime punishable by fine or imprisonment, but not death."

Troy's mind was whirling. This incredible, dusty little man had freed him.

"But Troy's a murderer!" shouted the advocate, his face white. "Sophisms can't restore a life!"

"The court does not recognize the advocate!" said the judge harshly. "Cut those remarks from the record," he directed the scanning clerk. "This court is guided by the principles of common law descended from ancient England. The learned

counsel for the defense has stated those principles correctly. Homicide is not murder if there is no intent to kill. And mere intent to kill is not murder if the poison doesn't take effect. This is a strange, an unusual case, and it is revolting for me to do what I have to do. I acquit the prisoner."

"Your honor!" cried the advocate. Receiving recognition, he proceeded. "This . . . this felon should not escape completely. He should not be permitted to make a travesty of the law. His own counsel admits he has broken the statutes on kidnaping, assault, and mutilation. The evaluators can at least return a verdict of guilty on those counts."

"I am just as sorry as you are," replied the judge, "but I don't find those counts in the indictment. You should have included them."

"If you release him, your honor, I'll re-arrest him and frame a new indictment."

"This court will not act on it. It is contrary to the Constitution of this Province for a person to be prosecuted twice on the same charge or on a charge which should have been included in the original indictment. The Peoples' advocate is estopped from taking further action on this case. This is the final ruling of this court." He took a drink of water, wrapped his robes about him, and strode through the rear of the courtroom to his chambers.

Troy and Poole, the saved and the savior, eyed one another with the same speculative look of their first meeting.

Poole opened the door of the 'copter parked outside the Judiciary Building and motioned for Troy to enter. Troy froze in the act of climbing in.

A man inside the cab, with a face like a claw, was pointing a blaster at his chest.

The man was Blogshak!

Two men recognizable as the Provinarch's bodyguards suddenly materialized behind Troy.

"Don't give us any trouble, major," murmured Poole easily. "Better get in."

The moment Troy was pushed into the subterranean suite he sensed Ann was alive—drugged insensate still, but alive, and near. This knowledge suppressed momentarily Blogshak's incredible existence and Poole's betrayal. Concealing his elation, he turned to Poole.

"I should like to see my wife."

Poole motioned silently to one of the guards, who pulled back sliding doors. Beyond a glass panel, which was actually a transparent wall of a tile room, Ann lay on a high white metal bed. A nurse was on the far side of the bed, exchanging glances with Poole. At some unseen signal from him the nurse swabbed Ann's left arm and thrust a syringe into it.

A shadow crossed Troy's face. "What is the nurse doing?"

"In a moment Mrs. Troy will awaken. Whether she stays awake depends on you."

"On me? What do you mean?"

"Major, what you are about to learn can best be demonstrated

rather than described. Sharg, the rabbit!"

The bettle-browed man opened a large enamel pan on the table. A white rabbit eased its way out, wrinkling its nose gingerly. Sharg lifted a cleaver from the table. There was a flash of metal, a spurt of blood, and the rabbit's head fell to the floor. Sharg picked it up by the ears and held it up expectantly. The eyes were glazed almost shut. The rabbit's body lay limp in the pan. At a word from Poole, Sharg carefully replaced the severed head, pressing it gently to the bloody neck stub. Within seconds the nose twitched, the eyes blinked, and the ears perked up. The animal shook itself vigorously, scratched once or twice at the bloody ring around its neck, then began nibbling at a head of lettuce in the pan.

Troy's mind was racing. The facts were falling in line. All at once everything made sense. With knowledge came utmost wariness. The next move was up to Poole, who was examining with keen eyes the effect of his demonstration on Troy.

"Major, I don't know how much you have surmised, but at least you cannot help realizing that life, even highly organized vertebrate life, is resistant to death in your presence."

Troy folded his arms but volunteered nothing. He was finally getting a glimpse of the vast and secret power supporting the Provinarch's tyranny, long suspected by the League but never verified.

"You could not be expected to discover this marvelous property in yourself except by the wildest chance," continued Poole. "As a matter of fact, our staff discovered it only when Blogshak and his hysterical guards reported to us, after your little escapade. But we have been on the lookout for your type for years. Several mutants with this chacteristic have been predicted by our probability geneticists for this century, but you are the first known to us—really perhaps the only one in existence. One is all we need.

"As a second and final test of your power, we decided to try the effect of your aura on a person in the devitalizing chamber. For that reason we permitted Mrs. Troy to be condemned, when we could easily have prevented it. As you now know, your power sustained your wife's life against a strong drain of potential. At my instruction she drugged herself in her cell simply to satisfy the doctor who checked her pulse and reflexes afterwards. When the staff—my employers—examined her here, they were convinced that you had the mutation they were looking for, and we put the finishing touches on our plans to save you from the chamber."

Granting I have some strange biotic influence, thought Troy, still, something's wrong. He says his bunch became interested in me *after* my attempt on Blogshak. *But Poole was at the assassination meeting!* What is his independent interest?

Poole studied him curiously. "I doubt that you realize what tremen-

dous efforts have been made to insure your presence here. For the past two weeks the staff has hired several thousand persons to undermine the critical faculties of the four possible judges and nine hundred evaluators who might have heard your case. Judge Gallon, for example, was not in an analytical mood this morning because we saw to it that he won the Province Chess Championship with his Inner Gambit—a prize he has sought for thirty years. But if he had fooled us and given your case to the evaluators, we were fairly certain of a favorable decision. You noticed how they were not concentrating on the advocate's opening statement? They couldn't; they were too full of the incredible good fortune they had encountered the previous week. Sommers had been promoted to a full professorship at the Provincial University. Gunnard's obviously faulty thesis on space strains had been accepted by the *Steric Quarterly*—after we bought the magazine. But why go on? Still, if the improbable had occurred, and you had been declared guilty by the evaluators, we would simply have spirited you away from the courtroom. With a few unavoidable exceptions, every spectator in the room was a trained staff agent, ready to use his weapons—though in the presence of your aura, I doubt they could have hurt anyone.

"Troy, the staff had to get you here, but we preferred to do it quietly. Now, why are you here? I'll tell you. Your aura, we think, will keep—" Poole hesitated. "Your aura will keep . . . *It* . . . from dying during an approaching crisis in its life stream."

"It? What is this 'it'? And what makes you so sure I'll stay?"

"The staff has not authorized me to tell you more concerning the nature of the entity you are to protect. Suffice to say that It is a living, sentient being. And I think you'll stay, because the hypo just given Mrs. Troy was pure *skon*."

Troy had already surmised as much. The move was perfect. If he stayed near her, Ann, though steeped in the deadliest known poison, would not die. But why had they been so sure he would not stay willingly, without Ann as hostage? He 'pathed the thought to Poole, who curtly refused to answer.

"Now, major, I'm going to turn this wing of the City Building over to you. For your information, your aura is effective for a certain distance within the building, but just how far I'm not going to tell you. However, you are not permitted to leave your apartment at all. The staff has demoted the Provinarch, and he's now the corporal of your bodyguard. He would be exceedingly embarrassed if you succeeded in leaving. Meals will be brought to you regularly. The cinematic and micro library is well stocked on your favorite subjects. Special concessions may even be made as to things you want in town. But you can never touch your wife again. That pane of glass will always be between you. A psychic receptor tuned to your personality

integration is fixed within Mrs. Troy's room. If you break the glass panel, or in any other way attempt to enter the room, the receptor will automatically actuate a bomb mechanism imbedded beneath Mrs. Troy's cerebellum. She would be blown to little bits—each of them alive as long as you were around. It grieves us to be crude, but the situation requires some such safeguard."

"When will my wife recover consciousness?"

"Within an hour or so. But what's your hurry? You'll be here longer than you think."

The little lawyer seemed lost in thought for a moment. Then he signaled Blogshak and the guards, and the four left. Blogshak favored Troy with a venemous scowl as he closed and locked the door.

There was complete and utter silence. Even the rabbit sat quietly on the table, blinking its eyes at Troy.

Left alone, the man surveyed the room, his perceptions palping every square foot rapidly but carefully. He found nothing unusual. He debated whether to explore the wing further or to wait until Ann awakened. He decided on the latter course. The nurse had left. They were together, with just a sheet of glass between. He explored Ann's room mentally, found nothing.

Then he walked to the center table and picked up the rabbit. There was the merest suggestion of a cicatrix encircling the neck.

Wonderful, but frightful, thought Troy. Who, what, am I?

He put the rabbit back in the box, pulled a comfortable armchair against the wall opposite the glass panel, where he had a clear view of Ann's room, and began a methodical attempt to rationalize the events of the day.

He was jolted from his reverie by an urgent 'pathic call from Ann. After a flurry of tender perceptions each unlocked his mind to the other.

Poole had planted an incredible message in Ann's ESP lobe.

"Jon," she warned, "it's coded to the Dar— . . . I mean, it's coded to the notes and frequencies of our last concerto, in the death house. You'll have to synchronize. I'll start."

How did Poole know we were familiar with the concerto? thought Troy.

"Think on this carefully, Jon Troy, and guard it well," urged Poole's message. "I cannot risk my identity, but I am your friend. It —the Outcast—has shaped the destinies of vertebrate life on earth for millions of years, for two purposes. One is a peculiar kind of food. The other is . . . you. You have been brought here to preserve an evil life. But I urge you, develop your latent powers and destroy that life!

"Jon Troy, the evil this entity has wreaked upon the earth, entirely through his human agents thus far, is incalculable. It will grow even worse. You thought a sub-electronic virus caused the hundred thousand deaths which launched you on your assassination junket. Not so! The monster in

the earth directly beneath you simply drained them of vital force, in their homes, on the street, in the theater, anywhere and everywhere. Your puny League has been fighting the Outcast for a generation without the faintest conception of the real enemy. If you have any love for humanity, search Blogshak's mind today. The staff physicians will be in this wing of the building today, too. Probe them. This evening, if I am still alive, I shall explain more, in person, free from Blogshak's crew."

"You have been wondering about the nature of the being whose life you are protecting," said Poole in a low voice, as he looked about the room. "As you learned when you searched the minds of the physicians this morning, he is nothing human. I believe him to have been wounded in a battle with his own kind, and that he has lain in his present pit for millions of years, possibly since pre-Cambrian times. He probably has extraordinary powers even in his weakened state, but to my knowledge he has never used them."

"Why not?" asked Troy.

"He must be afraid of attracting the unwelcome attention of those who look for him. But he has maintained his life somehow. The waste products of his organic metabolism are fed into our sewers daily. He has a group of physicians and physicists—a curious mixture!—who keep in repair his three-dimensional neural cortex and run a huge administrative organization designed for his protection."

"Seems harmless enough, so far," said Troy.

"He's harmless except for one venemous habit. I thought I told you about it in the message I left with Ann. You must have verified it if you probed Blogshak thoroughly."

"But I couldn't understand such near cannibalism in so advanced—"

"Certainly not cannibalism! Do we think of ourselves as cannibals when we eat steaks? Still, that's my main objection to him. His vitality must be maintained by the absorption of other vitalities, preferably as high up the evolutionary scale as possible. Our thousands of deaths monthly can be traced to his frantic hunger for vital fluid. The devitalizing department, which Blogshak used to run, is the largest section of the staff."

"But what about the people who attend him? Does he snap up any of them?"

"He hasn't yet. They all have a pact with him. Help him, and he helps them. Every one of his band dies old, rich, evil, and envied by their ignorant neighbors. He gives them everything they want. Sometimes they forget, like Blogshak, that society can stand just so much of their evil."

"Assuming all you say is true—how does it concern my own problem, getting Ann out of here and notifying the League?"

Poole shook his head dubiously. "You probably have some tentative plans to hypnotize Blogshak and make him turn off the screen. But no one on the staff understands the

screen. None of them can turn it off, because none of them turned it on. The chief surgeon believes it to be a direct, focused emanation from a radiator made long ago and known now only to the Outcast. But don't think of escaping just yet. You can strike a tremendous, fatal blow without leaving this room!

"This afternoon," Poole continued with growing nervousness, "there culminates a project initiated by the Outcast millennia ago. Just ninety years ago the staff began the blueprints of a surgical operation on the Outcast on a scale which would dwarf the erection of the Mechanical Integrator. Indeed, you won't be surprised to learn that the Integrator, capable of planar sterechronic analysis, was but a preliminary practice project, a rehearsal for the main event."

"Go on," said Troy absently. His sensitive hearing detected heavy breathing from beyond the door.

"To perform this colossal surgery, the staff must disconnect for a few seconds all of the essential neural trunks. When this is done, but for your aura, the Outcast would forever after remain a mass of senseless protoplasm and electronic equipment. With your aura they can make the most dangerous repairs in perfect safety. When the last neural is down, you simply suppress your aura and the Outcast is dead. Then you could force your way out. From then on, the earth could go its merry way unhampered. Your League would eventually gain ascendancy and—"

"What about Ann?" asked Troy curtly. "Wouldn't she die along with the Outcast?"

"Didn't both of you take an oath to sacrifice each other before you'd injure the League or abandon an assignment?"

"That's a nice legal point," replied Troy, watching the corridor door behind Poole open a quarter of an inch. "I met Ann three years ago in a madhouse, where I had hidden away after a League assignment. She wasn't mad, but the stupid overseer didn't know it. She had the ability to project herself to other probability worlds. I married her to obtain a warning instrument of extreme delicacy and accuracy. Until that night in the death house, I'd have abided by League rules and abandoned her if necessary. But no longer. Any plan which includes her death is out. Suffering humanity can go climb a tree."

Poole's voice was dry and cracking. "I presumed you'd say that. You leave me no recourse. After I tell you who I am you will be willing to turn off your aura even at the cost of Ann's life. I am your . . . agh—"

A knife whistled through the open door and sank in Poole's neck. Blogshak and Sharg rushed in. Each man carried an ax.

"You dirty traitor!" screamed Blogshak. His ax crashed through the skull of the little old man even as Troy sprang forward. Sharg caught Troy under the chin with his ax handle. For some minutes afterward Troy was dimly aware of

chopping, chopping, chopping.

Troy's aching jaw finally awoke him. He was lying on the sofa, where his keepers had evidently placed him. There was an undefinable raw odor about the room.

The carpet had been changed.

Troy's stomach muscles tensed. What had this done to Ann? He was unable to catch her ESP lobe. Probably out wandering through the past, or future.

While he tried to touch her mind, there was a knock on the door, and Blogshak entered with a man dressed in surgeon's white.

"Our operation apparently was a success, despite your little mishap," 'pathed the latter to Troy. "The next thirty years will tell us definitely whether we did this correctly. I'm afraid you'll have to stick around until then. I understand you're great chums with the Provinarch—ex-Provinarch, should I say? I'm sure he'll entertain you. I'm sorry about Poole. Poor fellow! Muffed his opportunities. Might have risen very high on the staff. But everything works out for the best, doesn't it?"

Troy glared at him wordlessly.

"Once we're out of here," 'pathed Troy in music code that afternoon, "we'll get General Blade to drop a plute fission on this building. It all revolves around the bomb under your cerebellum. If we can deactivate either the screen or the bomb, we're out. It's child's play to scatter Blogshak's bunch."

"If I had a razor," replied Ann, "I could cut the thing out. I can feel it under my neck muscles."

"Don't talk nonsense. What can you give me on Poole?"

"He definitely forced you to choose the red ball at the League meeting. Also, he knew he was going to be killed in your room. That made him nervous."

"Did he *know* he was going to be killed, or simply anticipated the possibility?"

"He knew. *He had seen it before!*"

Troy began pacing restlessly up and down before the glass panel, but never looking at Ann, who lay quietly in bed apparently reading a book. The nurse sat in a chair at the foot of Ann's bed, arms folded, implacably staring at her ward.

"Puzzling, very puzzling," mused Troy. "Any idea what he was going to tell me about my aura?"

"No."

"Anything on his identity?"

"I don't know—I had a feeling that I . . . we— No, it's all too vague. I noticed just one thing for certain."

"What was that?" asked Troy. He stopped pacing and appeared to be examining titles on the bookshelves.

"*He was wearing your rosebud!*"

"But that's crazy! I had it on all day. You must have been mistaken."

"You know I can't make errors on such matters."

"That's so." Troy resuming his pacing. "Yet, I refuse to accept the proposition that both of us were wearing my rosebud at the same

instant. Well, never mind. While we're figuring a way to deactivate your bomb, we'd also better give a little thought to solving my aura.

"The solution is known—we have to assume that our unfortunate friend knew it. Great Galaxy! What our League biologists wouldn't give for a chance at this! We must change our whole concept of living matter. Have you ever heard of the immortal heart created by Alexis Carrel?" he asked abruptly.

"No."

"At some time during the Second Renaissance, early twentieth century, I believe, Dr. Carrel removed a bit of heart tissue from an embryo chick and put it in a nutrient solution. The tissue began to expand and contract rhythmically. Every two days the nutrient solution was renewed and excess growth cut away. Despite the catastrophe that had overwhelmed the chick—as a chick—the individual tissue lived on independently because the requirements of its cells were met. This section of heart tissue beat for nearly three centuries, until it was finally lost in the Second Atomic War."

"Are you suggesting that the king's men can put Humpty Dumpty together again if due care has been taken to nourish each part?"

"It's a possibility. Don't forget the skills developed by the Muscovites in grafting skin, ears, corneas, and so on."

"But that's a long process—it takes weeks."

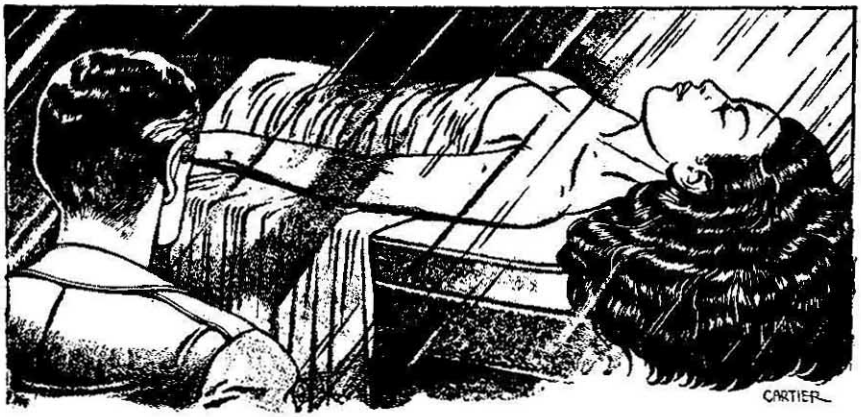
"Then let's try another line. Consider this: The amoeba lives in a fluid medium. He bumps into his food, which is generally bacteria or bits of decaying protein, flows around it, digests it at leisure, excretes his waste matter, and moves on. Now go on up the evolutionary scale past the coelenterates and flatworms, until we reach the first truly three-dimensional animals—the coelomates. The flatworm had to be flat because he had no blood vessels. His food simply soaked into him. But cousin roundworm, one of the coelomates, grew plump and solid, because his blood vessels fed his specialized interior cells, which would otherwise have no access to food.

"Now consider a specialized cell—say a nice long muscle cell in the rabbit's neck. It can't run around in stagnant water looking for a meal. It has to have its breakfast brought to it, and its excrement carried out by special messenger, or it soon dies."

Troy picked a book from the shelf and leafed through it idly.

Ann wondered mutely whether her nurse had been weaned on a lemon.

"This messenger," continued Troy, "is the blood. It eventually reaches the muscle cell by means of a capillary—a minute blood vessel about the size of a red corpuscle. The blood in the capillary gives the cell everything it needs and absorbs the cell waste matter. The muscle cell needs a continuously fresh supply of oxygen, sugar, amino-acids, fats, vitamins, sodium, calcium, and potassium salts, hormones, water,



and maybe other things. It gets these from the hemoglobin and plasma, and it sheds carbon dioxide, ammonium compounds, and so on. Our cell can store up a little food within its own boundaries to tide it over for a number of hours. But oxygen it must have, every instant."

"You're just making the problem worse," interposed Ann. "If you prove that blood must circulate oxygen continuously to preserve life, you'll have yourself out on a limb. If you'll excuse the term, the rabbit's circulation was decisively cut off."

"That's the poser," agreed Troy. "The blood didn't circulate, but the cells didn't die. And think of this a moment: Blood is normally alkaline, with a pH of 7.4. When it absorbs carbon dioxide as a cell excretion, blood becomes acid, and this steps up respiration to void the excess carbon dioxide, via the lungs. But so far as I could see, the rabbit didn't even sigh after he got his head back. There was certainly no heavy breathing."

"I'll have to take your word for it; I was out cold."

"Yes, I know." Troy began pacing the room again. "It isn't feasible to suppose the rabbit's plasma was buffered to an unusual degree. That would mean an added concentration of sodium bicarbonate and an increased solids content. The cellular water would dialyze into the blood and kill the creature by simple dehydration."

"Maybe he had unusual reserves of hemoglobin," suggested Ann. "That would take care of your oxygen problem."

Troy rubbed his chin. "I doubt it. There are about five million red cells in a cubic millimeter of blood. If there are very many more, the cells would oxidize muscle tissue at a tremendous rate, and the blood would grow hot, literally cooking the brain. Our rabbit would die of a raging fever. Hemoglobin dissolves about fifty times as much oxygen as plasma, so it doesn't take much hemoglobin to start an internal conflagration."

"Yet the secret must lie in the hemoglobin. You just admitted that the cells could get along for long periods with only oxygen," persisted Ann.

"It's worth thinking about. We must learn more about the chemistry of the cell. You take it easy for a few days while I go through Poole's library."

"Could I do otherwise?" murmured Ann.

". . . thus the effect of confinement varies from person to person. The claustrophobe deteriorates rapidly, but the agoraphobe mellows, and may find excuses to avoid the escape attempt. The person of high mental and physical attainments can avoid atrophy by directing his every thought to the destruction of the confining force. In this case, the increment in mental prowess is 3.1 times the logarithm of the duration of confinement measured in years. The intelligent and determined prisoner can escape if he lives long enough."—J. and A. T., An Introduction to Prison Escape, 4th Edition, League Publishers, p. 14.

In 1811 Avogadro, in answer to the confusing problems of combining chemical weights, invented the molecule. In 1902 Einstein resolved an endless array of incompatible facts by suggesting a mass-energy relation. Three centuries later, in the tenth year of his imprisonment, Jon Troy was driven in near-despair to a similar stand. In one sure step of dazzling intuition, he hypothesized the viton.

"The secret goes back to our old talks on cell preservation," he explained with ill-concealed excitement to Ann. "The cell can live for hours without proteins and salts, because it has means of storing these nutrients from past meals. But oxygen it must have. The hemoglobin takes up molecular oxygen in the lung capillaries, ozonizes it, and, since hemin is easily reduced, the red cells give up oxygen to the muscle cells that need it, in return for carbon dioxide. After it takes up the carbon dioxide, hemin turns purple and enters the vein system on the way back to the lungs, and we can forget it.

"Now, what is hemin? We can break it down into etiopyrophorin, which, like chlorophyll, contains four pyrrole groups. The secret of chlorophyll has been known for years. Under a photon catalyst of extremely short wave length, such as ultraviolet light, chlorophyll seizes molecule after molecule of carbon dioxide and synthesizes starches and sugars, giving off oxygen. Hemin, with its etiopyrophorin, works quite similarly, except that it doesn't need ultraviolet light. Now—"

"But animal cell metabolism works the other way," objected Ann. "Our cells take up oxygen and excrete carbon dioxide."

"It depends which cells you are talking about," reminded Troy. "The red corpuscle takes up carbon dioxide just as its plant cousin, chlorophyll, does, and they both excrete oxygen. Oxygen is just as much an excrement of the red cell

as carbon dioxide is of the muscle cell."

"That's true," admitted Ann.

"And that's where the viton comes in," continued Troy. "It preserves the status quo of cell chemistry. Suppose that an oxygen atom has just been taken up by an amino-acid molecule within the cell protoplasm. The amino-acid immediately becomes unstable, and starts to split out carbon dioxide. In the red corpuscle, a mass of hemin stands by to seize the carbon dioxide and offer more oxygen. But the exchange never takes place. Just as the amino-acid and the hemin reach toward one another, their electronic attractions are suddenly neutralized by a bolt of pure energy from me: The viton! Again and again the cells try to exchange, with the same result. They can't die from lack of oxygen, because their individual molecules never attain an oxygen deficit. The viton gives a very close approach to immortality!"

"But *we* seem to be getting older. Perhaps your vitons don't reach every cell?"

"Probably not," admitted Troy. "They must stream radially from some central point within me, and of course they would decrease in concentration according to the inverse square law of light. Even so, they would keep enough cells alive to preserve life as a whole. In the case of the rabbit, after the cut cell surfaces were rejoined, there were still enough of them alive to start the business of living again. One might suppose, too, that the viton accelerates the reestablishment of cell boundaries in the damaged areas. That would be particularly important with the nerve cells."

"All right," said Ann. "You've got the viton. What are you going to do with it?"

"That's another puzzler. First, what part of my body does it come from? There must be some sort of a globular discharge area fed by a relatively small but impenetrable duct. If we suppose a muscle controlling the duct—"

"What you need is an old Geiger-Müller," suggested Ann. "Locate your discharge globe first, then the blind spot on it caused by the duct entry. The muscle has to be at that point."

"I wonder—" mused Troy. "We have a burnt-out cinema projection bulb around here somewhere. The vacuum ought to be just about soft enough by now to ionize readily. The severed filament can be the two electron poles." He laughed mirthlessly: "I don't know why I should be in a hurry. I won't be able to turn off the viton stream even if I should discover the duct-muscle."

Weeks later, Troy found his viton sphere, just below the cerebral frontal lobe. The duct led somewhere into the pineal region. Very gingerly he investigated the duct environment. A small but dense muscle mass surrounded the entry of the duct to the bulk of radiation.

On the morning of the first day of the thirty-first year of their imprisonment, a few minutes before the nurse was due with the *skon*

hypo, Ann 'pathed to Troy that she thought the screen was down. A joint search of the glass panel affirmed this.

Ann was stunned, like a caged canary that suddenly notices the door is open—she fears to stay, yet is afraid to fly away.

"Get your clothes on, dear," urged Troy. "Quickly now! If we don't contact the League in the next ten minutes, we never shall."

She dressed like an automaton.

Troy picked the lock on the corridor door noiselessly, with a key he had long ago made for this day, and opened the portal a quarter of an inch. The corridor seemed empty for its whole half-mile length. There was a preternatural pall of silence hanging over everything. Ordinarily, someone was always stirring about the corridor at this hour. He peered closely at the guard's cubicle down the hall. His eyes were not what they once were, and old Blogshak had never permitted him to be fitted with contacts.

He sucked in his breath sharply. The door of the cubicle was open, and two bodies were visible on the floor. One of the bodies had been a guard. The green of his uniform was plainly visible. The other corpse had white hair and a face like a wrinkled, arthritic claw. It was Blogshak.

Two mental processes occurred within Troy. To the cold, objective Troy, the thought occurred that the viton flow was ineffective beyond one hundred yards. Troy the human being wondered why the Outcast had not immediately remedied this weak point in the guard system. Heart pounding, he stepped back within the suite. He seized a chair, warned Ann out of the way, and hurled it through the glass panel. Ann stepped gingerly through the jagged gap. He held her for a moment in his arms. Her hair was a pure white, her face furrowed. Her body seemed weak and infirm. But it was Ann. Her eyes were shut and she seemed to be floating through time and space.

"No time for a trance now!" He shook her harshly, pulling her out of the room and down the corridor. He looked for a stair. There was none.

"We'll have to chance an autovator!" he panted, thinking he should have taken some sort of bludgeon with him. If several of the staff should come down with the 'vator, he doubted his ability to hypnotize them all.

He was greatly relieved when he saw an empty 'vator already on the subterranean floor. He leaped in, pulling Ann behind him, and pushed the bottom to close the door. The door closed quietly, and he pushed the button for the first floor.

"We'll try the street floor first," he said, breathing heavily. "Don't look around when we leave the 'vator. Just chatter quietly and act as though we owned the place."

The street floor was empty.

An icy thought began to grow in Troy's mind. He stepped into a neighboring 'vator, carrying Ann with him almost bodily, closed the

door, and pressed the last button. Ann was mentally out, but was trying to tell him something. Her thoughts were vague, unfocused.

If they were pursued, wouldn't the pursuer assume they had left the building? He hoped so.

A malicious laughter seemed to follow them up the shaft.

He gulped air frantically to ease the roar in his ears. Ann had sunk into a semi-stupor. He eased her to the floor. The 'vator continued to climb. It was now in the two hundreds. Minutes later it stopped gently at the top floor, the door opened, and Troy managed to pull Ann out into a little plaza.

They were nearly a mile above the city.

The penthouse roof of the City Building was really a miniature country club, with a small golf course, swimming pool, and club house for informal administrative functions. A cold wind now blew across the closely cut green. The swimming pool was empty. Troy shivered as he dragged Ann near the dangerously low guard rail and looked over the city in the early morning sunlight.

As far as he could see, nothing was moving. There were no cars gliding at any of the authorized traffic levels, no 'copters or trans-ocean ships in the skies.

For the first time, Troy's mind sagged, and he felt like the old man he was.

As he stared, gradually understanding, yet half-unbelieving, the rosebud in his lapel began to speak.

Mai-kel condensed the thin waste of cosmic gas into several suns and peered again down into the stere-chron. There could be no mistake —there was a standing wave of recurrent time emanating from the tiny planet. The Great One made himself small and approached the little world with cautious curiosity. Sathanas had been badly wounded, but it was hard to believe his integration had deteriorated to the point of permitting oscillation in time. And no intelligent life capable of time travel was scheduled for this galaxy. Who, then? Mai-kel synchronized himself with the oscillation so that the events constituting it seemed to move at their normal pace. His excitement multiplied as he followed the cycle.

It would be safest, of course, to volatilize the whole planet. But then, that courageous mite, that microscopic human being who had created the time trap would be lost. Extirpation was indicated—a clean, fast incision done at just the right point of the cycle.

Mai-kel called his brothers.

Troy suppressed an impulse of revulsion. Instead of tearing the flower from his coat, he pulled it out gently and held it at arm's length, where he could watch the petals join and part again, in perfect mimicry of the human mouth.

"Yes, little man, I am what you call the Outcast. There are no other little men to bring my message to you, so I take this means of—"

"You mean you devitalized every

man, woman, and child in the province . . . in the whole world?" croaked Troy.

"Yes. Within the past few months, my appetite has been astonishingly good, and I have succeeded in storing within my neurals enough vital fluid to carry me into the next sterechron. There I can do the same, and continue my journey. There's an excellent little planet waiting for me, just bursting with genial bipedal life. I can almost feel their vital fluid within me, now. And I'm taking you along, of course, in case I meet some . . . old friends. We'll leave now."

"Jon! Jon!" cried Ann, from behind him. She was standing, but weaving dizzily. Troy was at her side in an instant. "Even *he* doesn't know who Poole is!"

"Too late for any negative information now, dear," said Troy dully.

"But it isn't negative. If *he* doesn't know, then he won't stop you from going back." Her voice broke off in a wild cackle.

Troy looked at her in sad wonder.

"Jon," she went on feverishly, "your vitons help preserve the status quo of cells by preventing chemical change, but that is only part of the reason they preserve life. Each viton must also contain a quantum of time flow, which dissolves the vital fluid of the cell and reprecipitates it into the next instant. This is the only hypothesis which explains the preservation of the giant neurals of the Outcast. There was no chemical change going on in them which required stabilization, but something had to keep the vital fluid alive. Now, if you close the duct suddenly, the impact of unreleased vitons will send you back through time in your present body, as an old man. Don't you understand about Poole, now, Jon? You will go back thirty years through time, establish yourself in the confidence of both the League and the staff, attend the assassination conference, make young Troy choose the red ball again, defend him at the trial, and then you will die in that horrible room again. You have no choice about doing this, *because it has already happened!* Good-by, darling! You are Poole!"

There was an abrupt swish. Ann had leaped over the guard rail into space.

A gurgle of horror died in Troy's throat. Still clutching the now silent rose in his hand, he jammed the viton muscle with all his will power. There was a sickening shock, then a flutter of passing days and nights. As he fell through time, cold fingers seemed to snatch frantically at him. But he knew he was safe.

As he spiraled inward, Troy-Poole blinked his eyes involuntarily, as though reluctant to abandon a languorous escape from reality. He was like a dreamer awakened by having his bedclothes blown off in an icy gale.

He slowly realized that this was not the first time he had suddenly been bludgeoned into reality. Every seventy years the cycle began for him once more. He knew now that seventy years ago he had completed

another identical circle in time. And the lifetime before that, and the one prior. There was no beginning and no ending. The only reality was this brief lucid interval between cycles, waiting for the loose ends of time to cement. He had the choice at this instant to vary the life stream, to fall far beyond Troy's era, if he liked, and thus to end this existence as the despairing toy of time. What had he accomplished? Nothing, except retain, at the cost of almost unbearable monotony and pain, a weapon pointed at the heart of the Outcast, a weapon he could never persuade the young Troy to use, on account of Ann. Troy old had no influence over Troy young. Poole could never persuade Troy.

Peering down through the hoary wastes of time he perceived how he had hoped to set up a cycle in the time stream, a standing wave noticeable to the entities who searched for the Outcast. Surely with their incredible intellects and perceptions this discrepancy in the ordered universe would not go unnoticed. He had hoped that this trap in the time flow would hold the Outcast until relief came. But as his memory returned he realized that he had gradually given up hope. Somehow he had gone on from a sense of duty to the race from which he had sprung. From the depths of his aura-fed nervous system he had always found the will to try again. But now his nervous exhaustion, increasing from cycle to cycle by infinitesimal amounts, seemed overpowering.

A curious thought occurred to him. There must have been, at one time, a Troy without a Poole to guide—or entangle—him. There must have been a beginning—some prototype Troy who selected the red ball by pure accident, and who was informed by a prototype staff of his tremendous power. After that, it was easy to assume that the first Troy "went back" as the prototype Poole to scheme against the life of the Outcast.

But searching down time, Troy-Poole now found only the old combination of Troy and Poole he knew so well. Hundreds, thousands, millions of them, each preceding the other. As far back as he could sense, there was always a Poole hovering over a Troy. Now he would become the next Poole, enmesh the next Troy in the web of time, and go his own way to bloody death. He could not even plan a comfortable suicide. No, to maintain perfect oscillation of the time trap, all Pooles must always die in the same manner as the first Poole. There must be no invariance. He suppressed a twinge of impatience at the lack of foresight in the prototype Poole.

"Just this once more," he promised himself wearily, "then I'm through. Next time I'll keep on falling."

General Blade sometimes felt that leading a resistance movement was far exceeding his debt to decent society and that one day soon he would allow his peaceful nature to override his indignant pursuit of

justice. Killing a man, even a very bad man, without a trial, went against his grain. He sighed and rapped on the table.

"As a result of Blogshak's misappropriation of funds to fight the epidemic," he announced, "the death toll this morning reached over one hundred thousand. Does the Assassination Subcommittee have a recommendation?"

A thin-lipped man rose from the gathering. "The Provinarch ignored our warning," he said rapidly. "This subcommittee, as you all know, some days ago set an arbitrary limit of one hundred thousand deaths. Therefore this subcommittee now recommends that its plan for killing the Provinarch be adopted at once. Tonight is very favorable for our—"

A man entered the room quietly and handed General Blade an envelope. The latter read it quickly, then stood up. "I beg your pardon, but I must break in," he announced. "Information I have just received may change our plans completely. This report from our intelligence service is so incredible that I won't read it to you. Let's verify it over the video."

He switched on the instrument. The beam of a local newscasting agency was focused tridimensionally before the group. It showed a huge pit or excavation which appeared to move as the scanning newscaster moved. The news comments were heard in snatches. "No explosion . . . no sign of any force . . . just complete disappearance. An hour ago the City Building was the largest structure in . . . now nothing but a gaping hole a mile deep . . . the Provinarch and his entire council were believed in conference . . . no trace—"

General Blade turned an uncomprehending face to the committee. "Gentlemen, I move that we adjourn this session pending an investigation."

Jon Troy and Ann left through the secret alleyway. As he buttoned his topcoat against the chill night air, he sensed that they were being followed. "Oh, hello?"

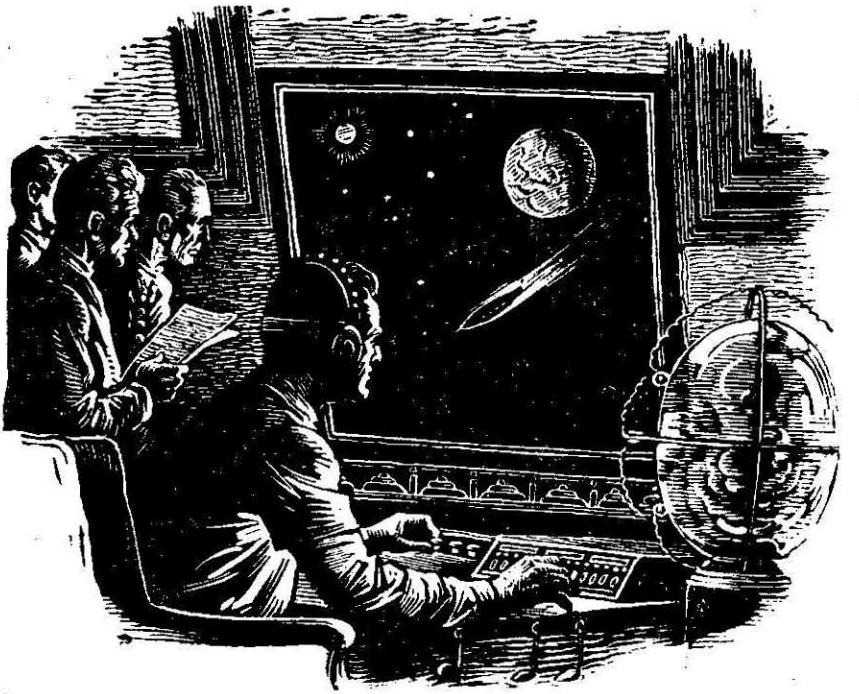
"I beg your pardon, Major Troy, and yours, madam. My name is Poole, Legal Subcommittee. You don't know me—yet, but I feel that I know you both very well. Your textbook on prison escape has inspired and sustained me many times in the past. I was just admiring your boutonniere, major. It seems so lifelike for an artificial rosebud. I wonder if you could tell me where I might buy one?"

Troy laughed metallicly. "It's not artificial. I've worn it for weeks, but it's a real flower, from my own garden. It just won't die."

"Extraordinary," murmured Poole, fingering the red blossom in his own lapel. "Could we run in here for a cocktail? Bartender Fonstile will fix us something special, and we can discuss a certain matter you really ought to know about."

The doorman of the Shawn Hotel bowed to the three as they went inside.

THE END



SMALLER THAN YOU THINK

BY KENNETH GRAY

In a culture that had spread to the stars by the slow, and painful process of spending lifetimes in interstellar flight, the faster than light ship was a wonderful boon—wasn't it?

Illustrated by Orban

When the mile-long ship emerged from hyperspace the video room was crowded to capacity. The planet which was their destination was no longer a mere pip on the detector screen. As a solid reality, it was a beautiful enough sight.

Even from the ship's native Ex-

celsia, a goodly six light-years distant, the spectroscope had hinted at its existence. Its primary sun was of the right type, the most favorable intensity range, the exact spectral age, to favor a heliod planet—one favorable to human life. And if one so existed, in this old-settled region of space, it hardly could have escaped being colonized.

"About seven thousand miles in diameter" murmured the ship's astrophysicist to the captain. Who cared about diameters, thought the assembled dozens of men, this is a hunt strictly for people. "Is there a detectable atmosphere?"

"Certainly. Give me time for analysis. Yes, there's a thick atmosphere. Oxygen—check. Wait a minute—I think I see lights. Sure enough—they look like the old-fashioned electrical kind . . . maybe fluorescent tubes."

Soon they were close enough for direct port views of the strange world. Continents and oceans were swathed in curly wisps and streamers of cloud and the polar snow caps glistened in the sun. There was a dark green sheen of vegetation on the day side, the dark crescent sparkled with the points of light, betrayers of the presence of ubiquitous man.

"Distance please," demanded Captain Keyl of the senior astrogator.

"Less than a million miles," was the prompt reply.

"Good. But slow down to drift speed. Take up an approach spiral. Let's look as much as possible like an ordinary emigrant transport, no use in scaring the livers right out of them."

Almost at once sharp telescopists hailed the approach of a small vessel indubitably native to the planet below. It was hailed again and again as it bore steadily down on them. It was classed immediately as a rocket craft of a type obsolete for centuries of Excelsian history, useful only for trips to the planets, own satellites. When it had come to within less than a hundred miles of them on a long sweeping collision course, it deigned to answer.

"What ship is that? What ship is that? Over to you."

The radioed message, in a form and a dialect known only to the ancient history of Excelsia, brought smiles to many a face. It was probably one of those numerous isolated backwaters of human settlement that spotted the civilized parts of the Galaxy. But it was comforting to know that they had to deal, not merely with humans, but with English-speaking humans.

"This is the ship *Reunion* of the planet Excelsia. What world is this? We wish permission to land."

"This world is Rubal, and welcome to Rubal. May we come aboard?"

"Yes, you may board us. Lights will outline our air lock for you. Do we have your consent to land, then?"

"I will discuss your landing with my government at once. Meanwhile I am maneuvering to board."

During the wait for the arrival of the Rubalian pilots there was plenty of excited discussion among

the assembled scientists and ship's officers in the compartment. Gradually the captain selected a welcoming committee from amongst their number and shepherded them to a wardroom further down in the ship. What kind of people might these Rubalians be? Who, indeed, could tell what strange breeds and strains of Homo sapiens had come into being on the thousands of populated planets up and down the Galaxy, separated as they were by voyages of a lifetime in length?

At long last two tall young men entered through the pressure door set in the bulkhead. Both were simply dressed in close-fitting black knitted clothes, a somber contrast to the varied gorgeous costumes of the ship's company. For a full two minutes they faced each other in silence —the first meeting of two splinters of humanity, each isolated for nearly half of a millennium. At length one of the Rubalians spoke:

"I am Tenant Skuve, of our World Security Bureau. I welcome you to our world in sincere friendship. You may have all the food and other supplies you need. But I warn you that ours is an old and settled planet, and we desire no more strangers looking for land."

"We are warmed by your welcome," answered the captain, "and you need not worry about our wanting any share in your world. This is not an emigrant ship. We have come simply to pay you a visit, one that will be remembered to the end of your history."

"Simply to visit us? But that is preposterous. Have you come far, then?"

"Only for six light-years. That is our own home star that you must have often seen, since it is closest of all to yours. And furthermore, it took us only an hour and a half to make the journey—I mean in real, not apparent time. This, my friend, is the dawn of a new day for the whole human race."

"Yes, I suppose that it is. Do you wish to berth close in?"

"We can berth right on the surface of the planet, that is, if you have enough room near your chief city. You shall find out that this is a very remarkable craft."

When the *Reunion* had found a dock near the Rubalian capital city, a place of no great size by Excelsian standards, when preliminary introductions were over, and when the natural first feelings of apprehension had been stilled; Captain Keyl could relax and go sightseeing. The active management of the expedition devolved on Dr. Emeri Savon, the leading Excelsian intellect in sociopsychology and related studies. He it was, then, who briefed the crew and the "passengers"—mostly the now useless technicians who had built the ship—in their future behavior:

"This is apparently a more retarded culture than ours. We must avoid giving the natives any feeling of inferiority. Don't poke fun, criticize, or tell them how much better we do things in Excelsia. Admire and praise everything that is pointed out to you."

Dr. Savon had cause to remember his own words. In the next three days he had to suppress his impatience with the slow and archaic Rubalian world. Most of the citizens of the capital lived in small individual homes and took some form of ground transport or just walked to the scene of their daily labors. Such labor went on in small establishments, each the property of some man or group of men who operated it without any regard to any all-comprehensive scheme for the planet as a whole. The main Rubalian occupation after the short working day was to gather in their homes or public places, for they were admittedly a friendly and gregarious race, but only for such unrewarding purposes as drinking, dancing, games or small talk. The whole question of government could be covered in a minute—they had no idea of it as an exact science belonging to experts, but seemed to be under the direction of a hereditary ruler whom they called simply the "Chief".

In comparison with Excelsia, where everything, even the weather, had been put under the control and supervision of minutely specializing experts and all integrated in a grand master plan, it was downright depressing. If the word had been in the doctor's vocabulary, he would have called it immoral. But there was at least one pleasant little thought to console him. When regular communications were opened up, the efficient humor technicians of Excelsia would have material to work over for the next generation. Some sort of production ceiling might have to be put on Rubalian jokes.

For the time being it was given out that the Chief, whom no one but the captain had yet met, was readying a grand ceremonial reception for the whole visiting horde in the government hall. For this he had to summon all the dignitaries of the state from unlikely places and odd rural places all over the planet, places where he was assured that these people actually lived, instead of staying near the seat of government where they rationally belonged. Meanwhile all of Savon's fellow-passengers and most of the crew were dispersing in all directions, fraternizing to the limit with the natives, and even drifting far from the city. Most of his fellow-savants were too absorbed to even talk to him on his pocket radio, so in despair he finally advised Captain Keyl to tell their host that less than one third of the crew would attend his banquet, and then wandered out to the local university in search of such intellectual company as the place might afford. But here the expedition's historian had got ahead of him and was the center of all attention. The first settlers of Rubal, like those of Excelsia, had come from Earth and Venus by way of the Cordova system and Procyon V, but whereas the Excelsians had arrived directly from the latter place, the local founders had tarried long on the vast and rich Calydon planet of Sheratan, a place of which Excelsia had as yet no knowledge; and moreover the Ru-

balian colonists had seen or heard many interesting things on the way. Speculation was traded for speculation: the tide of human settlement must long ago have overwhelmed even such faraway systems as Rigel, Polaris, and Antares. Many a well-loaded emigrant ship had stopped at Rubal, leaving some passengers and taking on some—the universal practice everywhere to prevent excessive inbreeding—and had vanished into the unknown on its decades-long journey—long, that is, to the watching stars, but reasonably short to the passengers within.

Savon returned to his quarters within the ship and pondered the Rubalian mentality at length, since it was the key to his part of the mission. At last Captain Keyl called and told him that the Chief had finally set that night as the time of their formal reception and hearing.

"There's something abroad here and I don't like it," he confided to his superior. "I can't give a solid instance for being suspicious, but a little thing here and a little thing there all may add up to something. For instance, why have the natives all exerted themselves so to split up our people and get them into their homes? Would we behave that way toward a bunch of Rubalians?"

"Of course we wouldn't, Savon, but then we're not Rubalians. That's just the tribute that an inferior culture pays to the superior. I thought you were a serious student of history, doctor. But just the same I am not going to neglect any of the simpler precautions. When we leave here tonight I am going to detail a good half of the crew under Norani as watch officer, he's a good fellow in any emergency, even if he is of nontechnical rank. If we don't show up in good shape by sunrise, he'll want to know the reason why, and if he can't frighten the local powers back into reason, he'll just go back to Excelsia and return with the *Reunion* in fighting trim. And when we step out of here, he puts up the electronic barriers. Mind you, I don't expect treachery, but these people could hardly be foolish enough to try anything as long as the ship was not in their hands."

"Very well," said Savon, much reassured. "Now let's see if we can round up a sizable group of our people to appreciate the Chief's hospitality."

Long before the long and leisurely meal had come to an end, Savon had reason to envy those who had escaped it. The local half of it was composed of the great men of Rubalia, who on introduction proved merely to be the heads of different associations of laborers, or else representatives of the men who tilled the soil on an individual and unsupervised basis, which appeared to be the only system of food production known to them.

At long last the final toasts had been drunk and the ultimate sentimental allusion to "Dear Mother Earth, the real home of us all" had been made. *(How long before he would really see the Earth, and what was it like now?)* The Chief,

an elderly man who might have been chosen for his Jovelike head and huge physical proportions, indicated that their eminent guest, Dr. Emeri Savon, vice-director of Primary University and the Supreme Board of Planning and Co-ordination of the planet Excelsia, would favor them with an address of some length.

Savon arose and surveyed his first alien audience. He had looked forward to this hour for a long time.

"Good hosts, fellow-men, kinsmen, for we come of common ancestors in remote worlds, how many must be the numbers of us who work, who invent, who triumph and who sorrow, all unknown to you and to me. Who can say where now are the boundaries of the human race, where and what its greatest achievements are, what wonderful things we cannot share?

"But I get too oratorical. Be patient for a few minutes while I sketch for you the processes which have split our race into so many tiny and unconnected fragments.

"Until some eighty generations ago our species was confined to one planet, the Earth. Now I know it is fashionable in both our worlds to wax nostalgic about the place when we are in certain moods; the grim truth, as written in ancient histories and brought to us through our ancestors, was that it eventually came to seem like a vast prison to them.

"At the earliest point to which the memory of the race reaches, even on that little world the human society was split up into numerous little local groups, each ignorant of the other's existence. Each made what slow progress it could with the best minds and the stored experience that it had.

"Then some of the most adventurous spirits in the more advanced local cultures began to look about and discovered the existence of the others and so all were gathered rapidly into one great community of civilization all over the planet. Now more rapid progress was made, because the pooled activity of all the best minds on the planet was incomparably greater than what they might do separately. But the more rapid conquest of nature that this made possible was incorrectly applied to the problems of living—it was used, first to increase the population of the planet at a rapid rate, and then to fight the battles that inevitably followed. At length the numbers of mankind increased to such an extent that life was less secure than ever before, and even the very exhaustion of the planet's resources was threatened.

"But for some strange reason that we cannot now understand, man simply went on multiplying and fighting. During this period the human communal mind suffered some sort of mental blockade that made it possible to advance and to hold any reason for the overcrowding of the world but the simple fact of overcrowding. Specialists still argue over the problem, but there seems to have been a positive rivalry among different intellectual groups or different geographical sectors of

the planet to invent any theory about the common misery and any solution for it that would avoid the right one, which was always followed by a forceful attempt to enforce the theory and solution on the rest of the community. We may as well accept the theory that a bald statement of the problem as sheer overpopulation would have offended certain obscure tribal feelings that were then very powerful. Even today the people of a newly colonized planet do not feel reasonably content until they have brought up their numbers to the density of the planet from which they came.

"But finally the crisis fathered it's own solution. As a by-product of the constant struggle, not deliberately, crude space travel of a type adequate within the system was developed. Fortunately that system contained one other very fine habitable planet which man could add to his habitable space. So the first two periods of human history, the long Age of the Isolated Cultures and the short but eventful Age of Confusion or Era of the World-Civilization, came to an end when the race burst out of the prison that it's home planet had finally become.

"For a short time the resources of two worlds made an interlude of peace and plenty. But the old tribal competition to see who could outstrip the other in sheer numbers still prevailed, and soon the new home was as crowded as the old had ever been. So the old struggles were revived on a larger and more dreadful scale.

"But by now man had learned from experience that new worlds, if he could reach them, were a guaranteed answer to his problem. He had reason to believe that the rest of the universe consisted of planetary systems similar to his own. Therefore a gigantic effort was made, and a huge part of the economic surplus was consumed, in an effort to develop interstellar flight.

"Finally the so-called zero-zero transport was invented; the ship which traveled at just under the speed of light, but inside of which, in obedience to natural laws, the apparent time of a journey was but a fraction of the real time. Some exploring expeditions were made with it while the search continued for a practical faster-than-light propulsion. But the limit of the inventive resources of two planets seemed to have been reached; so people quite naturally took to the zero-zero transport to colonize virgin systems and so regain the quiet and the plenty that they had come to associate with raw planets. This method still goes on today.

"Now the final effect of this, as we all know, was to throw the human race back to the very first period of its recorded history, the Age of Isolated Cultures. Regular communications could be kept up only between exceptionally close systems. To a group which made a journey of more than twenty light-years, the voyage seemed very short, but actually they were a generation away from their familiar homes and friends. Besides, emigrant ships are customarily broken up on

arrival for the materials and machinery they contain. Likewise, any scheme of government or commerce was out of the question, where a half-century might elapse between the dispatch of an order and a reply. Very soon the anxious hordes of colonizers found that it was not necessary to await the reports of age-long exploring expeditions. Habitable planets were common enough, all they needed to do was head outward and select a star of the correct spectroscopic types, more than two or three tries were unnecessary.

"I have already mentioned the period of intense rivalry between different human groups during the period just before the beginning of interstellar flight, usually arising from different theories about the prevalent shortage of the planetary resources. The zero-zero transport eliminated such rivalries, since any group of people who passionately espoused any peculiar doctrine, whether social, political, economic or a blend of all three; could somehow obtain one of the transports and hunt up some vacant world that they could organize to their heart's desire. If some minority of these colonists, in turn, did not agree with their fellows, they would repeat the process by emigrating again.

"Then too, there still existed old tribal differences in the race which were so profound at that time that different languages were spoken and the folk-customs were still varied. The less successful of these tribes could now rid themselves of the unwelcome company of others by picking out new worlds where they could be themselves. You probably have heard of worlds where our language is not used.

"So for a number of reasons human life spread throughout the system faster than mere increase in numbers would require, has been spreading at almost the speed of light; yet only a very small part of the Galaxy can yet be overrun. So now we have some thousands of worlds, mostly unknown to one another, all their cultures going in random directions, and with the old rapid scientific progress almost at a complete standstill. Do I weary you, your excellency?"

"No, you do not," answered the Rubalian ruler. "Of course all of these things are taught to every child in our schools; but you have a wonderfully crisp way of giving such a long story. Like you, we have often wondered what the rest of the human race was doing, and how their development compared with ours. But you have not yet come to the best part of the tale. How did your people realize the age-long dream of a ship that could travel faster than light, and what has it to do with us?"

"Thank you for your kind attention so far. Now I speak of the peculiar history of Excelsia. While our ancestors, who founded the planet, were not a doctrinaire group; they were chiefly engineers and technicians who wished to establish a world where every hand and brain would be as efficiently

organized and used as was possible. In a short time this aim was realized. After about two centuries they began to think that the long-awaited faster-than-light ship was not going to appear in any part of the system; and in order to give the rest of the race the benefits of our superb technology, we would have to cap it by building such a craft ourselves. Of course most of the experts had said it never could be done, but we believed that it was simply that the task was beyond the means of a single planet.

"By now our efficient organization had given us an enormous economic surplus which we could divert to this purpose. Hundreds of thousands of people were born, schooled, worked, exhausted myriads of false leads in research and handed the problem down to their children. Eventually about half of our adult population was engaged on this project. Finally we had unlocked the secrets of hyperspace and the ship *Reunion*, the first of fleets yet to come, took shape.

"Now I have only to explain to you your part in the birth of the faster-than-light ship and the coming of the new civilization. Inasmuch as by now there must be some thousands of inhabited worlds, it would take an immensely long time for the new type of transport to become known to all of them. So it is necessary that the propagation of this discovery must be carried on with the same sort of intense effort that created it. You have the resources here and much of the skilled labor to build another ship similar to the *Reunion*. We will give you all the necessary information, at no cost to you whatsoever, and also we will leave here the necessary technicians to oversee its construction and instruct you in its navigation."

At this point Savon paused for the expected burst of shouted thanks and applause but the hall was embarrassingly quiet. A small cloud of worry arose in his mind; either he had misjudged the Rubalian psychology, or perhaps they were too stupid or too polite to take the cue. So he continued.

"We will exact only one consideration from you in return. When your craft is complete, you must search out another inhabited world and teach them to build such a ship in your turn. Thus, each world teaching one, the whole human sector of the Galaxy will soon possess the new ships and the new unified human culture will be born."

Dr. Savon sat down and there was a light patter of hand-clapping about the room, which tapered into a deep silence when it was seen that only the Excelsians were in the act. After a painful interlude the Chief nodded to an elderly native who stood and faced Savon.

"Our learned visitor from Excelsia has at length told us two things: one of which we already know, of the present isolation and stagnation of the human race; and one of which is obvious, that his people have at last invented the ideal faster-than-light ship. But can he tell us of any happy result,

any positive and total good, that can come of it?"

The sociologist was thunderstruck. In his whole lifetime, no one had ever thought of questioning the Great Design which was the mainspring of life for his entire world. He groped for a reply that fitted the questioners.

"The whole level of human culture will be raised," he began. "The most backward worlds will be able to share at once in the progress of the more advanced ones." No, that wasn't the right thing to say, that was reminding them that they were a most backward world; he must get a grip on himself and continue. "We don't know, for one thing, what is going on around the fringes of civilization. We get vague and roundabout stories that from time to time contact has been made with intelligent but nonhuman races. With the absence of control over the behavior of men away from their home planets, such contacts have usually ended in a typically

human way, that is, the nonhumans have been looted, dispossessed and enslaved. So far, so good, while the alien races in question are inferior, or at least weaker, than man. But when may we brush up against a stronger one? Some fine day we may find a tide of extermination rolling over all of us because some lot of moronic adventurers have pricked the skin of a superior culture. I do not need to mention the purely moral evil of this, but some sort of central authority should stop it. And need I trouble to speak to as intelligent a people as you of the benefits of trade? Of fast communications, of being able to see and receive word from the colonists whom in the future you may send across space? What of those of you who are intellectuals, can you resist the hunger to explore, to learn more about the many-colored branches and varied cultures that our civilization must have in thousands of systems? That alone should make our work worth while. However, I should like to hear any specific objections that you may still have."

The old fellow who was evidently the native spokesman had remained standing meanwhile and began to reply in a slow and dignified manner.

"Our visitors show that they have a thorough knowledge of the history of our race back even to the days when it was confined to but one planet of one system. It is good that we should still remember and still think about those times, because it is the only trustworthy guide we have when we try to foresee the shape of things yet to come.

"At first some good things may flow from widespread travel and commerce throughout the system, though I admit I am a little curious as to what the merchants may adopt as money. In my own lifetime I would expect nothing but benefits from your invention. But man is still man, and from his past record we may expect other results.

"You speak of a universal government which will repress the looting of weaker races and perhaps attempt to do other necessary things. This would be nice, but how is such an authority to arise? From history we know that it can be in but one of two ways; either there must be voluntary union under some very real and threatening danger from the outside, by which time it may be too late; or else one community more determined and more powerful than the others will subject all of them to its tyrannical rule. This last is much the more likely, and you are offering any such conquerors as may be, just the one implement they need for a plan of universal conquest. Recollect, if you know the past so well, that every new invention which widened the range of travel—the sailing ship, the steamship, the airplane, or spaceships, finally only increased the space over which wars could be waged. In time there even came to be fighting between colonists on Venus and their mother planet. Only in the lifetime distances that separate system from system today had absolute peace finally been

found. Now there is no reward in the conquest of weaker worlds by the stronger, for what tyrant can live so long as to see the tribute brought to his feet?"

"Neither can your new ship stop any worrying about hostile contact with some superior race of beings, and I admit that is a possible danger. We may be pretty sure that no such race exists in the closer regions of the Galaxy, that is, within the area that human settlement will overrun in the next few thousand years, because if they did we would have met them already. And where do your profoundest thinkers, like ours, suppose that such a race is most likely to be found? Why in the older systems nearer the center of the Galaxy, where no zero-zero ships are going to penetrate for at least fifty millenniums as yet. But you would have us run headlong into them at once, before we are nearly equal to them in numbers or in technology.

"Now what is the present utility of the zero-zero transport? It exists chiefly to provide escape for the more adventurous denizens of overcrowded planets. That purpose it fills as admirably as would your ship. Today any shipload of emigrants knows that space is strewn with desirable but unpopulated worlds, and they can find and settle one without hindrance if they but find it. But what will be the situation when your spaceship comes into general use? A greedy and ambitious gang of men can become the owners of a whole world, yes, of dozens of worlds, simply by reaching them first. At once the whole universe would become property, and the Galaxy would be full of wandering land-hungry colonists and bitter battles over foggy claims. I could think of many other objections, but I think I have outlined our state of mind. We do not as yet wish to possess or use your fine new spaceship, much as it grieves us to disappoint you in your truly fine and generous enthusiasm. With many thanks, we decline."

The ancient one sat down. Savon and all his compatriots for the nonce were frozen to their chairs by this unexpected rebuff. At last the captain found his feet and his voice.

"Your excellency," he croaked, "is this the final decision of your government, of your people?"

"It is so."

"Then," roared the spaceman, "We shall leave here at once and try the people of another world. And wherever we go, we shall leave word that your planet does not care to be molested by outsiders."

"It will not be as simple as all that," replied the Chief. "To put it bluntly, you will remain here and so will your ship, and you shall stay forever. It would do us no good to let you go and alter the shape of things in the rest of the universe. Nor would there be much conviction in the views that we hold, if we did not do everything in our power to stop you. But you are not entirely prisoners, all your lives you will be free to come and

go, and have every liberty of a citizen of Rubal."

The captain had been raised to his rather low boiling point. "Stop us, would you? Sure you can, for about five hours. But it so happens that I considered something like this piece of treachery, and so we left a strong guard on the ship. The electronic barrier is up, and you can't get through it, and if we aren't safe on board in the morning, they'll simply go back home and fit out a raid that will bring you to your senses. So you better think twice!"

"Oh yes, the ship," mused the native ruler. "That thing. Well, we are neither a stupid nor a cowardly people, and there are some interesting plans we had worked out in case our main method failed. By the way, do you recognize this man?"

The captain turned about and was confronted by Noram, the watch officer. But he was smiling into the eyes of the Chief.

"Everything is under control on the ship, your excellency. The barrier is now down."

"What about the rest of your watch?"

"They'll sleep heartily until morning, but somebody had better carry them out of it right now. I just put a little sedative in the tea urn."

"What in the Magellanic Clouds is all this about?" piped the angry Excelsian captain.

"Sit down," commanded the Chief. "There is quite a lot to explain. And we wish to drop our mask of innocent surprise, our airs of naive wonder at the miraculous Excelsians and their ship. Such poses are not becoming to us.

"You see, about three centuries ago an emigrant ship from the Altair system came and circled about our world. They had a strange tale to tell us, a story of a planet they had just visited where all the surplus energy of the people was being given to a single monstrous purpose—the invention of a ship that would travel faster than light. They were very angry, too, for some of their best technicians had been lured away from them at that world with promises of rich rewards. Without those very necessary technicians they did not feel that they could successfully go on and establish a colony. So they stayed, in fact, some of them were my ancestors, and the ancestors of Noram, for like others of your people, he is one of ours.

"For generations our whole society discussed the pro and the con of your project and finally we came to about the same state of mind that we have tried to explain to you tonight. The next thing was to consider some way of stopping it. Our first step was keeping you under constant observation. A zero-zero ship could make the journey to Excelsia and back in about twelve years, sending our operators to the planet itself in small rocket craft while it remained outside the detector range. Each trip some stayed and worked their way into your so-

ciety and even into your project, while others returned home to report and to receive our thanks. We had men who were willing to devote the best years of their lives to this. Thus we knew when you had finally achieved success, and also learned of your determination to visit our world first of all, which we had always hoped, seeing that we were your closest neighbors in space.

"This is a hard thing for us to do, and a hard thing for you to take. I almost wish you had come to us as murdering pirates or even as grasping tradesmen, instead of the honest and confiding souls that you are. But our decision stands."

"But you can't keep our people at home from building another ship!" bellowed the captain.

"Certainly there is going to be another ship. Seeing that all your ablest technicians are being held here, it is going to take a long time. But we will be watching that one, too. Most likely it will come here, also, filled with curiosity about the fate of the missing first expedition. If it goes elsewhere, we shall intercept it, for now we have the first model.

"Meanwhile, we recognize that you have a right to some of your fears. We mean to carry on a reconnaissance of space for some distance around the fringe of civilization, just in case there is some danger there. Then your ship will be safely stored away. Some day mankind may have urgent need of it, perhaps some day he may conceivably be ready for it.

"I imagine we may be damned through all eternity as narrow enemies of progress. But we have here too vivid a memory of the past of our race, of the days when man's inventiveness too far outstripped individual self-control. Civilization is assured of comfort and security, what it needs most now is a long rest."

"They haven't licked me yet," grumbled the captain to the ashen-faced Savon in an undertone. "I'll be the loudest voice they ever had on this planet. I'll outshout the whole nine hundred million of them. I've changed people's minds before. You're going to help me, aren't you? It's more in your line."

"Yes, I suppose I have to," said the doctor. "But there is some hope in psychology. They can't all be so high-minded and noble here more than anywhere else. That ship equals power unlimited for anybody who lays his hands on it, and there are going to be a lot of itching hands on Rubal from now on and forevermore."

"Don't bank on it much, doctor. They seem like a pretty determined bunch to me. And don't tell me they aren't clever in their way!"

"Somehow I don't feel like arguing with them any more just now. We worked all our lives on a faster means of getting around the universe. But I guess the universe is just a bit smaller than you think!"

THE END

DAWN OF NOTHING

BY A. BERTRAM CHANDLER

The Great God ARP was a little understood diety. But it was a time of little understanding, save in one house where the old was studied.

Illustrated by Cartier

Perhaps it was the wind that deflected the arrow ever so slightly. Perhaps it was that old Maluph, Master Fletcher to the People of Bart, had let his craftsman's hand shake a little in the fashioning of this one shaft. Perhaps it was that Enery, Bart's chief huntsman, had taken aim and let fly too hastily.

But Enery himself had another explanation. He was to blame—but his culpability was more than a mere matter of aim too quickly and carelessly taken, of bow insufficiently bent. He was to blame because, last night, he had deliberately neglected the worship of ARP. And ARP the Watchful, ARP the All-Seeing, had overlooked neither the slight nor the quarrel between Enery and Pardi, Hereditary Warden of the God, that had preceded it. He had watched, with divine disapproval, the deliberate abstention from the propitiatory rites of the Shielded Light, the Extinguished Fire. And so ARP, Guider of the Missile, had signified his extreme displeasure by withdrawing his benign influence from the feathered shafts in Enery's quiver.

The stag, a short length of arrow protruding from its flank, sprang high into the air. The hunter hastily snatched another arrow from his quiver, fitted notch to bowspring, drew back swiftly to his right ear. But he was too late. Scarcely had the animal's feet touched earth before it had bolted into the forest. The sound of its passage through the undergrowth diminished, faded fast, as trees and shrubs and bushes were interposed between the hunter and his quarry.

Enery returned the arrow to his quiver, slung the long six-foot bow over his shoulder. His right hand went down to the knife in the sheath at his right side. His thigh muscles tensed as he fell into the runner's crouch, started to follow the stag. Then he remembered.

"Great ARP, your pardon," he

muttered. And, standing alone in the sunlit field at the forest's verge, he went through the daylight ritual. Through ringed thumbs and forefingers he stared solemnly at the cloudless sky. Still looking up, he brought his hands down from his face, clapped them sharply five times. And, his face passive, he thought: *But why, oh ARP, must your wardens always be such fools? Take to yourself* men *and we will respect them and respect you all the more . . .*

He was careful to keep his bearded lips motionless. ARP sees all, hears all, but the thoughts of men are a mystery to him. Thus it was that the Ancients fell.

Enery, having slipped with practised ease through the brief rites, took up the chase. The trail was easy to follow. The stag had been bleeding copiously. ARP or no ARP the arrow could not have been badly aimed. The hunter found himself regretting the time that he had wasted at the forest edge. As he ran he remembered his bitter argument with Pardi, the warden—the quarrel during which he had asserted that ARP was a fit God for women and children and fat, priestly men, but no deity for the warrior or the hunter. He would never have gone so far had he not been sure that the grizzled Bart secretly agreed with him. Bart, as Chief, would find it impolitic to challenge the theocratic power so intimately bound up with his own, lest, by so doing, he weaken his own authority. He had no objections should others do so. He had even been known to protect heretics from the wrath of the followers of ARP—his protection consisting of a plea for tolerance, the invocation of the vague yet universally respected principle known as the Magnic Charter. And if the heretic had been, like Enery, a strong man armed, his heresy had gone unpunished.

It was a pity that most of such heretics had been married men whose wives had bleated tearfully for a return to the flock of Pardi.

A briar tendril curled around the hunter's ankle, brought him crashing heavily down. Luckily for him the bushes broke his fall. He scrambled to his feet, bleeding from a score of scratches—his scanty summer garment of light skins was not much protection—carefully disentangled the string of his bow from the sharp thorns. He was almost decided to leave it there—here, with the trees close together and but a narrow passage through the bushes left by the wounded stag, it was a serious encumbrance. But he did not want to lose it. There were things in the woods—some said it was the wild dogs, but why should *they* do anything so pointless?—that carried off for their own purposes any man-fashioned stick.

So he pushed on, hampered by the long bow, alert for the frequent bright splashes on leaf and mossy ground. The trail was growing old. Already great fat-bodied flies were feasting on the spilled blood, rising with resentful buzz at his approach, falling back again to their meal after his passing. But he dare not hurry. Even should he keep his rebellious mind from straying from the business on hand, he dare not hurry. A broken leg, a seriously twisted ankle, could well mean his death. By day there were the packs of dogs—although they, as a rule, preferred more open country. And both by day and night there were the tree cats. If he failed to return from this expedition, then Pardi, surely, would attribute his disappearance to the wrath of ARP.

Come orf it! he thought in the

vernacular of his people. *Liven if the warden is sweet on young Lisa there ain't no need ter think abaht it orl the time, ter let it put yer orf yer stroke. The main thing is ter get that ruddy stag afore them ruddy cats gets 'im first!*

Doggedly, he pushed on. The trail became fresher again. There were gouts of blood that had not been found by the carrion flies. There were bruised and broken stems with the sap still oozing from the fractured ends. And there was, faint but growing louder, the sound of a heavy body forcing its way through the forest.

And this sound suddenly ceased.

Enery drew his knife. He pushed on boldly, perhaps a little carelessly. He noticed that the undergrowth was thinning, that the trees were now sparsely spaced and somehow sickly. But he failed to draw the obvious conclusion.

The dwelling of the Ancients that had once stood there had long vanished. Perhaps the failure of ARP's protection had let it be swept away like a dead leaf before a gale. Perhaps the infinitely slow, infinitely ruthless strength of growing things had leveled its walls over the course of centuries. But although the building itself was gone, the artificial caverns beneath it remained. And into these, following his quarry, fell the hunter.

It was dark when he recovered consciousness.

In his nostrils was the scent of death, of once hot blood gone cold and stale. Beneath him was something soft yet firm, the carcass of the stag. His exploratory hand touched the antlered head. He was briefly thankful that he had not fallen on to those branching, dangerous weapons.

Right above him was a patch of pale light. Silhouetted against it were the leafy branches of trees, among which glimmered a few dim stars. And there was something scrambling in the aperture, something that uttered a low mewling sound.

The hunter fumbled in his pouch. He pulled out his flint and steel. He smote the crude wheel with the palm of his hand. In the light of the sparks the green eyes of the big cat in the opening glowed balefully. Enery could see no more than a dim outline—but he sensed that it was tensed for a spring.

But the tow caught. It smoldered at first and then, after more than a little blowing on the part of the fire-maker, burst into flickering flame. The hunter thrust up his crude, feeble torch. He was just in time. The big cat snarled, showing its sharp white teeth. It slashed out and down with a razor-clawed fore paw. It hit the torch, sent scattering a shower of sparks, but did not extinguish the flame. It snarled again—and there was something of a scream in the ugly sound. There was a frantic scrabbling of the three uninjured paws as it backed away from the hole. And only a stink of burned fur remained.

"May ARP let you be smitten, you mucking, dirty swine!" shouted Enery. He jumped down from the

carcass of the stag, landed, with a loud crackling, in a pile of dry debris. He tried to drag the stag away from under the opening, but it was too heavy. It was a pity. It meant that much good meat would be spoiled.

Working fast—for he heard the cats prowling and crying to each other overhead—he piled the debris high on the body of the animal. He smote his wheel again with the palm of his hand. This time the tow caught fast and easily. He blew upon the glowing smolder until he had a flame. This he applied to the bonfire that he had built on top of the dead stag. It roared and crackled into flaming life. The smoke and flames rushed up through the opening. A draft of colder air came in from somewhere, replacing that lost by convection. There was no danger of suffocation—and the night-prowling cats would never dare a leap down through the blaze.

Enery grinned. He was safe for the night. The smell of roasting venison was savory in his nostrils—he hoped that it would be equally savory in the nostrils of his enemies. He drew his knife and hacked for himself a large steak, impaled it on a long, pointed stick. He sat down, the meat extended to the fire on the improvised fork, and waited for his supper to cook.

It was not until he was eating it, some minutes later, that the stench of burning meat drove him away from the fire, prodded him into an investigation of the place into which he had fallen.

It must have been used as a storeroom of some kind. There were boxes—or what was left of them—all packed with sheet after sheet of flimsy fabric. Unlike some of the material left—and found now and again by lucky discoverers—by the Ancients, it was useless for clothing or any kindred purpose. It was dry and brittle and tore easily. It had been disturbed by rats and other small beasts who had shredded it and carried it away to their nests. And in one or two of the boxes the rats themselves had nested. But it burned. Useless it was for anything but that. It burned well.

Enery was disappointed. He had known others who had made similar finds, who had stumbled upon storehouses of all kinds of useful tools and weapons. He stood there in the light of his flaring fire, tearing with his teeth at the hunk of meat held in his right hand, holding a sheet of the useless fabric in his left. He looked at it contemptuously. Its yellowed surface was marred with little black marks. It was neither useful nor ornamental. He screwed it into a tight ball and cast it on to the fire.

But there must, he told himself, be something of value stored here. He lifted one of the boxes, intending to tip it over and spill its contents on the floor. But the sides burst as he was starting to do so. And in the box were still more of the sheets of fabric—but these were themselves boxed in a binding of some stiffer material. He opened them, looked through them with intolerant ignorance. There was one

that appealed to him. It had pictures in addition to the meaningless little black marks—pictures such as William, the artist, could never hope to equal. There were men there, strangely clad and bearded. And there were women, attired as strangely as the men or naked, and with a slender grace that had passed from the world with the passing of the Ancients. The little black marks may have been meaningless to the hunter, but the pictures stirred something deep and lost in his nature, were magic casements opening wide on fairy lands far beyond his limited ken.

Hastily, almost surreptitiously, he stuffed the little box into the pouch at his belt.

There were other little boxes with pictures in them. But these were ugly, meaningless. They were no more than lines and circles—and the clearest of them seemed to be depictions of fantastic and graceless constructions. But they might, Enery decided, have some value or interest. He would take them to Bart. Even though the stag was lost—or most of it—he would not return entirely empty handed.

He slept a little then, stretched out on a bed made of the pieces of flimsy fabric piled high in a rectangular pile. It was not too uncomfortable. And it was almost his last sleep. He was awakened by a spasm of violent coughing. His smarting, smoke-filled eyes opened on what, at first, seemed to be the Hell promised for all those who did not follow ARP. The cavern was filled with a ruddy glare, with scorching heat. The flames had spread from the fire to the dry debris with which the floor was littered.

Enery staggered to his feet. He forgot the little boxes of fabric that he had intended to take out with him, that lay beside his bed, soon to be consumed by the hungry flames. He remembered his bow that, as always, had been beside him as he slept. He snatched it up. And, more by instinct than by conscious volition, he turned his face to the indraught of cold air, started to stumble in the direction from which it was coming.

The heat of the fire was fierce on his back when he found the door. It was of thick timber, bound with metal. Long ago, when the Ancients had made it, it had been strong. Now it was rotten, yielded at the first, preliminary nudge of the hunter's shoulder. And Enery fell out on to the dew-wet grass, used his last reserves of energy to crawl away from the tongues of fire that licked out after him.

And it was daylight, and the danger from the cats—although still to be reckoned with—was greatly lessened.

After a short rest the hunter began his trudge back to the village of Bart.

"And wot's this I 'ear?" demanded the chief. "My best 'unter back from the chase wiv nuffin'? I tell yer, Enery, it won't do!"

Enery looked back at his master. He looked at the little eyes, half hidden by the grizzled tangle of hair

and beard. He thought that he detected a twinkle, belying the severity of the chief's tone.

"Sorry, guv'ner," he said. "I got a stag—a big 'un—but 'e fell into one o' them old caves wot the Old 'Uns used ter make. Aht in the woods, it was. I'd chased 'im for miles, too, follered 'is trail, like. 'E was bleedin' 'eavy, see? An' I was a bit careless like, an' fell in arter 'im an' laid myself aht. An' when I come round the 'ole wood was alive wiv bleedin' cats. So I 'ad ter light a fire, see? An' the ole stag . . . well, 'e got burned up."

Pardi interrupted. He was standing beside the chief. At the sound of the high-pitched, womanish voice Enery looked at the warden with disfavor.

"Thus it is," cried Pardi, "wiv those 'o don't show ARP 'is proper respects. 'E don't guide their arrers, 'E don't. 'E don't put out the fire for 'em—not 'im! Not even when the fire is a-burning up food for the chief's own table. 'E don't never forget the unbelievers. 'E lets 'em come 'ome empty-'anded an' larfs."

"Empty-'anded, is it, yer little, sawed-off runt?" demanded the hunter. "Empty-'anded my left foot! Look, guv'ner! I found this for yer! I brought it back for yer!"

He fumbled in his pouch, fetched out the little box. Curious, Bart took it, and his big, clumsy seeming hands handled it with reverent care.

"A book," he said. "One o' them books wot the Old 'Uns made." He opened it, leafed through it. "An' picshers!" he cried. "Reel picshers! I must show young William this. 'E carn't do nuffin like it!" The deep-set eyes behind the gray, matted hair gleamed lecherously.

"Lemme see! Lemme see!" clamored Pardi, standing on tiptoe to peer over the chief's shoulder.

"Garn! Yer dirty old man!" growled Bart. "This ain't for the likes o' you. Yer knows as 'ow the wardens 'as got ter be pure in mind an' body!"

"That ain't nuffin ter do wiv it! This book should be put among the uvver treasures of ARP, for 'Is safe keeping."

"So the warden of ARP can feast 'is dirty old eyes on it yer mean. No, Pardi, you ain't gettin' it. An' I ain't keepin' it—more's the pity. This 'ere book is goin' on a long trip termorrer—it's 'igh time that I called on them two Mack brothers. They're fair batty over things like this, the pair of 'em. An' since my own smith can't turn out a decent pot or kettle to save 'is life—then your pore old chief 'as got ter go out of 'is own country to barter for 'em.

"You can go," he concluded. "No, not you, Enery. You stays 'ere an' 'as a sup o' beer along o' me. An' we'll look at these 'ere picshers while we 'as the chance."

Two days' riding it was to the Village of Mack. Two days, that is, provided that all went well.

But the rarely used road was in a shocking condition, and all its inequalities had been baked hard by the late summer sun. This did not

delay the dozen young men—led by Enery—of Bart's mounted bodyguard. They could have made the journey in half the time, but the speed of the party was, of necessity, slowed to the pace of the chief's gaudily painted caravan. He was an old man, he was fond of saying, and liked taking his comforts with him. It would have been better if his blacksmith, and not his youngest wife, had been on the list of comforts. For the rear axle of the cumbersome vehicle broke, and it took Enery and his companions all of six sweating hours to effect crude and temporary repairs.

The first night they camped by the roadside, several miles short of the Village of Les, in which settlement they should have spent the night. And nobody got much sleep. One of the rare nocturnal packs of hunting dogs was on the prowl and laid siege to the encampment. With a fire, and with twelve armed men, there was little danger. But there was no rest.

At the Village of Les there was a brief halt for gossip and refreshment, for the proper repair of the broken axle by Les' smith. And Les and Bart had to waste an hour or so in gloating over the pictures in the book.

Perhaps Bart would have stayed there the night, but the other chief obviously desired the trophy that Enery had brought back from the cavern of the Ancients. He was offering quite fantastically high prices in fowls and eggs—both of which commodities Bart had in abundance in his own country. And the name of Les and his people was a byword for thievery and all kinds of dishonesty. So Bart, at last, gave the order to push on.

Again they would have camped by the road. But the Romans were out—a war party of at least twenty bucks. Enery saw the dust raised by their ponies' hoofs whilst they were still miles distant. And when they came sweeping across the undulating plain, at right angles to the road, the hunter and his men were ready for them. Some—together with Bart and his wife—had taken cover in a clump of trees. Others were hiding behind the caravan. As soon as the raiders came within range they were greeted with a shower of arrows. A lucky shot—*an' I didn't pray to Mr. Bleedin' ARP neither,* thought Enery—took their leader in the throat. He fell from his pony, and the animal came to an abrupt standstill, stood nuzzling the body of its late master.

"'Old yer fire!" shouted Bart to his men. "Don't rile them baskets any more. Let 'em take their chief away an' they won't be back till they've picked a new 'un!"

And it was so.

And Bart decided, wisely, to keep moving, as fast as possible. To arrive at the Village of the Mack Brothers in the early hours of the morning was better than not to arrive at all.

The village, save for the watch, seemed to be sleeping when the little procession creaked and plodded up the one narrow street. The thatched roofs on either side were humped

dark and ominous against the stars. And there were those in the bodyguard who remembered, with a superstitious shudder, that neither Mack the Elder nor Mack the Younger followed ARP, that they had long held the reputation of being sorcerers. This, in itself, was nothing—but it was said that the Mack sorceries worked.

Halfway up the street, standing on a slight eminence, was a house larger than the others. And there was someone awake in this house—someone awake and working. Light streamed through the crevices of a shuttered window, and there was the sound of metal beating on metal.

Old Bart, perched high on the driving seat of his caravan, gave the order to halt. He threw down the reins, and they were caught by one of the bodyguard who had already dismounted. He clambered down from his seat.

"They're up yet," he growled.

Slowly, ponderously, he stumped to the door of the house. He hammered upon it authoritatively. Somebody—a small, thin silhouette against the light from within—opened it.

"Bart," said the chief. "Bart, Leader of the People of Bart, to pay 'is respects to Old Mack an' Young Mack, Chieftains o' the People o' Mack."

The figure in the door turned, shouted back to the interior of the house: "It's Bart, father!"

"This is an odd time to come a visiting!" replied a deep male voice. "All right, Beth. Ask 'im in!"

"But he's got about half a hundred men wi' him!"

"They can't come in. Leave 'em to find some place to sleep."

"Orl right," growled Bart. "Orl of yer find some place ter kip—an' don't let me find any of yer in my caravan! 'Op it!"

As the huntsman turned to go the chief called him back.

"No, Enery. You stay wiv me. 'Ave yer got the book?"

"No, guv'ner. You 'ave."

"So I 'ave. An' you'd better leave yer bow an' arrers outside—these 'ere Mack chiefs are rather fussy."

It was light inside the House of Mack—so much so that the two visitors blinked, dazzled. Here were no crude, tallow candles such as lit the homes in their own village. There were, instead, lamps of brass, the flame shaded with a shield of translucent horn.

Enery looked at the girl who had let them in. Slight she was, red haired and freckled, with sea green eyes. She was tall, too—far above the average. With her the dumpy womenfolk of the People of Bart compared most unfavorably. She was like—he searched his mind for a simile—she was like the women in the pictures in the book.

Gravely, she returned his stare. Then she turned abruptly. She led the two men along a short passage, opened a door leading into a large room. She motioned them in.

It was a strange room. It was half study—although the word had long since passed out of use—and half workshop. There were shelves along two of the walls, and on them

were rows of the little boxes of fabric called books. And in one corner of the room there was a forge, and an anvil. At this Young Mack was working, beating away at a piece of metal.

Old Mack—his silvery hair clean, his lined face shaven—advanced, with outstretched hand, to greet them. His pale gray eyes were friendly and it seemed to Enery that he treated Bart with an affectionate respect.

"Well," he said, "an' what can I do for ye?"

"I've a present for yer, Mack—and an 'ard enough time I 'ad bringing it! Mind you," continued Bart hastily, "even though it is a present I shouldn't say no to a few o' yer brother's good pots and pans in return."

"An' let's see your present first, Bart."

"'Ere!"

Old Mack took the little box of fabric.

"Anither book!" he breathed.

"Book?" barked Young Mack. Black haired, swarthy, sweating from his fire, he came to look. He looked over his brother's shoulder. Then he spat disgustedly. "More o' yon muck!" was all that he said. He went back to his workbench, busied with what looked like a sort of water wheel with metal blades.

"Wot does it say?" demanded Bart. "Wot does it say?"

"'Tis a song. 'Tis one o' the songs of Ancients. Ay, 'tis strange stuff—but not wi'out its ane beauty. But even I canna fathom what yon man who wrote it was driving at."

At his bench Young Mack was pouring water from a jug into a polished copper cylinder. He screwed home the cap of this cylinder. The girl Beth was beginning to take down the shutters from the windows. Enery was helping her.

"Ay, an' the pictures," went on Old Mack. "'Tis a bonny wee book, friend Bart, an' Ah'll see what ma brither has tae gi'e ye."

"An ye're barterin' ma guid pots an' pans for yon trash?" demanded the man at the workbench.

"It is getting light, Uncle," said Beth from the window.

"Never mind that. Fetch me fire, girl, tae put under ma wee boiler!"

"But wot does it say, Old Mack?" demanded Bart. "Wot does it say? If it is a song, carn't yer sing it?"

There was a pause, a silence, broken only by the faint hiss of escaping steam. The pale light of early morning streamed through the windows.

"'Tis not that kind o' song, Bart."

The old man began to mumble. All that his hearers got was a sense of rhythm. He was reading for himself alone. Then, freakishly, his voice came loud and clear.

"The Stars are fading, and the Caravan

Starts for the Dawn of Nothing . . ."

"Hurry! shouted Young Mack. "More fire! Quick!"

A jet of steam impinging on its blades, the little wheel was revolving rapidly.

THE END

THE MONSTER

BY A. E. VAN VOGT

***Raising** the Monster from the dust of a dead planet proved a dangerously one-way affair. They could raise him, but laying that ghost wasn't so simple—*

Illustrated by Cartier

The great ship poised a quarter of a mile above one of the cities. Below was a cosmic desolation. As he floated down in his energy bubble, Enash saw that the buildings were crumbling with age.

"No sign of war damage!" The bodiless voice touched his ears momentarily. Enash tuned it out.

On the ground he collapsed his bubble. He found himself in a walled inclosure overgrown with weeds. Several skeletons lay in the tall grass beside the rakish building. They were of long, two-legged, two-armed beings with the skulls in each case mounted at the end of a thin spine. The skeletons, all of adults, seemed in excellent preservation, but when he bent down and touched one, a whole section of it crumbled into a fine powder. As he straightened, he saw that Yoal was floating down nearby. Enash waited

till the historian had stepped out of his bubble, then he said:

"Do you think we ought to use our method of reviving the long dead?"

Yoal was thoughtful. "I have been asking questions of the various people who have landed, and there is something wrong here. This planet has no surviving life, not even insect life. We'll have to find out what happened before we risk any colonization."

Enash said nothing. A soft wind was blowing. It rustled through a clump of trees nearby. He motioned towards the trees. Yoal nodded and said:

"Yes, the plant life has not been harmed, but plants after all are not affected in the same way as the active life forms."

There was an interruption. A voice spoke from Yoal's receiver: "A museum has been found at approximately the center of the city. A red light has been fixed to the roof."

Enash said: "I'll go with you, Yoal. There might be skeletons of animals and of the intelligent being in various stages of his evolution. You didn't answer my question: Are you going to revive these beings?"

Yoal said slowly: "I intend to discuss the matter with the council, but I think there is no doubt. We must know the cause of this disaster." He waved one sucker vaguely to take in half the compass. He added as an afterthought, "We shall proceed cautiously, of course, beginning with an obviously early development. The absence of the skeletons of children indicates that the race had developed personal immortality."

The council came to look at the exhibits. It was, Enash knew, a formal preliminary only. The decision was made. There would be revivals. It was more than that. They were curious. Space was vast, the journeys through it long and lonely, landing always a stimulating experience, with its prospect of new life forms to be seen and studied.

The museum looked ordinary. High-domed ceilings, vast rooms. Plastic models of strange beasts, many artifacts—too many to see and comprehend in so short a time. The life span of a race was imprisoned here in a progressive array of relics. Enash looked with the others, and was glad when they came to the line of skeletons and preserved bodies. He seated himself behind the energy screen, and watched the biological experts take a preserved body out of a stone sarcophagus. It was wrapped in windings of cloth, many of them. The experts did not bother to unravel the rotted material. Their forceps reached through, pinched a piece of the skull—that was the accepted procedure. Any part of the skeleton could be used, but the most perfect revivals, the most complete reconstructions resulted when a certain section of the skull was used.

Hamar, the chief biologist, explained the choice of body. "The chemicals used to preserve this

mummy show a sketchy knowledge of chemistry; the carvings on the sarcophagus indicate a crude and unmechanical culture. In such a civilization there would not be much development of the potentialities of the nervous system. Our speech experts have been analyzing the recorded voice mechanism which is a part of each exhibit, and though many languages are involved—evidence that the ancient language spoken at the time the body was alive has been reproduced—they found no difficulty in translating the meanings. They have now adapted our universal speech machine, so that anyone who wishes to, need merely speak into his communicator, and so will have his words translated into the language of the revived person. The reverse, naturally, is also true. Ah, I see we are ready for the first body."

Enash watched intently with the others, as the lid was clamped down on the plastic reconstructor, and the growth processes were started. He could feel himself becoming tense. For there was nothing haphazard about what was happening. In a few minutes a full-grown ancient inhabitant of this planet would sit up and stare at them. The science involved was simple and always fully effective.

. . . . Out of the shadows of smallness life grows. The level of beginning and ending, of life and—not life; in that dim region matter oscillates easily between old and new habits. The habit of organic, or the habit of inorganic.

Electrons do not have life and un-life values. Atoms know nothing of inanimateness. But when atoms form into molecules, there is a step in the process, one tiny step, that is of life—if life begins at all. One step, and then darkness. Or aliveness.

A stone or a living cell. A grain of gold or a blade of grass, the sands of the sea or the equally numerous animalcules inhabiting the endless fishy waters—the difference is there in the twilight zone of matter. Each living cell has in it the whole form. The crab grows a new leg when the old one is torn from its flesh. Both ends of the planarian worm elongate, and soon there are two worms, two identities, two digestive systems, each as greedy as the original, each a whole, unwounded, unharmed by its experience.

Each cell can be the whole. Each cell remembers in a detail so intricate that no totality of words could ever describe the completeness achieved.

But — paradox — memory is not organic. An ordinary wax record remembers sounds. A wire recorder easily gives up a duplicate of the voice that spoke into it years before. Memory is a physiological impression, a mark on matter, a change in the shape of a molecule, so that when a reaction is desired the *shape* emits the same rhythm of response.

Out of the mummy's skull had come the multi-quadrillion memory shapes from which a response was now being evoked. As ever, the memory held true.

A man blinked, and opened his eyes.

"It is true, then," he said aloud, and the words were translated into the Ganae tongue as he spoke them. "Death is merely an opening into another life—but where are my attendants?" At the end, his voice took on a complaining tone.

He sat up, and climbed out of the case, which had automatically opened as he came to life. He saw his captors. He froze—but only for a moment. He had a pride and a very special arrogant courage, which served him now.

Reluctantly, he sank to his knees, and made obeisance, but doubt must have been strong in him. "Am I in the presence of the gods of Egyptus?"

He climbed to his feet. "What nonsense is this? I do not bow to nameless demons."

Captain Gorsid said: "Kill him!"

The two-legged monster dissolved, writhing, in the beam of a ray gun.

The second man stood up palely, and trembled with fear. "My God, I swear I won't touch the stuff again. Talk about pink elephants—"

Yoal was curious. "To what *stuff* do you refer, revived one?"

"The old hooch, the poison in the old hip pocket flask, the juice they gave me at that speak . . . my lordie!"

Captain Gorsid looked questioningly at Yoal. "Need we linger?"

Yoal hesitated: "I am curious." He addressed the man. "If I were to tell you that we were visitors from another star, what would be your reaction?"

The man stared at him. He was obviously puzzled, but the fear was stronger. "Now, look," he said, "I was driving along, minding my own business. I admit I'd had a shot or two too many, but it's the liquor they serve these days. I swear I didn't see the other car—and if this is some new idea of punishing people who drink and drive, well, you've won. I won't touch another drop as long as I live, so help me."

Yoal said: "He drives a 'car' and thinks nothing of it. Yet we saw no cars; they didn't even bother to preserve them in the museum."

Enash noticed that everyone waited for everyone else to comment. He stirred as he realized the circle of silence would be complete unless he spoke. He said:

"Ask him to describe the car. How does it work?"

"Now, you're talking," said the man. "Bring on your line of chalk, and I'll walk it, and ask any questions you please. I may be so tight that I can't see straight, but I can always drive. How does it work? You just put her in gear, and step on the gas."

"Gas," said engineering officer Veed. "The internal combustion engine. That places him."

Captain Gorsid motioned to the guard with the ray gun.

The third man sat up, and looked at them thoughtfully. "From the stars?" he said finally. "Have you a system, or was it blind chance?"

The Ganae councillors in that

domed room stirred uneasily in their curved chairs. Enash caught Yoal's eye on him; the shock in the historian's eyes alarmed the meteorologist. He thought: "The two-legged one's adjustment to a new situation, his grasp of realities, was unnormally rapid. No Ganae could have equaled the swiftness of the reaction."

Hamar, the chief biologist, said: "Speed of thought is not necessarily a sign of superiority. The slow, careful thinker has his place in the heirarchy of intellect."

But, Enash found himself thinking, it was not the speed; it was the accuracy of the response. He tried to imagine himself being revived from the dead, and understanding instantly the meaning of the presence of aliens from the stars. He couldn't have done it.

He forgot his thought, for the man was out of the case. As Enash watched with the others, he walked briskly over to the window and looked out. One glance, and then he turned back.

"Is it all like this?" he asked.

Once again, the speed of his understanding caused a sensation. It was Yoal who finally replied.

"Yes, Desolation. Death. Ruin. Have you any idea as to what happened?"

The man came back and stood in front of the energy screen that guarded the Ganae. "May I look over the museum? I have to estimate what age I am in. We had certain possibilities of destruction when I was last alive, but which one was realized depends on the time elapsed."

The councillors looked at Captain Gorsid, who hesitated; then: "Watch him," he said to the guard with the ray gun. He faced the man. "We understand your aspirations fully. You would like to seize control of this situation, and insure your own safety. Let me reassure you. Make no false moves, and all will be well."

Whether or not the man believed the lie, he gave no sign. Nor did he show by a glance or a movement that he had seen the scarred floor where the ray gun had burned his two predecessors into nothingness. He walked curiously to the nearest doorway, studied the other guard who waited there for him, and then, gingerly, stepped through. The first guard followed him, then came the mobile energy screen, and finally, trailing one another, the councillors. Enash was the third to pass through the doorway. The room contained skeletons and plastic models of animals. The room beyond that was what, for want of a better term, Enash called a culture room. It contained the artifacts from a single period of civilization. It looked very advanced. He had examined some of the machines when they first passed through it, and had thought: Atomic energy. He was not alone in his recognition. From behind him, Captain Gorsid said:

"You are forbidden to touch anything. A false move will be the signal for the guards to fire."

The man stood at ease in the center of the room. In spite of a curious anxiety, Enash had to admire his calmness. He must have known what his fate would be, but he stood there thoughtfully, and said finally, deliberately:

"I do not need to go any farther. Perhaps, you will be able better than I to judge of the time that has elapsed since I was born and these machines were built. I see over there an instrument which, according to the sign above it, counts atoms when they explode. As soon as the proper number have exploded it shuts off the power automatically, and for just the right length of time to prevent a chain explosion. In my time we had a thousand crude devices for limiting the size of an atomic reaction, but it required two thousand years to develop those devices from the early beginnings of atomic energy. Can you make a comparison?"

The councillors glanced at Veed. The engineering officer hesitated. At last, reluctantly: "Nine thousand years ago we had a thousand methods of limiting atomic explosions." He paused, then even more slowly, "I have never heard of an instrument that counts out atoms for such a purpose."

"And yet," murmured Shuri, the astronomer breathlessly, "the race was destroyed."

There was silence—that ended as Gorsid said to the nearest guard, "Kill the monster!"

But it was the guard who went down, bursting into flame. Not just one guard, but the guards! Simultaneously down, burning with a blue flame. The flame licked at the screen, recoiled, and licked more furiously, recoiled and burned brighter. Through a haze of fire, Enash saw that the man had retreated to the far door, and that the machine that counted atoms, was glowing with a blue intensity.

Captain Gorsid shouted into his communicator: "Guard all exits with ray guns. Spaceships stand by to kill alien with heavy guns."

Somebody said: "Mental control. some kind of mental control. What have we run into?"

They were retreating. The blue fire was at the ceiling, struggling to break through the screen. Enash had a last glimpse of the machine. It must still be counting atoms, for it was a hellish blue. Enash raced with the others to the room where the man had been resurrected. There another energy screen crashed to their rescue. Safe now, they retreated into their separate bubbles and whisked through outer doors and up to the ship. As the great ship soared, an atomic bomb hurtled down from it. The mushroom of flame blotted out the museum and the city below.

"But we still don't know why the race died," Yoal whispered into Enash's ear, after the thunder had died from the heavens behind them.

The pale yellow sun crept over the horizon on the third morning after the bomb was dropped—the eighth day since the landing. Enash floated with the others down on a

new city. He had come to argue against any further revival.

"As a meteorologist," he said, "I pronounce this planet safe for Ganae colonization. I cannot see the need for taking any risks. This race has discovered the secrets of its nervous system, and we cannot afford—"

He was interrupted. Hamar, the biologist, said dryly: "If they knew so much why didn't they migrate to other star systems and save themselves?"

"I will concede," said Enash, "that very possibly they had not discovered our system of locating stars with planetary families." He looked earnestly around the circle of his friends. "We have agreed that was a unique accidental discovery. We were lucky, not clever."

He saw by the expressions on their faces that they were mentally refuting his arguments. He felt a helpless sense of imminent catastrophe. For he could see that picture of a great race facing death. It must have come swiftly, but not so swiftly that they didn't know about it. There were too many skeletons in the open, lying in the gardens of the magnificent homes, as if each man and his wife had come out to wait for the doom of his kind.

He tried to picture it for the council, that last day long, long ago, when a race had calmly met its ending. But his visualization failed somehow, for the others shifted impatiently in the seats that had been set up behind the series of energy screens, and Captain Gorsid said:

"Exactly what aroused this intense emotional reaction in you, Enash?"

The question gave Enash pause. He hadn't thought of it as emotional. He hadn't realized the nature of his obsession, so subtly had it stolen upon him. Abruptly, now, he realized.

"It was the third one," he said slowly. "I saw him through the haze of energy fire, and he was standing there in the distant doorway watching us curiously, just before we turned to run. His bravery, his calm, the skilful way he had duped us—it all added up."

"Added up to his death?" said Hamar. And everybody laughed.

"Come now, Enash," said vice-captain Mayad good-humoredly, "you're not going to pretend that this race is braver than our own, or that, with all the precautions we have now taken, we need fear one man?"

Enash was silent, feeling foolish. The discovery that he had had an emotional obsession abashed him. He did not want to appear unreasonable. One final protest he made.

"I merely wish to point out," he said doggedly, "that this desire to discover what happened to a dead race does not seem absolutely essential to me."

Captain Gorsid waved at the biologist. "Proceed," he said, "with the revival."

To Enash, he said: "Do we dare return to Gana, and recommend mass migrations—and then admit that we did not actually complete

our investigations here? It's impossible, my friend."

It was the old argument, but reluctantly now Enash admitted there was something to be said for that point of view.

He forgot that, for the fourth man was stirring.

The man sat up—and vanished.

There was a blank, startled, horrified silence. Then Captain Gorsid said harshly:

"He can't get out of there. We know that. He's in there somewhere."

All around Enash, the Ganae were out of their chairs, peering into the energy shell. The guards stood with ray guns held limply in their suckers. Out of the corner of his eye, he saw one of the protective screen technicians beckon to Veed, who went over—and came back grim.

"I'm told the needles jumped ten points when he first disappeared. That's on the nucleonic level."

"By ancient Ganae!" Shuri whispered. "We've run into what we've always feared."

Gorsid was shouting into the communicator. "Destroy all the locators on the ship. Destroy them, do you hear!"

He turned with glary eyes. "Shuri," he bellowed, "they don't seem to understand. Tell those subordinates of yours to act. All locators and reconstructors must be destroyed."

"Hurry, hurry!" said Shuri weakly.

When that was done they breathed more easily. There were grim smiles and a tensed satisfaction. "At least," said Vice captain Mayad, "he cannot now ever discover Gana. Our great system of locating suns with planets remains our secret. There can be no retaliation for—" He stopped, said slowly, "What am I talking about? We haven't done anything. We're not responsible for the disaster that has befallen the inhabitants of this planet."

But Enash knew what he had meant. The guilt feelings came to the surface at such moments as this—the ghosts of all the races destroyed by the Ganae, the remorseless will that had been in them, when they first landed, to annihilate whatever was here. The dark abyss of voiceless hate and terror that lay behind them; the days on end when they had mercilessly poured poisonous radiation down upon the unsuspecting inhabitants of peaceful planets—all that had been in Mayad's words.

"I still refuse to believe he has escaped." That was Captain Gorsid. "He's in there. He's waiting for us to take down our screens, so he can escape. Well, we won't do it."

There was silence again, as they stared expectantly into the energy shell—into the emptiness of the energy shell. The reconstructor rested on its metal supports, a glittering affair. But there was nothing else. Not a flicker of unnatural light or shade. The yellow rays of the sun bathed the open spaces

with a brilliance that left no room for concealment.

"Guards," said Gorsid, "destroy the reconstructor. I thought he might come back to examine it, but we can't take a chance on that."

It burned with a white fury; and Enash who had hoped somehow that the deadly energy would force the two-legged thing into the open, felt his hopes sag within him.

"But where can he have gone?" Yoal whispered.

Enash turned to discuss the matter. In the act of swinging around, he saw that the monster was standing under a tree a score of feet to one side, watching them. He must have arrived *that* moment, for there was a collective gasp from the councillors. Everybody drew back. One of the screen technicians, using great presence of mind, jerked up an energy screen between the Ganae and the monster. The creature came forward slowly. He was slim of build, he held his head well back. His eyes shone as from an inner fire.

He stopped as he came to the screen, reached out and touched it with his fingers. It flared, blurred with changing colors; the colors grew brighter, and extended in an intricate pattern all the way from his head to the ground. The blur cleared. The colors drew back into the pattern. The pattern faded into invisibility. The man was through the screen.

He laughed, a soft sound; then sobered. "When I first wakened," he said, "I was curious about the situation. The question was, what should I do with you?"

The words had a fateful ring to Enash on the still morning air of that planet of the dead. A voice broke the silence, a voice so strained and unnatural that a moment passed before he recognized it as belonging to Captain Gorsid.

"Kill him!"

When the blasters ceased their effort, the unkillable thing remained standing. He walked slowly forward until he was only half a dozen feet from the nearest Ganae. Enash had a position well to the rear. The man said slowly:

"Two courses suggest themselves, one based on gratitude for reviving me, the other based on reality. I know you for what you are. Yes, *know* you—and that is unfortunate. It is hard to feel merciful.

"To begin with," he went on, "let us suppose you surrender the secret of the locator. Naturally, now that a system exists, we shall never again be caught as we were—"

Enash had been intent, his mind so alive with the potentialities of the disaster that was here that it seemed impossible he could think of anything else. And yet, now a part of his attention was stirred.

"What did happen?"

The man changed color. The emotions of that far day thickened his voice. "A nucleonic storm. It swept in from outer space. It brushed this edge of our galaxy. It was about ninety light-years in diameter, beyond the farthest limits

of our power. There was no escape from it. We had dispensed with spaceships, and had no time to construct any. Castor, the only star with planets ever discovered by us, was also in the path of the storm."

He stopped. "The secret?" he said.

Around Enash, the councillors were breathing easier. The fear of race destruction that had come to them was lifting. Enash saw with pride that the first shock was over, and they were not even afraid for themselves.

"Ah," said Yoal softly, "you don't know the secret. In spite of

all your great development, we alone can conquer the galaxy."

He looked at the others, smiling confidently. "Gentlemen," he said, "our pride in a great Ganae achievement is justified. I suggest we return to our ship. We have no further business on this planet."

There was a confused moment while their bubbles formed, when Enash wondered if the two-legged one would try to stop their departure. But the man, when he looked back, was walking in a leisurely fashion along a street.

That was the memory Enash carried with him, as the ship began to move. That and the fact that the three atomic bombs they dropped, one after the other, failed to explode.

"We will not," said Captain Gorsid, "give up a planet as easily as that. I propose another interview with the creature."

They were floating down again into the city, Enash and Yoal and Veed and the commander. Captain Gorsid's voice tuned in once more:

". . . . As I visualize it"—through mist Enash could see the transparent glint of the other three bubbles around him—"we jumped to conclusions about this creature, not justified by the evidence. For instance, when he awakened, he vanished. Why? Because he was afraid, of course. He wanted to size up the situation. *He* didn't believe he was omnipotent."

It was sound logic. Enash found himself taking heart from it. Suddenly, he was astonished that he had become panicky so easily. He began to see the danger in a new light. One man, only one man, alive on a new planet. If they were determined enough, colonists could be moved in as if he did not exist. It had been done before, he recalled. On several planets, small groups of the original populations had survived the destroying radiation, and taken refuge in remote areas. In almost every case, the new colonists gradually hunted them down. In two instances, however, that Enash remembered, native races were still holding small sections of their planets. In each case, it had been found impractical to destroy them because it would have endangered the Ganae on the planet. So the survivors were tolerated.

One man would not take up very much room.

When they found him, he was busily sweeping out the lower floor of a small bungalow. He put the broom aside, and stepped onto the terrace outside. He had put on sandals, and he wore a loose-fitting robe made of very shiny material. He eyed them indolently but he said nothing.

It was Captain Gorsid who made the proposition. Enash had to admire the story he told into the language machine. The commander was very frank. That approach had been decided on. He pointed out that the Ganae could not be expected to revive the dead of this planet. Such altruism would be unnatural considering that the ever-growing Ganae hordes had a continual need for new worlds. Each

vast new population increment was a problem that could be solved by one method only. In this instance, the colonists would gladly respect the rights of the sole survivor of the—

It was at that point that the man interrupted. "But what is the purpose of this endless expansion?" He seemed genuinely curious. "What will happen when you finally occupy every planet in this galaxy?"

Captain Gorsid's puzzled eyes met Yoal's then flashed to Veed, then Enash. Enash shrugged his torso negatively, and felt pity for the creature. The man didn't understand, possibly never could understand. It was the old story of two different viewpoints, the virile and the decadent, the race that aspired to the stars and the race that declined the call of destiny.

"Why not," urged the man, "control the breeding chambers?"

"And have the government overthrown!" said Yoal.

He spoke tolerantly, and Enash saw that the others were smiling at the man's naivete. He felt the intellectual gulf between them widening. The man had no comprehension of the natural life forces that were at work. He said now:

"Well, if you don't control them, we will control them for you."

There was silence.

•

They began to stiffen. Enash felt it in himself, saw the signs of it in the others. His gaze flicked from face to face, then back to the creature in the doorway. Not for the first time Enash had the thought that their enemy seemed helpless.

"Why," he almost decided, "I could put my suckers around him and crush him."

He wondered if mental control of nucleonic, nuclear and gravitonic energies included the ability to defend oneself from a macrocosmic attack. He had an idea it did. The exhibition of power two hours before might have had limitations, but, if so, it was not apparent.

Strength or weakness could make no difference. The threat of threats had been made: "If you don't control—we will."

The words echoed in Enash's brain, and, as the meaning penetrated deeper, his aloofness faded. He had always regarded himself as a spectator. Even when, earlier, he had argued against the revival, he had been aware of a detached part of himself watching the scene rather than being a part of it. He saw with a sharp clarity that that was why he had finally yielded to the conviction of the others.

Going back beyond that to remoter days, he saw that he had never quite considered himself a participant in the seizure of the planets of other races. He was the one who looked on, and thought of reality, and speculated on a life that seemed to have no meaning.

It was meaningless no longer. He was caught by a tide of irresistible emotion, and swept along. He felt himself sinking, merging with the Ganae mass being. All the strength and all the will of the race surged up in his veins.

He snarled: "Creature, if you have any hopes of reviving your dead race, abandon them now."

The man looked at him, but said nothing. Enash rushed on:

"If you could destroy us, you would have done so already. But the truth is that you operate within limitations. Our ship is so built that no conceivable chain reaction could be started in it. For every plate of potential unstable material in it there is a counteracting plate, which prevents the development of a critical pile. You might be able to set off explosions in our engines, but they, too, would be limited, and would merely start the process for which they are intended—confined in their proper space."

He was aware of Yoal touching his arm. "Careful," warned the historian. "Do not in your just anger give away vital information."

Enash shook off the restraining sucker. "Let us not be unrealistic," he said harshly. "This thing has divined most of our racial secrets, apparently merely by looking at our bodies. We would be acting childishly if we assumed that he has not already realized the possibilities of the situation."

"*Enash!*" Captain Gorsid's voice was imperative.

As swiftly as it had come Enash's rage subsided. He stepped back.

"Yes, commander."

"I think I know what you intended to say," said Captain Gorsid. "I assure you I am in full accord, but I believe also that I, as the top Ganae official, should deliver the ultimatum."

He turned. His horny body towered above the man.

"You have made the unforgivable threat. You have told us, in effect, that you will attempt to restrict the vaulting Ganae spirit—"

"Not the spirit," said the man. He laughed softly. "No, not the spirit."

The commander ignored the interruption. "Accordingly, we have no alternative. We are assuming that, given time to locate the materials and develop the tools, you might be able to build a reconstructor.

"In our opinion it will be at least two years before you can complete it, *even if you know how.* It is an immensely intricate machine not easily assembled by the lone survivor of a race that gave up its machines millennia before disaster struck.

"You did not have time to build a spaceship.

"We won't give you time to build a reconstructor.

"Within a few minutes our ship will start dropping bombs. It is possible you will be able to prevent explosions in your vicinity. We will start, accordingly, on the other side of the planet. If you stop us there, then we will assume we need help.

"In six months of traveling at top acceleration, we can reach a point where the nearest Ganae planet would hear our messages. They will send a fleet so vast that all your powers of resistance will be overcome. By dropping a hundred or a thousand bombs every

minute we will succeed in devastating every city, so that not a grain of dust will remain of the skeletons of your people.

"That is our plan.

"So it shall be.

"Now, do your worst to us who are at your mercy."

The man shook his head. "I shall do nothing—now!" he said. He paused, then thoughtfully, "Your reasoning is fairly accurate. Fairly. Naturally, I am not all powerful, but it seems to me you have forgotten one little point.

"I won't tell you what it is.

"And now," he said, "good day to you. Get back to your ship, and be on your way. I have much to do."

Enash had been standing quietly, aware of the fury building up in him again. Now, with a hiss, he sprang forward, suckers outstretched. They were almost touching the smooth flesh—when something snatched at him.

He was back on the ship.

He had no memory of movement, no sense of being dazed or harmed. He was aware of Veed and Yoal and Captain Gorsid standing near him as astonished as he himself. Enash remained very still, thinking of what the man had said: ". . . *Forgotten one little point.*" Forgotten? That meant they knew. What could it be? He was still pondering about it when Yoal said:

"We can be reasonably certain our bombs alone will not work."

They didn't.

Forty light-years out from Earth, Enash was summoned to the council chambers. Yoal greeted him wanly:

"The monster is aboard."

The thunder of that poured through Enash, and with it came a sudden comprehension. "That was what he meant we had forgotten," he said finally, aloud and wonderingly, "that he can travel through space at will within a limit—what was the figure he once used—of ninety light-years."

He sighed. He was not surprised that the Ganae, who had to use ships, would not have thought immediately of such a possibility. Slowly, he began to retreat from the reality. Now that the shock had come, he felt old and weary, a sense of his mind withdrawing again to its earlier state of aloofness.

It required a few minutes to get the story. A physicist's assistant, on his way to the storeroom, had caught a glimpse of a man in a lower corridor. In such a heavily manned ship, the wonder was that the intruder had escaped earlier observation. Enash had a thought.

"But after all we are not going all the way to one of our planets. How does he expect to make use of us to locate it if we only use video—" He stopped. That was it, of course. Directional video beams would have to be used, and the man would travel in the right direction the instant contact was made.

Enash saw the decision in the eyes of his companions, the only possible decision under the circumstances. And yet—it seemed to

him they were missing some vital point.

He walked slowly to the great video plate at one end of the chamber. There was a picture on it, so vivid, so sharp, so majestic that the unaccustomed mind would have reeled as from a stunning blow. Even to him, who knew the scene, there came a constriction, a sense of unthinkable vastness. It was a video view of a section of the milky way. Four hundred *million* stars as seen through telescopes that could pick up the light of a red dwarf at thirty thousand light-years.

The video plate was twenty-five yards in diameter—a scene that had no parallel elsewhere in the plenum. Other galaxies simply did not have that many stars.

Only one in two hundred thousand of those glowing suns had planets.

That was the colossal fact that compelled them now to an irrevocable act. Wearily, Enash looked around him.

"The monster had been very clever," he said quietly. "If we go ahead, he goes with us—obtains a reconstructor and returns by his method to his planet. If we use the directional beam, he flashes along it, obtains a reconstructor and again reaches his planet first. In either event, by the time our fleets arrived back there, he would have revived enough of his kind to thwart any attack we could mount."

He shook his torso. The picture was accurate, he felt sure, but it still seemed incomplete. He said slowly:

"We have one advantage now. Whatever decision we make, there is no language machine to enable him to learn what it is. We can carry out our plans without his knowing what they will be. He knows that neither he nor we can blow up the ship. That leaves us one real alternative."

It was Captain Gorsid who broke the silence that followed. "Well, gentlemen, I see we know our minds. We will set the engines, blow up the controls—and take him with us."

They looked at each other, race pride in their eyes. Enash touched suckers with each in turn.

An hour later, when the heat was already considerable, Enash had the thought that sent him staggering to the communicator, to call Shuri, the astronomer.

"Shuri," he yelled, "when the monster first awakened—remember Captain Gorsid had difficulty getting your subordinates to destroy the locators. We never thought to ask them what the delay was. Ask them . . . ask them—"

There was a pause, then Shuri's voice came weakly over the roar of static:

"They . . . couldn't . . . get . . . into . . . the . . . room. The door was locked."

Enash sagged to the floor. They had missed more than one point, he realized. The man had awakened, realized the situation; and, when he vanished, he had gone to

the ship, and there discovered the secret of the locator and possibly the secret of the reconstructor—if he didn't know it previously. By the time he reappeared, he already had from them what he wanted. All the rest must have been designed to lead them to this act of desperation.

In a few moments, now, *he* would be leaving the ship secure in the knowledge that shortly no alien mind would know his planet existed. Knowing, too, that his race would live again, and this time never die.

Enash staggered to his feet, clawed at the roaring communicator, and shouted his new understanding into it. There was no answer. It clattered with the static of uncontrollable and inconceivable energy.

The heat was peeling his armored hide, as he struggled to the matter transmitter. It flashed at him with purple flame. Back to the communicator he ran shouting and screaming.

He was still whimpering into it a few minutes later when the mighty ship plunged into the heart of a blue-white sun.

THE END

IN TIMES TO COME

Next month, for the first time in quite a while, we will have no serial installment, but a long novelette by George O. Smith called "The Catspaw." It's got a neat gimmick in it. Suppose you have thought up a way of running a ship faster than light—maybe. The maybe being the possibility that the device will set up a total-annihilation chain reaction not only in the ship, but in any near-by planets or suns! Makes one a leetle hesitant about trying it out—unless you can get some poor unsuspecting race to try it.

There's another novelette with a wonderful gimmick, too. It's a Doc Methuselah yarn by René Lafayette called "The Great Air Monopoly." Yep, the monopolists sold people the right to breathe the planet's atmosphere. Made it stick, too—if they didn't pay the air tax, they couldn't breathe! Can be done on the basis of modern knowledge, too—if you can figure out how it's worked though, you should be figuring out stories for us!

THE EDITOR.

NEW DIELECTRICS

BY E. L. LOCKE

***Men can** generate power, but to date we have no satisfactory way of storing it. The invention of a really effective power-storage device is at least equal in importance to the development of a power-producing atomic pile, and probably will mean more to J. Q. Public. This, then, is how things stand:—*

One of the pressing technological needs of mankind is a good way to store electrical energy. While improved storage means for other kinds of energy would also be welcomed, it is the lack of an efficient, compact and high capacity electricity storage device that is felt most acutely. This is natural because electrical energy is so convenient to use and the benefits to be gained from such a device are so clearly visible.

The whole problem of generating electric power is intimately tied up with the methods of energy storage that we have available. Our present power technology is based on the chemical energy storage nature has provided us—coal and oil. The processes we are forced to use to get electricity from them are complicated and not too satisfactory.

We have potentially available a much more satisfactory source, the solar energy that the earth receives in such abundance. If this could be freely utilized, much of the political tension of the world would disappear, since it is engendered by the quest of the large powers for sources of energy.

It is quite likely that the direct conversion of solar energy into electricity could be accomplished even today with fair efficiency and at a reasonable cost. The deterrent has to do with the fact that the sun shines at irregular intervals and the power needs are continuous, though not uniform. Clearly then the solar energy plant will not be practical in an economic sense until we have a satisfactory energy storage device producible at an acceptable cost. In some ways this would be even a better solution than atomic power. The preparation of atomic fuel requires elaborate plants and the gen-

eration of electricity and its distribution would still involve more or less conventional methods.

This brings up another point. Even if solar energy plants should prove unacceptable from the economic viewpoint, there are other ways in which an electrical storage device would prove to be a boon. Consider for a moment what it would do to the problem of generation of electricity from coal and its distribution. The size of a generating plant would no longer be determined by the peak load, but by the average load. This would decrease the size of the plants by a very appreciable factor.

The greatest benefits, however, would come from its effect on the distribution problem. Today a kilowatt hour of electricity can be generated for a small fraction of a cent. The rest of the electric bill that you pay goes mostly to pay for the cost of the distribution system. If electricity could be delivered in packaged form to your house, just as milk is delivered, but by no means as frequently, most of the electric bill would disappear.

The uses of such a storage device would be multitudinous. To take one at random, the electric automobile would undoubtedly come back because it has some nice advantages over the gasoline-driven one. And to come down to trivialities, one could get really good portable radios, transmitters as well as receivers.

With all these pleasing prospects before us, it is natural to ask what is blocking progress along these

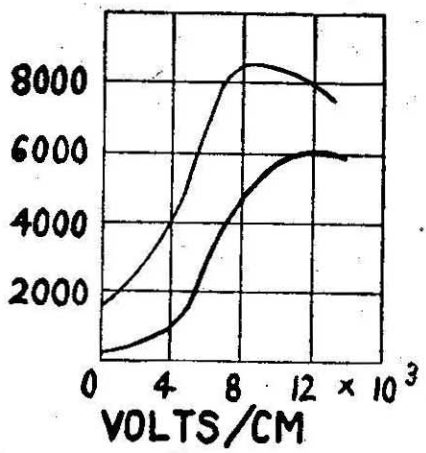


FIG.1
VARIATION OF DIELETRIC CONSTANT WITH FIELD STRENGTH AND TEMPERATURE; $BaTiO_3$

lines. Let's see what common ways we know to store electrical energy and what are their shortcomings and possibilities.

The first method to come to mind is the storage battery and its cousin the dry cell. These store the energy in a chemical form. The storage battery is clumsy, takes a relatively long time to charge and has a lot of other troubles as every car owner knows. The dry cell is, of course, just a one-shot affair, in which the chemical changes are not easily reversible.

Electricity can also be stored as mechanical energy by adding a heavy flywheel to a motor generator. This again is clumsy and further-

more friction quickly collects a large toll. It is, therefore, unsatisfactory for general use although in a couple of instances it has been used in default of anything better. One such case is in a cyclotron now being designed; another is the way Peter Kapitza, the Russian physicist, used it to supply for a short time the enormous electric currents needed to produce extremely high intensity magnetic fields.

Inductances will also store electrical energy which they do by setting up a magnetic field. Again it is not a general purpose storage device because it requires a continuous flow of current to maintain the field. But this is precisely what a general purpose device must avoid, and hence while inductances have their uses, they will not do for the problem at hand.

Finally, we have the electrical condenser which in many respects offers the best hope for the ultimate solution of our problem. It can be charged practically instantaneously and the stored energy can be recovered either quickly or slowly. If it uses the right materials, it will hold its charge, not indefinitely it is true, but for hours and under the right conditions for days. The only real trouble is that the amount of energy that can be stored per unit of volume is as yet too small. The real problem then would be to find materials which would improve this energy per unit volume figure, and as a secondary, but still important problem, to extend the length of time this energy could be stored. It is the progress on the first problem that we shall concern ourselves with in this article.

The earliest form of the electrical condenser, the Leyden Jar, is still a good illustration of what constitutes a condenser. If you will recall your high school physics, the Leyden Jar consists of a glass jar with a coating of tin foil on its inner and outer surfaces. The metal foil serves as the "plates" of the condenser while the glass acts as the insulator, or "dielectric" medium. It stores electrical energy by virtue of the fact that when a voltage is applied across the two plates the resulting electric field distorts slightly the electronic structure of the dielectric. This is by no means the whole story, but it will serve for the present to give a preliminary idea as to what goes on in a condenser.

The Leyden Jar, which originally was only a laboratory curiosity, has evolved into the modern condenser with multifold uses. It is a basic component in all sorts of communication circuits, where it serves as a tuning element for selective circuits, filters out power hum, isolates circuits and does a great many other things. In the power field, it is used principally to improve the characteristics of induction motors. In nuclear physics, the well-known Van de Graff generator is nothing but a huge spherical condenser which can be charged up to some millions of volts. Glass, of course, is seldom used as a dielectric, the most common ones now being air, paper, mica and oil.

Let's look into the question of

how much—right now, how little—energy a condenser can store and on what factors it depends. It turns out that this energy is proportional to the square of the voltage applied across the plates. That is, doubling the applied voltage quadruples the energy stored. It is also proportional to the area of the dielectric and inversely proportional to its thickness.

It would seem offhand that an easy way to store a lot of energy would be to make the dielectric extremely thin and apply a lot of voltage across it. Unfortunately, these are contradictory requirements because a given thickness of the dielectric will support only a certain voltage before it breaks down and is physically damaged. This breakdown voltage is very nearly proportional to the thickness and hence it turns out that the energy that can be stored in a unit volume is independent of the thickness of the dielectric.

There is one other factor that enters into the problem which we have not yet mentioned. It is the "dielectric constant" of the insulator used. This varies from one material to another. The larger it is, the more energy can be stored in a given volume if all other factors are equal. The real hope of licking the energy storage problem lies in finding materials with very high dielectric constants.

To get at the notion of what is meant by this term consider a condenser with a perfect vacuum as the insulator. If we charge this with a given voltage, it will store a certain quantity of energy. Now replace the vacuum with some other insulator and, after charging to the same voltage, measure again the energy stored. We will find that it is always greater than for the vacuum case. The ratio of the non-vacuum to vacuum energies is called the dielectric constant, which we will denote by the symbol K. The table below gives values for a few common materials.

TABLE I

Material	*K*
Air	1.00015
Glass	5.5 to 9.1
Mica	5 to 7
Paper	2.6
Hard Rubber	2.0 to 3.5
Sulfur	2.9 to 3.2

It will be convenient for future discussion to introduce here the notion of capacitance, C. This is a single number which lumps together the effects of plate area, dielectric constant and thickness of the dielectric. That is to say, we customarily express the energy stored, E, in terms of the applied voltage V and capacitance C through the following relation

$$E = \frac{1}{2} CV^2 \qquad (1)$$

If the energy is expressed in watt seconds and the voltage in ordinary volts, the unit of C will be the farad. Now the farad is an impractically

large unit and the practical units are the microfarad (mf) which is one-millionth of the farad and the micro-microfarad (mmf), which is still smaller by another factor of a million.

The capacitance can be expressed also by a simple formula

$$C = .225\ AK/t\ \text{mmf} \qquad (2)$$

the symbol A standing for the area in square inches, t for the thickness of the dielectric in inches, while K is the dielectric constant.

With these formulas before us, let us see how much energy we can store in a condenser. Suppose we take a 10 microfarad condenser which is already on the somewhat bulky size. If it is a good grade of commercial condenser, it will safely withstand about 500 volts. The energy stored turns out to be 1-1/4 watt seconds which would run a 25-watt lamp for all of 1/20 of a second. By our ordinary notions, this certainly does not constitute a lot of energy. Now if we could only increase the dielectric constant to—

At this point I recall with much mental drooling one of George O. Smith's Venus Equilateral stories. This one had to do with the construction of an energy gun. As you may recall, it required among other things that a tremendous amount of electrical energy be accumulated and dumped into the gun in a hurry. Now an electrical condenser is just the thing for this purpose, except that Smith's boys realized that ordinary values of dielectric constant were inadequate. So one of them solved the problem by inventing a material whose dielectric constant was up in the multiple billions.

It's too bad that this material is not yet available to us for it would certainly solve our problem. If we assume that our present 10 mf condenser uses a dielectric with a K of 5, then the substitution of this material with a K of 9×10^{20} would permit us to store sixty thousand billion kilowatt hours of energy! This high a K is really not needed for our purposes. If we had a more modest value, say a mere billion (10^9), we could store a thousand kilowatt hours into a few cubic inches, which would be about right for our purposes.

Well, modern research has not come through with a dielectric as good as Smith's, but it did turn up some dandies during the war. As Table I shows, five or six repre-

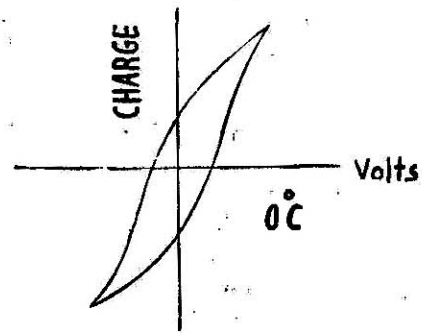


FIG. 2
TYPICAL HYSTERESIS LOOP FOR $BaTiO_3$

sented before the war a high value of dielectric constant K. Of course there was water, which had a K of about 80, but it was unusable because of its high losses. Now, as the result of the war effort, we have available the new dielectrics whose Ks run from 100 to as much as 12,000! As is to be expected, the extremely high K value materials tend to be somewhat lossy, but nevertheless they are remarkedly good compared to electrolytics. The material with the K of 100 is astonishingly good, ranking with the best previously known.

Before describing these new materials, let us see what they will mean to the users. Suppose we had an air condenser the size of a penny, the area of which is .44 square inches. If the separation between plates was .005 inches, its capacitance, since K is practically unity for air, would be about 20 mmf. If we substituted for air the new dielectric with the K of 100, the capacitance would be 2,000 mmf. Hence a good radio condenser could be made in a size considerably smaller than a penny. If we used a K of 12,000, the penny size would result in a capacitance of about ¼ of a microfarad, which is getting up into the sizable range. Suppose we wanted to use this type of condenser for a hum filter in a radio power supply. This needs about 10 microfarads, say. Then we would need 40 layers of the dielectric. Assuming that the metal needed for plates would also be .005 inches thick, the total pile-up would be about 4/10 inches. Hence this condenser would take up no more room than a stack of 7 pennies!

Or again, consider the matter of delaying electrical signals. This is a very necessary matter in some radar circuits. The delay needed is not very much by ordinary standards of time reckoning, being only one-one millionth of a second. Yet, if one were to use an ordinary wave guide for this purpose, it would have to be about 1,000 feet long. Now the velocity with which an electromagnetic wave is propagated varies inversely with the square root of the dielectric constant. Hence using a wave guide filled with the low loss K = 100 material, the length is reduced to 100 feet. This is not short, yet it is quite an improvement over what was available before.

It is amusing to consider how Smith's material would have worked. For air K is unity and the speed is the same as the speed of light in air, or thirty billion centimeters per second. In Smith's material, the speed of light would get down to one centimeter per second, a figure which any slow poke of a turtle could easily beat. Our delay line would need to be only 1/1,000,000 cm long! Incidentally, as my friend J. J. Coupling points out, maybe this hypothetical material would not have been so good for an energy gun after all. When a condenser charges or discharges, the energy flow is at a finite speed, namely, the velocity of the electromagnetic magnetic wave

through the dielectric. At one centimeter per second, it would take about 1/100 seconds for the wave to pass through .004 inch thick layer of dielectric. This is pretty slow, particularly for energy gun applications.

Let's turn to a consideration of the physical properties of these new materials. First of all, they are all compounds of the element titanium. The ones that have been investigated most thoroughly are titanium dioxide TiO_2, and the titanates of magnesium, calcium, strontium and barium, whose chemical formula is $XTiO_3$, where X stands for one atom of any of the elements listed. Finally, there have been studies made on mixtures of these, the most interesting ones being those of barium and strontium. All these compounds are ceramics and are prepared for use by firing at 1,350°C for several hours followed by a very slow cool.

Titanium dioxide is interesting from the practical standpoint because it is such a high quality condenser material. It has a dielectric constant of about 100. The astonishing thing about this is that it holds this value with remarkable constancy from d. c. all the way up to 10,000 megacycles—3 cms wave length. What it does beyond this frequency is not yet public knowledge, there being no published data. This constancy is a completely surprising behavior, since a high dielectric constant at a low frequency generally implies a rapid dropping off with increasing frequency. In the past, materials that held their dielectric constant up to these ultra-high frequencies had Ks of about 3 only.

Let's digress for a moment and look at this matter of the variation of dielectric constant with frequency. When an alternating voltage is applied to a condenser the internal electric field, that is the forces acting on the electronic structure, will oscillate at the same frequency as the applied voltage. Now if the electronic structure is capable of following these alternating forces, the dielectric constant will remain unchanged. However, if the structure is of a type that shows less and less ability to follow as the frequency is raised, the dielectric constant will show a corresponding decrease.

An example of this type of material is water. We have mentioned that it has a K of 80. This is true only at low frequencies. At optical frequencies it has dropped to about 1.75. This is known from the fact that the index of refraction of water is about 1.33. This index is merely the ratio of the speed of light in air to that in the medium under question. We have already mentioned that the speed of propagation of an electromagnetic wave is inversely proportional to the square root of the dielectric constant. Hence it follows that the dielectric constant of water at optical frequencies is 1.33×1.33 or 1.75.

In view of the constancy of the dielectric constant of titanium dioxide with frequency, it is not too surprising that it has very low elec-

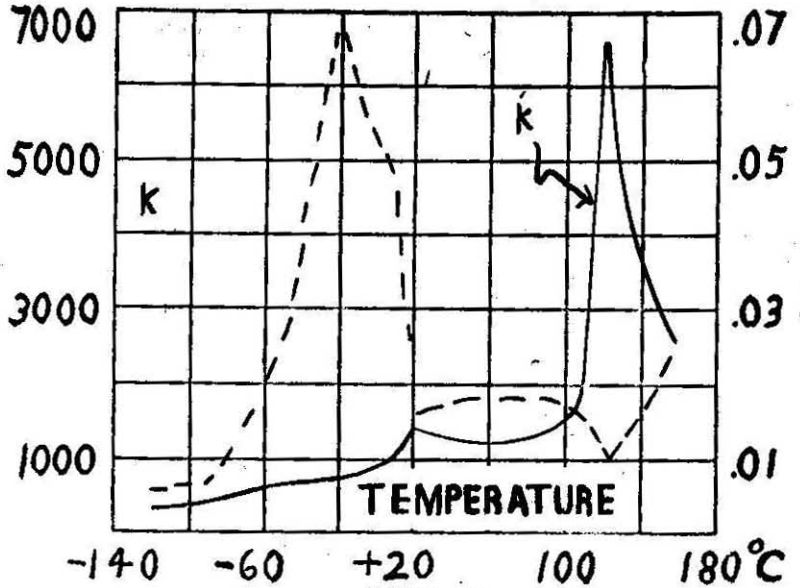


FIG. 3

DIELECTRIC CONSTANT AND LOSS OF $BaTiO_3$ AT 1Kc AND 23 VOLTS 1cm

trical losses. From about 1,000 cycles to 10,000 megacycles, its loss factor never exceeds 4/10,000 and on the average it is considerably better than this figure. This means that when power is being supplied to the condenser only 4/100 per cent or less is being dissipated as heat!

The material has a somewhat complicated behavior with temperature. As the temperature is increased the K drops uniformly, at the rate of about 1/10 per cent per degree Centigrade. As some critical temperature, the K starts to increase but at a much steeper rate. The location of this critical temperature depends on the frequency. For instance, at 60 cycles, it is about 95°C; at 1,000 cycles it is 140°C; while at 100 kilocycles it has shifted up to 240°C. This means that for high-frequency work the user need not worry about the operating tempera-

ture getting up so high that the transition point will be reached. So much for TiO_2.

The material that really captures the imagination, and one that is proving a happy hunting ground for physicists, is barium titanate and its mixtures with strontium titanate. It almost seems that all you have to do is to mention any physical effect and barium titanate will have it in an exaggerated form.

It is what is called a ferro-electric material. This means that in the field of electrification this material bears the same relation to other dielectrics as iron does to other materials in regards to magnetization. The parallelism is quite close in many respects.

The dielectric constant is enormous by ordinary standards. Furthermore it varies considerably with the strength of the applied electric field in about the same way that the permeability of iron does with external magnetic field. At first K increases considerably with increasing field strength. It then reaches a maximum value and with further increases in field strength it drops off in value, rather slowly. Typical plots for three temperatures are shown in Figure 1. It will be seen that at 22°C the dielectric constant starts in at about 2,000, and by the time a field strength of 9,000 volts per centimeter is reached K hits a maximum of over 8,000. Now while this voltage gradient seems high, actually it can be reached quite easily in a practical condenser. Taking the dielectric to be .005 inches in thickness, it would take only 115 volts across the condenser to get to this point.

Like iron, it has a hysteresis loop. A typical one is shown in Figure 2, which shows the charge that such a condenser will have as a function of cyclic voltage across it. For a given maximum voltage the shape and size of the loop depends a great deal on the temperature. Starting from —175°C, the loops increase in area up to —80°C. There is an abrupt drop at this point, and the curve starts in at about ½ of the former value, rises again until at 15°C it reaches the same value as at —80°C. Again there is an abrupt break, but this time further increase in temperature decreases the loop area. One more break occurs at about 85°C, the area suddenly dropping to half its former value, and from there on the area decreases continuously and rapidly, when it finally disappears at about 140°C. These multiple abrupt breaks are indicative of the fact that the crystal structure of the material can take on at least four different forms, the known changes from one to the other occurring at the temperatures mentioned.

The fact that the material has hysteresis brings about another curious effect. If one takes a condenser of this material and puts on both a d.c. and an a.c. voltage, the a.c. capacitance measured will be far from the same as the capacitance to d.c. One might be tempted to think that the former would be proportional to the slope of the K-applied voltage curve shown in Figure 1. However, just as in the

case of iron core choke coils—as, for instance, in radio B voltage supplies—this is not so. The a.c. values in the presence of d.c. are always smaller than when either one only is present.

Again, just as iron exhibits magnetostriction, so this material exhibits a strong piezo electric effect. What this means is that if a voltage is applied to the material, it changes its dimensions. Conversely, pull or squeeze the material, and a voltage will appear across it. Just how large this effect is is not known exactly because of the difficulty in preparing a large enough specimen of a single crystal. That the effect must be large is shown by the fact that polycrystalline form, which by rights should not show it, will sing vigorously when an audio-frequency voltage is applied across it.

Even the linear expansion of this material is peculiar. There are certain temperature ranges where it behaves quite normally, expanding as the temperature is increased. These, however, are separated by other ranges, where the material remains very constant in length!

The specific heat likewise exhibits peculiar breaks. But the effect that has the crystallographers bothered is a sudden change in the axial ratio of the crystal at 125°C. The change is only 1 per cent, but this is considered pretty terrific by those who work with such things.

From the standpoint of the physicist, the most interesting feature of this material is the way the dielectric constant behaves with temperature. A typical curve is shown in Figure 3. The behavior is certainly peculiar. Starting with a value of about K = 100 at −269°C —not shown on the curve—the curve shows first a somewhat gradual rise, with at least three distinct regions where the behavior changes abruptly. In the vicinity of about 100°C, the dielectric constant rises with great rapidity, until in a matter of 15° it reaches a value of about 6,500, and then decreases sharply again. Peculiarly enough, the dielectric loss reaches a minimum where the K is the highest. The minimum loss is about 1 per cent, which, while not low, is very much better than would be obtained from an electrolytic condenser.

A fact of considerable practical importance is that by the addition of strontium titanate, the temperature at which the peak occurs can be shifted wherever we desire. For instance, in a 29 per cent strontium, 71 per cent barium mixture, the peak is brought down to 23°C or 73°F, that is, room temperature. The curve is shown in Figure 4. It exhibits the astonishing K value of 11,600 at the peak. Unfortunately, the loss is rather large at this point, about 10 per cent. However, for certain applications this may not be serious. Since the loss drops rapidly with a slight increase in temperature—being only 1 per cent at 35°C, while the K has dropped to only 6,500—this suggests that a little more strontium should be added, thus shifting the peak down by 12° and bringing the low loss point to room temperature.

The peculiar business about all this is that strontium titanate is a well behaved material, with a quite modest dielectric constant as shown in Figure 5. Its change with temperature is quite gradual, and it maintains a substantially constant value of K even up to 100 megacycles. Yet its addition to its rather crazy cousin produces some pretty weird effects.

It is natural to ask why these materials exhibit such high dielectric constants. The whole story is by no means well understood and even what is known requires a rather advanced knowledge of modern theoretical physics. In simplest terms, the matter may be put this way.

Consider a unit condenser with plates 1 sq. cm. in area and separated by 1 cm. The space is assumed to be occupied by a dielectric. The capacitance of this condenser will then merely be the dielectric constant of the material. Now if a unit voltage is applied, it will be

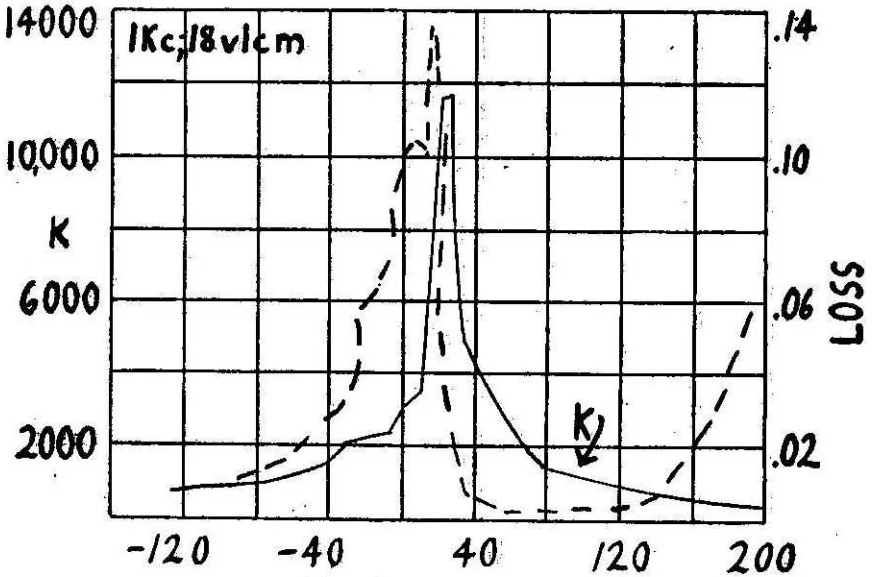


FIG. 4

DIELECTRIC CONSTANT AND LOSS FOR 71% $BaTiO_3$. 29% $SrTiO_3$

found that the metal plates have acquired a charge. The capacitance, or dielectric constant is simply the measure of how much charge collects on the plates. This charge is established in the following manner.

When the voltage is put on, an electric field is established throughout the dielectric. If we picture an atom within the dielectric to consist of a positively charged nucleus surrounded by a negatively charged electron cloud, the atom will be electrically neutral before the field is applied because the electrical center of the electron cloud coincides with that of the nucleus.

The applied electric field will exert a force which tends to separate the cloud center and the nucleus. These centers may be visualized as being held together by an attraction akin to that of an ordinary spring which resists the force exerted by the applied field. The amount of separation multiplied by the electronic charge per atom is called the dipole strength. This quantity, figured over a unit volume, will be proportional to the force created by the electric field, the constant of proportionality being known as the polarizability. Now the greater the polarizability, the greater will be the separation between the + and — charges of the atom, and hence it will depart farther and farther from the electrically neutral condition. By the ordinary laws of electrostatics, this internal unbalance will induce a corresponding charge on the metal plates of the condenser. Thus it can be seen that the greater the polarizability, the greater will be the dielectric constant of the material.

According to a simplified version of the mathematical theory, the relation between polarizability A and dielectric constant K is given by the relation

$$K = (2A + 1)/(1 - A). \quad (3)$$

It can be seen from this formula that for all dielectrics, A must be a number between zero and unity. The relation between K and A is illustrated below. It will be seen that as A gets near unity the dielectric constant is very sensitive to small changes in polarizability.

TABLE II

A	0	.5	.9	.95	.99	.9997
K	1	4	28	58	298	10,000

Now the problem is, what causes the modest increase in A for barium titanate that results in its stupendous dielectric constant. Well, so far we have talked of the shifting of the electron cloud. In a crystalline material there is a second effect in that the atoms in the lattice are ionized. Thus we have in addition to the dipoles formed by each atom another group of dipoles formed by the positive and negative ions in the crystal lattice. In barium titanate these contribute an additional 50 per cent or so to the already respectable electronic polarizability. The contributions of the ions thus bring the value of A very close to unity.

Now it may be objected that there are plenty of crystalline materials with quite ordinary values of dielectric constant. This is true. All that can be said is that for this particular material the effect is enough greater to show up as an enormous increase in K. By way of explanation, it is stated that in this material the separation between the oxygen and titanium atoms is slightly greater than the sum of their individual radii. In most crystalline substances it is slightly less. Thus it is said that the titanium atom can "rattle" within its inclosing octahedron of six oxygen atoms which accounts for the increase in ionic polarization. This means that when an electric field is applied, the ionic dipole can stretch more easily than in other materials.

The explanation of why this material is voltage sensitive follows the line usually given for magnetic materials. These are assumed to be made up of small blocks about 1/100 millimeter on a side, which are fully magnetized even when no external field is applied. Because of the fact that these blocks or domains are oriented at random, the net magnetization in the absence of an external field is zero. As a field is applied and increased, the domains gradually line up with the direction of the applied field.

In a ferro-electric material, the existence of these small regions has also been demonstrated. Within each region, the dipoles are assumed to be spontaneously polarized and oriented in the same direction, but again, because of the random directions of the domains, no net polarization is observable until a voltage is applied. Then as the voltage is increased, these domains start to align themselves in a common direction. When they are all lined up, the material is saturated, just as in the magnetic case.

To get back at the relation of all this to our hopes for the practical storage of electrical energy, let us take another look at Table II and draw cheer from it. The problem is essentially the pushing of the polarizability a little nearer unity. With barium titanate we are already at .9997 and the research is still in its infancy. As our ability to manipulate the structure of matter grows, it may well be that in the not too distant future we will be able to make the titanium or some other atom "rattle" just a little more. We will then have solved the problem of storage of electrical energy.

At this point, it is natural to inquire how far we are today from the solution. Suppose we assume that for home use, a 100 kilowatt-hour package represents a reasonable requirement. This should last an average household from two to four weeks. A juggling of the two formulas already given shows that the volume of the package varies directly with the energy to be stored and inversely with the dielectric constant. However, it also varies inversely with the square of the maximum safe working voltage that we can put across the

material. For barium titanate this is rather low, being only 100,000 volts per inch. Thus, despite the large K, it turns out that to hold the above amount of energy the condenser would need to be 20,000 cubic feet in volume, or the size of a six room house! If the breakdown voltage could be increased to that of paper—2,000,000 volts per inch—the size would come down to 50 cubic feet. This then means that a charged condenser slowly loses its energy because the dielectric is not a perfect insulator. Unfortunately, barium titanate is a rather poor insulator. It turns out that a condenser made from this material would lose 1 per cent of its energy in the incredibly short time of 4/10ths of a second! But suppose that the dielectric constant were increased by the factor of 50 referred to above. The time would

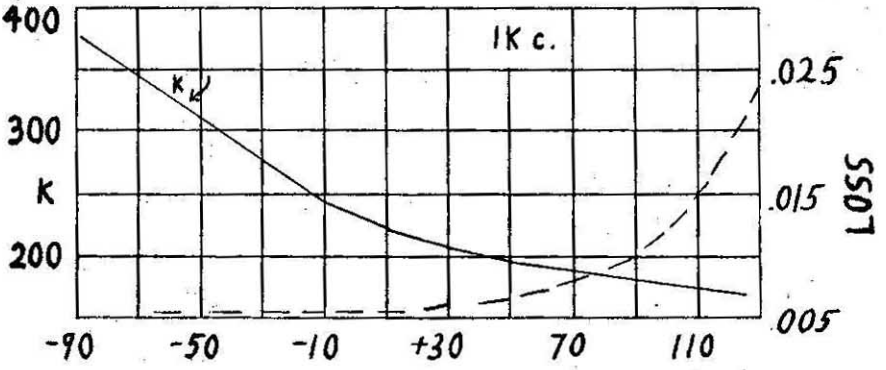


FIG. 5

DIELECTRIC CONSTANT AND LOSS OF $SrTiO_3$

we would still need a 50-fold increase in the dielectric constant before the size of the package would be right.

There is, however, another very serious problem to be solved before packaged electricity is practical. This is the matter of energy leakage. It is a well known fact that a charged condenser slowly loses its energy because the dielectric is not a perfect insulator. Unfortunately, barium titanate is a rather poor insulator. It turns out that a condenser made from this material would lose 1 per cent of its energy in the incredibly short time of 4/10ths of a second! But suppose that the dielectric constant were increased by the factor of 50 referred to above. The time would then increase to 20 seconds. If now our material could only be endowed with the insulating qualities of hard rubber—10,000,000 times as good as barium titanate—the time required to lose the 1 per cent would become 6 years!

To sum up, it would seem that before energy packaging becomes

practical, we must acquire a material with a dielectric constant 50 times greater than that of barium titanate, with the breakdown strength of paper and the insulation resistance of hard rubber! This seems like a lot to ask for. But remember, the research is still in its infancy. Would you bet that it won't be done?

References: (1) Von Hippel et al. "High Dielectric Constant Ceramics." *Industrial and Engineering Chemistry*, Vol. 38, No. 11, 1946 Pp. 1097-1109.

(2) B. Wul. "High Dielectric Constant Materials." *Jour. Phys. U.S.S.R.*, Vol. X, No. 2. 1946.

THE END

THE ANALYTICAL LABORATORY

The results on the May issue follow below. It's been some time since I explained how these scores are figured, so for those who have missed it, the method of scoring is as follows. Say a letter or card votes Story A for first place, X for second, M for third, and R for fourth. That gives A 1 point, X gets 2, M 3, and so on. Another reader may rate them A-2, X-4, M-1 and R-3. The total number of vote-points each story receives from all letters is added, and divided by the number of votes, giving the average point score. Since a reasonably accurate statistical sampling of our "universe" of readers would require about one thousand letters, which we don't ordinarily get, the point scores are actually meaningful only to two digits. That usually determines order of preference, at any rate.

But here are the May scores:

Place	Story	Author	Points
1.	And Searching Mind (End)	Jack Williamson	1.85
2.	The Rull	A. E. van Vogt	2.25
3.	The Strange Case of John Kingman	Murray Leinster	3.10
4.	The Mechanical Answer	John D. MacDonald	3.60
5.	The Obsolete Weapon	L. Ron Hubbard	3.90

THE EDITOR.

BOOK REVIEW

"The Reach of the Mind," by J. B. Rhine. (William Sloane Associates, New York.) Price $3.50.

Reviewed by Jack Williamson

"What are we?" Dr. Rhine inquires.

"No one knows," he replies.

This exciting book, however, tells of a bold effort, launched by Dr. Rhine himself, to ask that tremendous question of nature herself, through the scientific method.

The arresting, if incomplete, answer from the laboratories of parapsychology at Duke University is confirmed by other workers at other centers of learning. Man is more than a meat machine.

"The Reach of the Mind" is a broad survey of recent discoveries which promise a revolution in science and philosophy quite as devastating as the equally uncomfortable theories of relativity and the quantum touched off soon after 1900.

Dr. Rhine sketches the background for his now-famous investigations, which began in 1930. He describes the methods used to snare the most elusive capacities of the mind for laboratory study, the criticism which greeted publication of his first results in 1934, and the slowly widening acceptance of parapsychology as the critics were answered.

These experiments have established two nonphysical capacities of the mind—ESP or extrasensory perception, and PK or psychokinesis. The two are shown to be so nearly related, logically and experimentally, that they must be really one. This ability of the mind to transcend space and time beyond the reach of the ordinary senses, to perceive matter and to act upon it without the intervention of any physical medium, has been designated by the Greek letter *psi*.

Two phases of the research aroused criticism. The experiments themselves, commonly made with dice or the simple deck of "ESP cards," are not spectacular. The mathematical analysis of the results

can find a significant meaning in an apparently small deviation from random chance. But the critics have been silenced.

"On the experimental side," says a press release authorized in 1937 by the American Institute of Mathematical Statistics, "mathematicians, of course, have nothing to say. On the statistical side, however, recent mathematical work has established the fact that . . . the statistical analysis is essentically valid."

A vividly convincing aspect of the evidence is the decline in scoring rate during every typical experiment. Something makes a subject do his best on the first trials after each pause or change in routine. No flaw in the methods could well account for that. But if the *psi* effect belongs to the highest level of mental activity, as Dr. Rhine believes, that decline seems a natural result of fatigue and monotony.

Altogether, the evidence for a nonphysical phase of mental activity is convincing. It demands attention, as urgently as Max Planck's equally disturbing notion of the quantum did in 1900. For it is nothing freakish or abnormal. Dr. Rhine has revealed a generally unsuspected fact about all men.

Psychokinesis must involve a natural force not known before. Its observed effect upon the fall of dice may seem as feeble as the flashes of disintegrating radium atoms in the spinthariscope. Under conscious control, however, the *psi* capacity would surely be mightier than nuclear fission.

The superiority of the *psi* process to space and time suggests some sort of survival after death. Dr. Rhine mentions the possibility of a psychical continuum, beyond the narrow domain of physics, which might have "a transcendent uniqueness . . . that some might call divinity."

For all the challenging importance of such ideas, Dr. Rhine remains sober, fair, and calm. He seems not merely to be looking for proof of any wishful preconception, but rather earnestly seeking scientific truth and ready to abide by his findings.

He concludes with a plea for further research, to establish the far-reaching science of the mind he envisions. Today, as he says, we know the atom better than the mind —and atomic knowledge has created a desperate need for the higher ethical power and the new social feeling he expects from parapsychology.

". . . And Searching Mind" was written before I had read this book, but much of the background is based on the researches of Dr. Rhine and his associates. The paraphysical attributes of mankind are the final answer to the overgrown physical science of the humanoids—and Dr. Rhine hopes for a "nuclear psychology," which might likewise rescue mankind from the devastating aftermath of nuclear physics.

The crisis is here. Human power must rule atomic power—or perish from this planet. The parapsychological research which Dr. Rhine requests might decide the remotest future of mankind.

DREADFUL SANCTUARY

BY ERIC FRANK RUSSELL

***Concluding** the story of men who did not want the stars—and the proof that a belief need not be true to be real—and deadly.*

Illustrated by Timmins

Part III

After seventeen successive Moon-rocket disasters, John J. Armstrong, New York gadgeteer, has uncovered an international organization responsible for sabotaging the vessels. He has been aided in his investigation by Bill Norton, of the Herald; *Hansen, a private inquiry agent and his secretary Miriam; also by Eddie Drake, technician employed on the ill-fated rocket number nine; George Quinn, pilot-to-be of the incompleted rocket number eighteen; and Claire Mandle, physicist sister of the mysteriously killed Professor Robert Mandle, a rocket specialist.*

The international saboteurs masquerade under the name of the Norman Club. Politically and financially powerful, they regard themselves as bell-wethers of the world's stupid flocks and believe themselves chosen for this function by the hard facts of history. Armstrong discovers that two of its local notabilities are Senators Lindle and Womersley.

While trapped by the Norman Club, he is told by Lindle that the world is populated mostly by descendants of intellectually defective outcasts of other planets, the black races being deported Mercurians, the brown races Venusians, and the white races Martians. Only the yellow races, he asserts, are native Terrestrials. This ancient act of tri-racial purification was perhaps the most stupendous purge in the history of sentient life and has made Terra a dreadful sanctuary for the Solar family's mentally deficient. On the other planets, it has been of immense benefit to the purged races, making them almost godlike.

Lindle claims that even among Earth's maniacs sanity remains a dominant strain so that eventually the world must grow sane even though the process be slow, tortuous and long. He divides Earth's population into a huge majority of humoral beings called Hu-mans, and a tiny minority of normal ones called Nor-mans. Most people, he maintains, are still insane to varying degree, but all members of the international Norman Club are completely sane and can be proved as such by employing a Martian-designed apparatus known as the psychotron.

He asserts that the few sane ones of Earth owe loyalty to none but their equally sane forefathers on other planets, and that therefore it is their bounden duty to prevent rockets reaching the Moon and thus opening the cosmos to congenital imbeciles. After forcibly subjecting Armstrong to the analysis of the psychotron, he pronounces him sane and invites him to join the Norman Club.

Armstrong has been hunted by members of an unknown gang led by a sandy-haired man armed with a new weapon in the form of a coagulator, and he learns from Lindle that these are much-feared Martian Hu-mans, or deportees of recent date. They know little of the Normans, but are anxious to get back to Mars and thus favor rocket-progress. Although Armstrong is equally in favor, he has fallen foul of them repeatedly, and some have been killed. After listening to Lindle's proposition, Armstrong asks time to think it over, is set free, and promptly rejects it as contrary to his own inclinations.

Alarmed by the world's accelerating psychic trend which favors increased rocket-building despite disasters, the Norman Club seeks to divert it by stirring up a third world war. Realizing that previous wars have stimulated scientific progress, they aim to postpone rocket-ventures indefinitely by prolonging the war until the world is in ruins and they alone hold the remnants of former science.

Armstrong and his helpers, now driven underground, wanted by the police and the F.B.I., hunted by Martian Hu-mans and sought for by the Norman Club, decide that attack is the only defense. Armstrong goes to Washington and gains an interview with General Gregory, an influential opponent of the saboteurs, tells him all that he has learned. He indicts Senators Lindle and Womersley and the entire Norman Club organization, leaving it to Gregory to take whatever action lies within his power.

Immediately afterward, Armstrong reads a report to the effect that Claire Mandle has disappeared and that George Quinn is being hunted for the murder of Ambrose Fothergill, director of the rocket-plant in New Mexico. This is a mortal blow to his plans—unless he moves quickly and hits hard. Singlehanded, he decides to strike at once at the very root of the opposition.

XII.

The address shown in the telephone directory proved to be that of a colonial mansion standing within high-walled grounds. A barbed and electrified wire fence ran along the top of this wall. There was a small, solidly built lodge at front, another at back, and each flanked a pair of enormous steel gates behind which lounged some decidedly hard-looking eggs. Other equally tough mugs could be seen patrolling the grounds beyond the gates. The whole set-up suggested that Senator Womersley rated as a person of considerable importance.

It was obvious to Armstrong that he must discard his vague notions of busting into the dump by means of any handy door or window. Nor was there a chance of anyone bulling his way in without getting lead in the liver for his pains. This was a situation requiring guile.

"Softly, softly, catchee monkey!" he quoted to himself as he approached the front gates.

The guards alerted when they saw him nearing. He put on his face an expression which felt stupid but was intended to be ingratiating. One of the guards responded by spitting contemptuously at a fly on the lodge wall.

Holding his card through the thick bars of the gate, Armstrong spoke as agreeably as possible. "Would you mind inquiring whether Senator Womersley is willing to see me?"

Taking the pasteboard, one of the guards glanced at it, demanded, "You got an appointment?"

"No."

"What d'you want to see him about?"

"A matter referred to me by Senator Lindle."

"O.K." He turned toward the lodge. "You wait there."

The wait lasted half an hour during which he stamped impatiently around and wondered how many wires were humming with questions about him. Eventually the guard came back, surlily unlocked the gate.

"He'll see you now."

Going through, Armstrong fol-

lowed the other to the house. The gates clanged behind them; it was an ominous sound, the sort of metallic clamor which heralds the beginning of twenty years in Sing Sing. Another patrolling guard crossed their path; he was being dragged at the end of an anchor-chain by a dog half the size of a horse.

Gaining the building, they waited another five minutes in a gloomy, oak-paneled hall from one wall of which the dusty, moth-eaten head of a moose stared lugubriously down at them. There were four guards stationed in this hall and all looked as if they'd been affected by long association with the moose.

Finally he was shown into a lounge where Womersley posed by the French windows. The senator turned to examine his caller, revealing himself as a portly and somewhat pompous personage with ruddy cheeks and long white hair of the kind politely called distinguished.

"So you're Mr. Armstrong?" he enunciated, pontifically. Taking a high-backed chair, he seated himself carefully and importantly, as if about to declare this meeting open. "What can I do for you?" Tapping his teeth with a silver pencil, he regarded his visitor with a faint air of patronage.

"Not so long ago our mutual friend Randolph Lindle treated me to a taste of the psychotron." He eyed Womersley sharply. "Doubtlessly you know about that?"

Womersley smiled slowly and went on tapping his teeth. He said: "Please proceed."

"You refuse to say?" He shrugged his shoulders. "Oh, well, I guess it doesn't matter. I assume that you do know of it."

"I am interested only in facts," Womersley observed. "Your assumptions fail to divert me."

"Facts interest me likewise—especially the fact that you and Lindle appear to be the leading lights of the Norman Club in this country."

Still playing with the silver pencil, Womersley smiled again, made no reply.

"The Norman Club viewed me as a natural," Armstrong went on. "Having given me the works, they assured me that I'd come back to them, voluntarily, of my own accord. I'm sane, you see? I'm bound eventually to think as they think—because great minds think alike." He paused reflectively. "At that time I disagreed with them most emphatically, and I felt certain that I'd never see things their way, not if I lived another million years. But I was wrong."

"Ah!" Womersley rammed the pencil into his pocket, clasped his hands together, put on an I-told-you-so expression.

"They were right and I was wrong." He faced the senator squarely, his manner deceptively frank. "It's not so much that I've had time to think as the fact that events have compelled me to think. Sandy-hair's gang has given me plenty of food for thought."

"Sandy-hair's?" Womersley was mystified.

"I'm being hunted by a crazy

crowd who claim to be Martians lately deported from Mars."

"Hu-mans," defined Womersley. He made a clicking noise with his tongue. "What they lack in numbers they make up for in capabilities. This place of mine is well guarded because you're not the only one they'd like to get at."

"Anyway, they convinced me where Lindle failed. So I've come back."

In silence, Womersley studied him for a while. Then he turned round in his chair, flipped a little lever set in the wall. For the first time, Armstrong noticed that there was a diamond pattern of small perforations in the wall beneath the lever and a small lens above it.

"Well?" said Womersley to the wall.

"It's him all right," assured a tinny voice from the perforated diamond.

"Thanks!" Reversing the lever, the senator turned back and faced his visitor.

"New York identification?" Armstrong suggested.

"Certainly!" He contemplated the ceiling while he continued speaking. "The psychotron identifies sanity. No more than that. It does not classify opinions. Even the sane may hold differing opinions about some things—though not those opinions peculiar to the insane. You realize that, of course?"

"Yes, I do."

"Therefore you will also realize that you can't just jump aboard the bandwagon the moment you consider yourself entitled to do so. A declaration of change of heart is not sufficient for us. It is far from sufficient."

"I had guessed that in advance. You will want me to prove that my notions really are what they purport to be. I shall have to assassinate the President or do something equally desperate."

"You are not without perspicacity," Womersley conceded. "That is to be expected considering that you are a Norman by nature. It now remains to be seen whether you are also one by inclination. We can find you a task the satisfactory performance of which—"

"You need not bother about concocting a test of my loyalty," Armstrong put in swiftly. "The second reason why I wished to see you is because I now have the proof ready and prepared."

Womersley's eyes glowed, and his voice lost its suavity. "What will be acceptable will be that which corresponds with *our* definition of proof—not yours!"

"Maybe. But in this instance the proof is something you'll have to take up whether you like it or not. You can't afford to let it go. To let it pass would send even the psychotron daffy!"

Standing up, his posture irefully important, Womersley snapped: "Be more explicit!"

"They're building rocket eighteen in New Mexico. It's cheese in the mousetrap, as you most certainly know. It's a decoy to draw certain parties away from nineteen and

twenty which are being built elsewhere."

"So far, you have told me nothing."

"I'll tell you something now—all three of those rockets might as well be tossed on the scrap-heap."

The senator's face was cold as he said: "Is that all?"

"Not by a long shot!" He grinned his satisfaction. "You shouldn't make assumptions yourself, you know! I didn't mean that they're useless because the Norman Club is going to bust them when the time is ripe. On the contrary, they're no better than scrap because they're hopelessly outdated."

"Eh?" Womersley breathed heavily. "What d'you mean by that?"

"Somehow . . . I don't know how . . . one of those Martian nuts got himself deported along with plans of a super-dooper scout job." He watched with pleasure as the other's florid complexion deepened and his eyes widened in incredulity. "You can understand why he did it seeing that every one of them is itching to get back home. It's a seven-man-crew contraption, and it's umpteen centuries ahead of anything we've got. He claims that it can be constructed in ten weeks, given the facilities. We can be on Mars—let alone the Moon—sooner than you think!"

Womersley's face was now a dull purple. His breath wheezed deeply. The fury boiling within him was amazing for one of his appearance.

Controlling himself with an effort, he rasped: "Where did you get all this?"

"It was offered me for two reasons. Firstly, it was known that I'm violently in favor of going places as fast as possible. Secondly, it was believed that I might be able to pull enough strings to get the facilities necessary for building the ship. If I can't, or won't, the escapee takes his plans to Britain, France, Russia or anywhere else where he can get co-operation."

"Go on," Womersley ordered, grimly.

"This guy has reneged on his gang—Sandy-hair's gang. Or maybe odd deportees have failed to contact other, better organized ones. He's looking after himself, see? He wants help to build a scout job. He's got the plans—and he's got a price for them."

"What is it?"

"A firm guarantee that he'll be taken to Mars, will be released immediately on arrival, and that no mention will be made of him to the Martians." He made an explanatory gesture. "The boy is homesick."

"Where are the plans now?"

"He's sticking to them."

Gazing at him steadily and deliberately, eye to eye, Womersley harshed, "All this could be true. Yes, it could be—knowing what I do know. What I'm far from satisfied about is why you opposed us so long before you come to us running."

"I dismissed the Norman Club because I couldn't believe all this Martian-origin stuff. It was con-

trary to everything I'd learned, everything I knew." He stood up, shoved his hands into his pockets. "But now I've learned a lot more. I've been sniped at and I'm still being gunned for, so that for me the whole affair is no longer a matter of truth or untruth, but rather of life or death."

"Yes, but—"

"The snag I'm up against now is that of convincing this fellow holding the plans that I've got political connections powerful enough to get his rocket built in double-quick time. If I don't convince him, off go the plans heaven knows where—and somebody's sure to use them. So this is where you come in."

"Me?"

"Yes. He knows of you as a considerable political influence in Washington. He doesn't know about the Norman Club, much less your connection with it. Being a Hu-man, he'd be mighty leery of Nor-mans, anyway. Having taken a chance on me, he'll take one on any big enough political figure standing behind me. You've got to tell him you can find a million dollars to splurge on his rocket. You've got to persuade him to hand over those plans."

A conflict of emotions twisted the senator's plump features. Apprehension, suspicion, desire—all were there. He paraded several times up and down the room before speaking.

"Where and in what circumstances can you make contact with this individual?"

"He's going to phone my New York apartment before twelve tomorrow."

"Your apartment is burned down."

Oh, so you know that! thought Armstrong. Glibly, he said: "I've got another, of course. D'you think I'd sleep in the fields?"

"What if he has phoned already, while you are here?"

"He'll get no reply and will call again later. But when he does, you had better be there too! Or Lindle. I don't care which of you it may be, so long as it's one or the other. To bring this fish in needs better bait on the hook than I can provide."

"Armstrong," pronounced Womersley, with sudden decision, "I'm enough of a political picture to be framed. In fact, some have tried it—to their everlasting regret!" He stuck out his chest as if he'd have beaten it if only he'd been adorned in a tiger-skin. "So take warning—any funny business will be liable to boomerang on you! I'm going to come in with you on this plan-question, not because I fully believe you, but solely because it could be true and, if it is, it's far too momentous to ignore. We just can't afford to ignore it!"

"That's what I thought."

"And that's what I know you've been thinking!" Womersley retorted. "Therefore, I'm coming in my way, and not yours! If this story proves to be an elaborate gag"—he paused, his face hard—"it will be your last such one on this world or any other!"

"And if it's not a gag, if it proves

genuine, the Norman Club takes me to its collective bosom?"

"Yes." Ringing a deskbell, Womersley spoke to the guard who responded. "Have Mercer get the car ready. Tell Jackson, Hardacre and Wills that they're coming with me to New York pronto." He waited until the other had gone, then said to Armstrong, "Those four will accompany us. They're so touchy they start shooting if someone grits his teeth. Bear that in mind!"

"I won't forget," Armstrong promised.

He resumed his seat while Womersley made ready for departure. His broad, heavy face held a hungry look. As a crocodile, he'd put over a good imitation of a log!

They piled into a big, silver-gray Cadillac with Mercer behind the wheel and Jackson sitting by his side. Armstrong's large pants pressed the middle of the back seat where he was jammed between Womersley and Wills. The folding occasional seat facing the rear three was taken by Hardacre, a craggy personage who obviously regarded his position as strategical and viewed the passenger as a prisoner. He favored the latter with a belligerent stare. Armstrong stared back at him, sniffed a couple of times, then sneezed.

Pulling away from the fortress-like estate, the powerful machine swooped northward. Armstrong sniffed at frequent intervals, sneezed a couple more times. Pressed closely against him, Womersley fidgeted with distaste but made no remark. Hardacre eyed him as if the free distribution of germs were a hostile act.

"Got plenty wet in that storm," Armstrong mourned to nobody in particular. "I'll be dead with pneumonia before we get there . . . *A-a-arshoo!*" He jerked with the violence of his sneeze, leaned hard on Wills, struggled to extract a handkerchief from his right-hand pocket.

Hardacre's eyes glittered as he waited for the handkerchief to appear. He seemed to be expecting the sufferer to produce anything from a rattlesnake to a field howitzer. Emitting an irritated grunt, Womersley edged away, giving the heaving Armstrong room to get at the pocket.

Drawing out the handkerchief with a triumphant flourish, Armstrong wrapped it around his nose and bugled vigorously. At the same moment, a tiny metal cylinder slid up his right nostril. Holding the handkerchief on his lap, he blinked owlishly at Hardacre.

After another ten miles, he resumed his sniffing, doing it through the nostril yet unblocked. Then he coughed, gobbled like a turkeycook and hurriedly employed the handkerchief to choke another sneeze. The second cylinder slid up the other nostril. Hardacre's gaze remained fixed upon him. He gasped a couple of times, coughed again, leaned on Womersley while he fought to get at his left-hand pocket.

Hardacre snapped at Wills: "I

don't like this song and dance. See what he's diving for now."

Raising himself clumsily in the swaying car, Wills forced a hairy hand into the pocket, dragged out another handkerchief and a bunch of keys. Hardacre registered acute disappointment.

Hoarsely murmuring, "Thanks!" Armstrong mopped his nose with the second handkerchief, jingled the keys, smiled broadly at Hardacre. That worthy scowled, turned his gaze away for the first time, and stared out of the window.

Armstrong sighed, began to scratch his knees. He did it absentmindedly, sniffing and wheezing at intervals, while the others continued pointedly to ignore him. His fingers scratched and tapped and played nervously until finally he got the phial loose from its knee-strap and felt it slide down the leg of his pants. The slender glass tube fell silently onto the carpeted floor and none heard the sound of it as it splintered under his heel.

The Cad rushed onward and covered eight more miles in nine minutes before things began to happen. Womersley, who had slowly slumped in his seat, suddenly made loud bubbling noises through pursed lips. At the opposite end of the seat, Wills lolled against Armstrong and swayed helplessly with the motion of the car.

With a sharp preliminary swerve, the big machine commenced to wander at high speed all over the road. With vague alarm battling the urge to slumber, Hardacre fought to awake and make action. His hands moved slothfully and uncertainly as they sought for his gun.

Lifting a columnar leg, Armstrong put his big foot on Hardacre's stomach and shoved. The breath whooshed out of the other. He fell forward, sobbed for air on the carpet. Fumes rising from the crystals on the floor filled his lungs.

Leaning over him, Armstrong snatched the nodding Mercer bodily from under the wheel, tossed him onto Womersley's lap. The Cadillac yawed, headed toward a bank. Bending further forward, he grabbed the wheel, straightened the onrushing machine. He held it thus a moment, knowing that with no foot on the accelerator its automatic gears had slipped into neutral. It slowed. In the seat beside that lately warmed by Mercer, the semi-drugged Jackson pawed at him feebly. Still holding the wheel with his left hand, he slugged Jackson behind the ear with his right.

Reluctantly the Cad drifted to a stop. Putting on the handbrake, he got out, closed the door behind him, sat on the bank and enjoyed a cigarette while the supine passengers continued to stew in the fumes. Once Wills rolled his head lackadaisically; once Womersley made a feeble gesture in his sleep, but after five more minutes they resembled a load of corpses.

With the little filters out of his nose and back in his handkerchief, Armstrong opened all the doors, let the wind clear the car. He swept out a few undissolved crystals. Keeping a careful watch on the

road lest he be subjected to the unwelcome attentions of other motorists, he lifted out all but Womersley, bore them swiftly one by one up the bank, parked them side by side where they'd be out of sight from the highway. As an afterthought, he picked a convenient weed, placed it in Hardacre's hand. Returning to the car, he rolled Womersley onto the floor, closed and locked the rear doors, got into the front seat and drove onward at top speed.

His mad pace would have interested the police had he not slowed down twice in precisely the right places. He rushed the Cad as if every second were costing him a thousand dollars. Three times he stopped; once for gas, once to send a wire postponing his appointment with the general, and once to quiet his slowly reviving passenger. All these pauses meant trouble. He had to shoo off a nosey gas-station attendant. He had to tell a tale of drunkenness to a passer-by near the post office. As for the last, Womersley's dim awakening indicated that the tricked guards likewise would be recovering and that the hue and cry would begin as soon as they could start it.

Womersley settled down under a second dose of dope. He gave the senator a long shot of it, enough to keep him peaceful for most of the night. The rest of the journey was covered without mishap, and he tooled the car through New Jersey with a feeling of satisfaction which grew as he neared Drake's home.

Ed Drake answered the door, took one look, exclaimed, "Jeepers! I thought you'd been buried!"

"I'm in trouble, Ed. I want you to help me out."

"What's wrong now?" His wandering eyes suddenly found Womersley reposing in the back of the car and pain sprang into his lean features. "Hey, are you carrying a stiff?"

"No—he's all out. I'd like you to take him off my hands a short while." Unlocking the rear door, he proceeded to lug the senator from the car. He handed the body to the surprised Drake as if bestowing a gift. "Toss him on a bed and let him snore until I return. I'll be back before long—I'll explain everything then."

Holding the sagging Womersley with difficulty and without enthusiasm, Drake said: "I hope this is on the up and up?"

"Don't worry, Ed. Put him out of sight until I return. You'll be all right. You know me."

"Yeah, I know you—that's what's got me worried," Drake walked backward through the door, dragging the senator with him.

The Cadillac started up, and Armstrong whirled it away. He took the bottom corner on two wheels. Behind him, Ed Drake peered sourly from the door until the fast moving car was out of sight. Then he shrugged, closed the door, lugged his unconscious visitor upstairs.

It was four hours and twenty minutes later when Armstrong reappeared. Heavy-footed and tired,

he lumbered in, dumped a big black box on the floor, glanced at the clock which showed the hour of midnight.

"Has that body become animated yet?"

"No," said Drake. "He's sleeping like he'd been drugged."

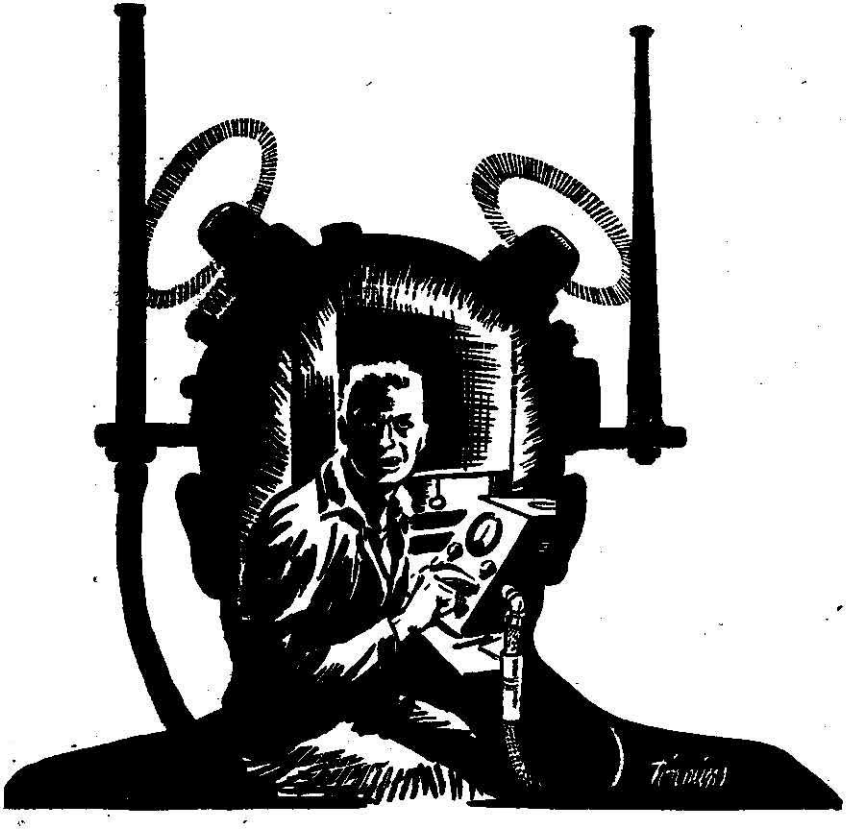
"Which he has."

"Eh?" Drake let his mouth dangle. "Who drugged him?"

"Me." He smiled at the other's expression. "I had to do it to get him all to myself." He sighed, looked at the clock again. "I could have been back an hour ago if it hadn't been necessary to dump his car in New York where they'll be sure to find it. I had to skip from one taxi to another to return."

"You dumped his car?" Ed Drake's voice went up in pitch. "D'you mean it was hot? Have you kidnaped this guy? What the heck's going on around here?"

"Take it easy, Ed. The gentleman is Senator Womersley, and he's paying us an involuntary visit."



Drake jumped. "Womersley! I thought his fat face looked familiar!" He waved worried hands. "Hell's bells, John, they'll give you life for this. What the deuce possessed you to snatch a guy like him? Why drag me into it?"

"You'll see." His foot poked the heavy box he'd brought in. "That is one of the only ten electronic schizophrasers in existence. I had to borrow it at short notice, and after plenty of argument, from old Professor Shawbury, at Columbia. The original model is still in my lab at Hartford—but I can't go there to collect it."

"Why not?"

"Because, brother, I suspect that traps await me at every one of my oldtime haunts. That's one reason why I've had to come to you. I've seen you about four times in the last seven years, and this house of yours never was a regular calling-place of mine." He studied the mystified Drake keenly. "The other reason is that after some thought I've decided that I trust you—as far as anyone can be trusted these crazy times."

"That's nice! That's very nice! When I'm doing my twenty years in the cell next to yours, it'll be good to remember that at least you trusted me!"

Armstrong said, harshly: "Ed, if I don't get to the bottom of this, neither you nor I nor millions of others may live long enough to do twenty years any place." He made an impatient gesture. "Where's the body?"

"Upstairs on the front bed." Drake trailed after him moodily, helped him carry the senator down. He made no attempt to conceal his doubt and apprehension as he watched the other tie the victim in a chair.

Moving with businesslike efficiency, Armstrong opened the box, pulled from it a compact piece of apparatus resembling a portable short-wave therapy set. It had a tiny silver-tube antenna and a similar half-wave reflector set on either side of a plastic cup at the end of four yards of coaxial cable.

Putting the cup on Womersley's head, he adjusted the antenna and reflector with great care. Finally satisfied that the two tubes were located precisely where he wanted them with respect to the subject's cranium, he strapped them in position, made sure that no movement of the slumbering senator's head could dislodge them by a fraction.

Next, he connected the apparatus to a power-plug set in the wall, disconnected the coaxial cable, switched on, checked operation. Reconnecting the antenna lead, he fiddled with matching transformers at both ends of it, then switched off. He flopped into a seat, glowered at the unconscious Womersley.

"All we've got to do now is wait for this fat schemer to wake up."

Drake found another chair, lowered himself into it uneasily. "I wish you wouldn't use so much 'we' stuff. This is all your play, not mine." He surveyed the apparatus and chewed at his bottom lip. "What will that do to him?"

"Nothing harmful. So far as I'm

concerned, it's a sample of tit for tat. His crowd put me under a contraption called a psychotron. I'm putting him under this dingbat which, in its own peculiar way, is more efficient."

"Well, what is it?" Drake persisted.

"A microwave schizophraser. A kind of transmitter. It sprays oscillations on the neural band. You know that thoughts are electrical in nature, don't you?"

Drake nodded.

"This thing is no more than a simple jammer of thought-processes. Its beauty is that it can be made to muddle-up only the rationalizing sector of the human brain, leaving the motor ganglions, the memory sector and other parts free to operate spontaneously."

"If I'm right," suggested Drake, "that'll fill the guy with involuntary reactions. It will make him a spasmic. Where's the sense of that?"

"It won't make him a spasmic. It has no permanent effects. The gadget is nothing more than something ten times better than a lie-detector. A person questioned while under its influence is mentally incapable of refusing, concealing or distorting whatever information is lying latent in his memory sector. When asked, he cannot help but respond with what he knows to be the truth or sincerely believes to be the truth. If he hasn't got the answer, he doesn't reply—he can't substitute a false or misleading item of information." He waved a reassuring hand. "The worst that can happen to this political specimen is that for once in his life he may blurt out some awkward facts. Not so very terrible, is it?"

"He'll take off your hide for it, all the same. He'll make you die the death of a thousand cuts first chance he gets." Drake had another go at his bottom lip while he stared at the senator. His eyes grew round. "Look, he's waking now!"

Going across to the chair, Armstrong slapped Womersley's face gently but firmly. The senator snorted, mumbled, half-opened his eyes, closed them, opened them again. Taking his hands, Armstrong rubbed them vigorously. Womersley gulped, yawned, tried to move within his bonds, looked slightly stupefied when he found himself tied down. Pulling his hands out of Armstrong's grasp, he muttered peevishly:

"Where . . . am I? What's happening?"

Switching on the apparatus, Armstrong watched the politician's florid features. Drake likewise studied them, his own expressing anxiety.

Womersley put out a dry tongue, drew it in again, gaped around with optics which gradually grew dazed. He tried to lift his hands and failed. A few seconds later, his stare was as comprehending as that of a village idiot.

In a loud, clear voice, Armstrong snapped at him: "Who killed Ambrose Fothergill?"

Womersley was silent a moment, then croaked: "Muller."

"On whose orders?"

Again the silence. Womersley seemed to be having a psychic battle within himself despite the jamming of his reasoning processes. Instinct was substituting here—the ancient law of self-preservation. He blinked at his questioner as if he couldn't see him.

"Mine," he said. "Mine . . . mine!"

"Jerusalem!" breathed Drake, looking on.

Sternly, Armstrong continued: "Then why did George Quinn take it on the run? Was he framed? Did he realize that he'd been framed?"

Womersley made no reply.

Putting it in a different way, Armstrong demanded: "Did you give any orders concerning Quinn?"

"Yes."

"What were they?"

"He was to be taken away."

"By whom? By Muller?"

"By Muller, Healy and Jacques."

"This always is somewhat tedious," Armstrong observed to Drake, "because he's conditioned to answer only the bare question and he won't volunteer anything more. I'll have to drag data out of him item by item." Then, to Womersley: "Why did you order them to take Quinn away?"

"It did two jobs at one stroke."

"What were they?"

"It made it look as if Quinn had lammed and therefore was guilty. And it got rid of him."

"Why did you want to get rid of Quinn?"

"He was the official pilot."

"To what place has he been taken?" Armstrong's hard optics were fixed on the senator as he waited for the response.

There was no response.

"Don't you know?"

"No."

Taking a deep breath, he tried it another way. "To whom has he been taken?"

"To Singleton."

"Who is Singleton?"

"The Norman Club director in Kansas City," Womersley murmured. His head lolled forward, was brought up sluggishly.

"Do you know where Singleton has hidden him?"

"No."

"Do you know whether he is alive or dead?"

"No."

"Why did you order Fothergill's death?"

"He was one of us—a Nor-man. He was sane. But he lacked courage. He let us down."

"So?"

Womersley said nothing. He appeared to be in a semislumber.

Between his teeth, Armstrong gave forth: "Enough of that. We'll jump to the next subject." In louder voice, he pressed: "Where is Claire Mandle?"

"I don't know."

"Has the Norman Club any hand in her disappearance?"

"I don't know."

Suppressing his surprise, he continued: "If your New York mob had taken her, would you have been informed of it?"

"Not necessarily."

Frowning, he said to Drake: "We can learn something even from negative responses. He doesn't know what Singleton has done with Quinn, nor what Lindle's crowd in New York are up to. He's a pretty fat frog in this Norman Club puddle but isn't informed on everything concerning it. Therefore, big as he is, he's not Mister Big! He's high up—but someone else is higher!"

"Ask him," Drake suggested, with perfect logic.

"Who is the leader of the Norman Club in the United States?"

Womersley sagged in his chair, behaved as if deaf.

"Some gadget," Drake offered, sardonically. "It makes him confess all."

"It can't make him tell what he doesn't know," Armstrong retorted. He questioned the victim in different terms. "Is there a national leader of the Norman Club in this country?"

"No."

He favored Drake with an I-told-you-so glance before carrying on with: "Who's the Norman Club boss in Washington?"

"Me."

"And in New York?"

"Lindle."

"And Singleton's the boss in Kansas City?"

"Yes."

"Who is boss in Chicago?"

"I don't know."

"He doesn't know," Armstrong observed. "You see the significance of that? It's the cell technique! The boss of each cell functions as contact man with two or three other cells, the rest remaining unknown to him. Nobody can betray more than his immediate fellows and maybe another cell or two—whereupon the remainder take revenge. Surviving cells avenge those gone under. The sane maintain discipline in the same manner as the insane, namely, by fear of reprisals." He stamped up and down the room. "That means that elsewhere the Norman Clubs don't all function openly as Norman Clubs, and that some are masquerading in other guises—yogi cults, or heaven knows what. I could do with an army, Ed, a veritable army! And it would have to be an international one at that!"

"It sure looks like you're trying to bite off more than you can chew."

"I am—but I've gone too far to withdraw even if I wished to. I'm like a python who's locked his jaws on an antelope ten sizes too large for him—I've got to go on even if I bust!" He tramped backwards and forwards worriedly. "Supposing that in some miraculous manner I bumped this cynical old geezer and all his guards and all his Washington followers—what then? Lindle and his mob continue to function. So do a hundred or more similar cells scattered over this country. So do a thousand or more distributed over the rest of the globe." He screwed his right fist into his left palm. "It's like trying to overthrow international Buddhism in one week. It can't be done—but it's *got* to be done!"

"I don't see why." Drake scowled at the sagging senator, then at the

schizophraser, then at the clock. He suppressed a desire to yawn. "If you're yearning for a fight, why don't you get married?"

"This isn't funny, Ed. It's as unfunny as the robot-rocket and the atom bomb. It's as unfunny as bacteriological warfare, starvation, pestilence and the final collapse of civilization." He paused, hot eyes on his listener who looked a little abashed. "If you don't believe it, get a load of this!" Turning to the man in the chair, he said, sharply: "Womersley, are the international influences of the world's Norman Clubs striving to bring about a major war?"

"Yes." The speaker's voice was automatic, toneless, and his face was relaxed into near-dopiness.

"Why?"

"We're at the last ditch."

"What d'you mean by that?"

"They'll get . . . they'll get their Moon rockets away." He was mumbling haltingly now. "Maniacs . . . loose in the cosmos . . . congenital maniacs . . . snatching at the stars . . . unless we can start them . . . killing . . . each other." The senator ended with a low gasp and his head sank.

Armstrong leaped forward, switched off the schizophraser. "Brain-strain," he explained to the alarmed Drake. "He's endured the jamming too long and his mind has found refuge in unconsciousness. He'll get over it." Taking the plastic cap from the victim's head, he put the cap on the floor, propped the head with a cushion. "He's out of that drug, but the neural impulses have put him in a haze again. He'll need a little sleep to recover." Discontentedly, he eyed his dead apparatus. "Darn it, I could get ten times as much out of him if only his mind would stand the strain."

"What's all this gabble about the Norman Club, anyway?" Drake inquired.

Armstrong gave him the whole story as swiftly and briefly as he could, and finished, "They have not got complete power in this country —yet! We're a democracy, which means they stand to gain power most anytime, when circumstances favor them. Even now, as a strong, influential and ruthless minority they've enough pull to divert our destiny one way or the other. Governmental keyposts are held by their nominees, and departments have a quota of their members. Remember, Ed, that these Norman fanatics can be Democrats, Republicans or even Tibetan lamas; they can operate under any fancy tag which happens to suit their purpose at any given moment—though, all the time, fundamentally, they are Nor-mans, the superiors of Hu-mans!"

"Swami-stuff!" defined Drake, contemptuously. "That's not strong enough to start world-wide wars."

"Don't kid yourself! We aren't alone in this cockeyed-world. There are other nations, other peoples animated by other ideas of destiny. In some of them these Nor-mans may have less influence than they have here—but are fighting to get it! In some, they may have more power. In a few, they may be in complete

command. And it needs only one country to start a war—not two or more. One country, determined to start a holocaust, can begin the bloodbath. Germany did it under Hitler—and he was as fantastic a visionary as this fat chump or any of his Norman Club buddies. Germany marched into hell and pulled half the world with her—all for the sake of a mighty obsession."

"But—"

"Look, Ed, suppose that Germany's eighty million Nazis had been not a nation but an international cult. Suppose that they'd gained control of two or three countries at least one of which had high military potential. Suppose that they were in near-control of most other countries and formed a gigantic and redoubtable Fifth Column in what part of the world remained—d'you think they might have won their war?"

"They'd still have lost it," Drake declared without hesitation.

"Maybe they would; but they'd have taken a heck of a lot longer to lose it and would have exacted a price infinitely heavier from the world as a whole. However, that's not the point." He tapped Drake's arm to emphasize his words. "The point is that these Norman crackpots cannot lose a war."

"They can't—!" began Drake, irefully.

"Did Orientals lose the last war?"

"A silly question. The last scrap was between the democracies and the totalitarians."

"With the Chinese on our side and the Japs on the other. There were Orientals on *both* sides—so, taking them as a whole, they couldn't lose." His voice slowed down, became more emphatic. "Get it into your head, Eddie, that these Norman cultists are as completely international as short-haired dogs—and have as few real loyalties. Their purpose is to start a war big enough to put an effective brake on what they choose to regard as an undesirable form of progress. Which side nominally wins and which nominally loses matters not a hoot to them so long as the general wreckage is enough for their purpose. Why should they care who stands torn and tattered on the field of battle and claims to be the winner—they're on both sides!"

"I think you credit them with more power than they've got. The world's masses won't rush into uniform and die by the millions merely because an obscure gang of lunatics want them to do so."

"Won't they?" Armstrong's smile was lopsided and lugubrious. "All you have to do is invent a devil with which to scare the millions, use every available channel of propaganda to convince them that said devil exists and that it's an awful thing, and finally persuade them that a fate worse than death awaits them if they don't fight it with all they've got." He clicked his tongue sardonically. "Whereupon they fight like wildcats!"

Drake was indignant. "Are you suggesting that in the last war our boys fought and died for nothing?"

"Not at all! Quite the contrary!

But for what was the *other* side fighting?"

Drake went silent, thoughtful.

"As I have said," Armstrong persisted, "it needs only one country to start it. The others then have to fight to stop it. And any devil will do to get *some* mob in murderous mood. The Germans fought frenziedly against the imaginary demon called Encirclement. For fifty years or more the Russkies have held themselves ready to battle a fiend called Capitalism. There was a time when Christians fought bloodily against a foe named Islam. If, after due preparation through the world's propaganda-channels, tonight's radio dramatically summoned everyone to prepare to defend themselves against Technocrat invaders from Alpha Centauri, thousands of credulous listeners would reach for their guns. Do you recall those people who wanted to exterminate each other over the question of whether a boiled egg should be cracked at the big end or the little?"

"Shut up!" suggested Drake. "You turn my stomach. You talk like one of these Nor-mans—you're saying that we're all nuts!"

"What if we are? Maybe these Norman cultists are correct; maybe this world is a cosmic madhouse, a sort of dreadful sanctuary for the solar system's idiots—but is that any reason why the inmates should sit and sulk in a corner? Maybe ninety per cent of we Terrestrials are just plain daffy, but what good will it do us to roam around our cell and mope about it? That's where I and the Norman Club part company. If the loonies can bust out, I say good luck to them!" He pondered a few seconds, added: "Anyway, I'm not satisfied with a psychotron's arbitrary definitions of sanity and insanity, neither am I convinced that Martians, Venusians and Mercurians—if they really exist—are paragons of virtue when compared with us."

"You're selling me. What now?"

"You need to know all these things, Ed, because you've got to help me."

"In what way?"

"I must milk this white-haired old schemer of all he knows even if he collapses ten times during the process. I've got to make contact with some friends lying low in New York. I've got to discover what has happened to Claire Mandle, and I've got to figure some way of getting George Quinn out of bad. And that's not all, in fact it's not half of it; I must find some way of getting the police and the F.B.I. off my neck. Finally, if it's possible, I've got to pull a fast one on the international Norman Club before they pull a fast one on the world!"

"Three-quarters of which is totally impossible," declared Drake, positively. "You might just as well give yourself up and let matters take their course."

"Not while I've feet in my socks!" He studied Womersley as that individual suddenly commenced to snore. "He's recovering all right. I want you to hang onto

him for me, Ed; hang onto him at all costs for at least twenty-four hours. Don't let him get away from you even if you have to bash out his brains!"

"Are you going again?"

"I'm beating it across the river for reinforcements. Have you got a car you can lend me?"

"The Lincoln. It's around the back." Drake gloomed at his sleeping prisoner. "Oh, well—kismet! Reckon I'd better frisk him in case he's carrying something unpleasant."

"I searched him before we got here. He's carrying nothing. If he wakes up and starts bawling about his authority, hammer on his noggin!"

Hastening around the back, he found the Lincoln, took it away fast. It was three-forty in the morning by the clock on the dashboard, and the Moon was riding high as he pointed his bonnet toward the Hudson. "Three-quarters . . . is impossible," Drake had remarked. As one of those concerned with an earlier, ill-fated rocket-shot, Drake tended to be pessimistic. There was another viewpoint, older, better established, namely, that nothing is impossible.

Least of all a cosmic prison-break!

XIV

The choice lay between two possible contact-points—Norton or Miriam. If Hansen had not yet got in touch with Norton, and if the leery Miriam already had skipped, neither of these points would prove of any use. It was a waste of valuable time trying to think up a third way of finding Hansen without first testing these ready-made alternatives.

Miriam would be best for the first attempt, he decided. Parking the Lincoln near a phone booth, he tried the number which had got him through to her on the previous occasion. There was a long wait while the automatic system maintained its persistent *buzz-buzz* at the other end of the line. He listened uneasily, his eyes constantly searching the empty street.

Eventually there came a sharp click, the screen swirled, Miriam appeared in it. She looked dishevelled and liverish—there was no evidence of her afternoon glamour at this hour when dawn was breaking in the east.

"'Lo, Splendiferous!" he hailed. "How're your poor dogs?"

"What d'you want?" she demanded, showing a mixture of apprehension and irritability. "And why can't it wait?"

"Now, now! Be amiable! I wished only to see what you look like when you've crawled out of bed."

Automatically she primped her hair. Then she gave him a sour look and said: "Say what you want to say, and beat it."

"I called to see if you were still there." He glanced hurriedly through the windows of the booth, looking up and down the street. "I've got to make another call before we can talk turkey, so I'll put it through and ring you again in

half an hour's time. Hope you don't mind?"

"It would make a fat lot of difference if I did!"

"I'll call you back from this same booth and will be as quick as I can." He watched her fade out of the screen.

Quickly he returned to the Lincoln, drove it farther up the street, parked it around a corner. He had the bonnet sticking out just enough to enable him to keep watch on the distant booth. With the engine running, and his hands at the controls ready for a fast getaway, he kept the booth under observation for half an hour.

A few early workers appeared, passed him casually. Nothing more noteworthy had happened by the end of the appointed time. Giving up the watch, he drove the Lincoln uptown, found another booth, called Miriam from that.

"I checked your line. Somebody might have been sitting on it—in which case they'd have tried to pick me up forthwith. Evidently they've not traced you yet."

"Would I be here, if they had?" she inquired, scornfully.

"Perhaps, my lovely! They wouldn't remove the bait from the trap, would they?"

"Don't you call me bait!"

"Oh, all right." He wagged his head wearily. "I should have known better than to drag you from your dreams. Tell me where I can find a mutual friend and then you can return to your slumbers."

She babbled an address in Flushing, added hurriedly: "That's until noon tomorrow. Afterward, he'll be some place else."

"Thanks."

He took the Lincoln across the Triboro at a pace sufficiently sedate to soothe the cops patrolling at both ends. They let him pass with no more than an idle, disinterested glance. Once clear of the bridge he speeded into Long Island, soon found the tumbledown brownstone house which was Hansen's momentary hiding-place.

Hansen peered cautiously around the door. He was barefooted, and his suspenders dangled from his hastily pulled-on pants.

"Did Miriam give you this?" He closed the door quickly behind his visitor.

"Yes. She was anything but sweet—but she gave."

"You were lucky. One more day and you'd have had to whistle for both of us. She's moving tomorrow. Me, too." He dragged the suspenders over his shoulders. "You've got bags like flour sacks under your eyes."

"I know it. I've been up all night."

"Bad habit. It buys you nothing." He padded along the passage and into a rear room. "Squat somewhere while I get the rest of my clothes." His bare feet trudged upstairs. In short time he came down with the remainder of his attire bundled carelessly under one arm. Proceeding with his dressing, he asked: "What's our next step toward the scaffold?"

"I'll tell you shortly." Arm-

strong's voice was urgent. "Where's Claire Mandle?"

"Darned if I can tell you. She dropped her shadows and went some place fast."

"Dropped her shadows?"

"Yep. The F.B.I. had her tagged like a jealous father. They've been doing it for weeks—you know that. She kissed them a fond farewell."

"How do you know this?"

Hansen rammed a shoe on his foot, laced it expertly. "Because I helped her."

Waggling his eyebrows, Armstrong rumbled: "You're capable of speech without priming by me."

"I went to see her, and got a list off her like you ordered. She said she could do a lot more to help you if only she could cross the road without trailing a string of bureaucrats behind her. She was convinced that the F.B.I. were the boys following her around, but I wasn't so sure. I lent her a couple of my guys to accompany her into town—just in case."

"And then?"

"She was smart. She got them involved with her trackers and faded out during the argument." He expressed grudging admiration. "It was as slick a piece of work as any I've seen."

"The papers report that she's disappeared, but imply that something has happened to her."

"The papers!" Hansen made a gesture of derision. "When were the papers, the recorders or the newscasts ever concerned with undiluted facts?" He stood up, stamped in his shoes, started putting on his jacket. "The reports didn't mention that two of my men are being held for questioning?"

"No."

"See?"

Armstrong thought it over, then asked: "Did you make a pass at that stooge of Lindle's?"

"Carson? No. I was going after him today."

"Forget him. He doesn't matter now. Things are shaping up—and they're getting mighty hot!"

"*Getting* hot!" Hansen echoed. "What the deuce d'you call it *now?*" "Out with it—what's your latest crime?"

"I'm wanted for snitching a senator."

Hansen paused and stood statuelike while about to knot his tie. Holding the tie straight out, with one tag twisted over the other, he gaped openly.

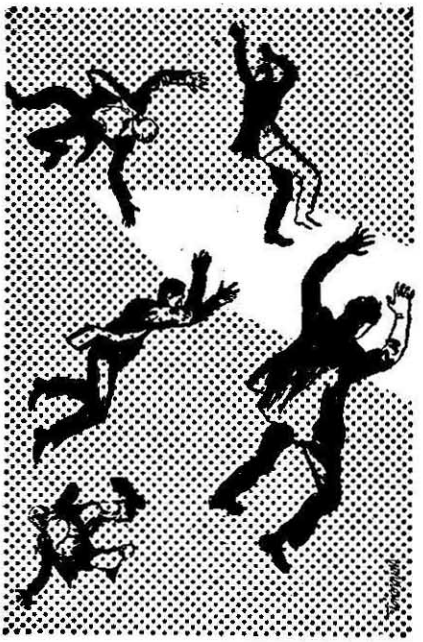
"Say that again."

"I'm wanted for kidnaping as treacherous a senatorial slob as you'd meet in a month's march," said Armstrong. "Womersley."

"We have had murder, arson, espionage and wholesale sabotage," remarked Hansen, looking prayerfully at the ceiling. "Now he has to add kidnaping." He knotted the tie. "Where have you hidden him?"

"At Eddie Drake's, in New Jersey. I want you to get out there as fast as you can with all the men you've got available. How many have you got?"

"Pete's dead, and the F.B.I. is holding two—that leaves four regulars and five casuals. I can trust the regulars."



"Four plus you and me and Ed. Seven in all. If we can rescue Quinn, that'll make eight."

"Why does Quinn need rescuing? Has he got himself marooned on an iceberg?"

"The Norman yahoos in Kansas City are holding him and are trying to pin the killing of Ambrose Fothergill on him. I think maybe they'll hesitate before they go too far with him; we're quits now—they've got Quinn, but I've got Womersley!"

"Oh, well—!" He reached for his hat. "The day I took you on as a client I stuck my neck out a mile. It was the dopiest thing I've ever done. Sooner or later I'll have to pay for it with the best years of my life." He rammed the hat on his head. "Meanwhile, let's have fun."

"Money is the root of all evil," Armstrong observed. "Whatever happens will serve you right for being greedy. Let it be a lesson to you."

Drake was jittery by the time Armstrong got back. He slammed the door with alacrity, waved his arms around while he declaimed.

"This is the devil's own mess! That stinker upstairs came round about three hours after you'd gone. He had a lot to say, all of it authoritative and ominous. We had a slugging match before I tied him up on the bed. Then the first edition newscast came on—have you seen it?"

"Been too busy. You've got it on the recorder?"

Drake nodded dumbly, crossed the room, switched on his set. The screen filled itself with the front page.

EUROPEAN SHOWDOWN COMING, WARNS LINDLE.

Demands supplementary $1,000,000,000.00 for national defense.

Scanning the matter beneath, Armstrong didn't bother to read it thoroughly, contented himself with skipping from phrase to phrase.

"The crisis is approaching . . . we must now pay and pay until it hurts . . . never forget the terrible lessons of the past . . . war clouds looming on the gray and dismal horizon . . . all unnecessary expendi-

ture must be ruthlessly curtailed if we are to shoulder this greater and far more urgent burden . . . no folly more monstrous than that of pouring men, material and money into Moon rockets at such a time as this."

In the adjoining column appeared a small paragraph saying, "Following his interview with the President last night, General L. S. Gregory assured the Press that the fighting forces are ready for any emergency."

Pointing to this, he said to Drake: "I'd gamble my life that Gregory spoke to much greater length than that. The rest of his comments may have been too soothing to suit the propaganda boys. So they left it out, publishing only the bit best calculated to increase public apprehension. One selected part of the truth can be as effective as a downright lie!" He was biting his lip as his eyes suddenly found the right-hand side column.

PUBLIC ENEMY NUMBER ONE.

Washington, D. C. A nation-wide hunt is now in progress for John J. Armstrong, thirty-four year old New York dabbler in scientific appliances. Armstrong, who stands seventy-five inches and weighs two hundred thirty pounds stripped, is wanted for activities on behalf of a foreign power as well as for several killings and one kidnaping. He is believed to be hiding in the New York metropolitan area, and is known to be armed.

There was not a word about Womersley.

His face calm and expressionless as he switched off, Armstrong commented: "Looks like they've picked up that Cadillac." He gave a shrug of indifference. His eyes were red-rimmed and puffy. There was a strong stubble on his chin. "You lay down for an hour or so, Ed. You need the sleep."

Drake sat in a chair, fumbled with his hands, looked at him wide-eyed. "As if I could snore through this!"

"You're nervous, jumpy. How about a shot of Vitalax?"

"Vitalax!" said Drake, violently.

"And so say some of us—though by no means all!" He took another chair, flopped into it, rubbed his eyes and yawned. Then he closed his mouth and listened. "Someone's coming."

A car whined to a stop in front. Drake came out of his chair like a man in a dream. He stood with his hands dangling at his sides, his whole attention on the door.

Armstrong smiled at him grimly, opened the door, let Hansen in. The agent was followed by three muscle-bound characters, with Miriam bringing up the rear. Armstrong introduced them to Drake.

They spread around the room, and Hansen announced: "We're one down already. Jake got picked up last night. If they'd had the sense to watch his place, they'd have got me when I went for him this morning." He sniffed his contempt for the unfortunate Jake. "He was as drunk as a lord. I don't know what I saw in that guy."

He looked at Armstrong. "I had to bring Miriam."

"Of course. You couldn't leave her behind. We'll vote her an angel if she'll set up some sandwiches and coffee." He watched her saunter into the kitchen, said to Drake: "We'd better feed the prisoner, too. Can't let him starve to death."

"He's been fed. I beat him up, then gave him his fodder. He didn't let hard feelings spoil his appetite—he guzzled like a pig."

"Good! Then he ought to be ripe for a further dose of the schizophraser." He tramped heavily upstairs, came down carrying the bound senator like a baby in his arms. He dumped him unceremoniously into a chair.

Glaring around, Womersley pontificated in tones of outraged importance. "You scum needn't think you're going to get away with this." He bestowed the glare on each in turn. "I'll remember each and every one of you, and I'll see that you suffer if it takes the rest of my life!"

Hansen responded, coolly: "And what do you estimate as the rest of your life?"

"Shut up. Leave him alone." Armstrong planted the cup on the furious Womersley's head, tried to strap it accurately into position. Womersley shook his head vigorously and snarled an oath. Carefully and deliberately, Armstrong slapped him in the jaw. The sound of it reverberated around the room. Hansen looked mildly pleased. Womersley rocked back, and Armstrong got the cup fixed to his own satisfaction. He switched on the apparatus.

Breathing heavily, Womersley yelled: "Armstrong, if it's the last —!" His voice petered out. The rage died away from his face which slowly became stupefied.

"What is Singleton's private address?"

Rolling his head to and fro, Womersley mouthed it like an automaton. Hansen pulled out a notebook, noted the address therein.

"But you don't know whether Quinn is there?"

"No."

"Singleton alone knows where he's been hidden?"

"Yes."

Rubbing his bristly chin, Armstrong contemplated the semicomatose politician, and continued inexorably. "Womersley, do you know that someone already is building rockets numbers nineteen and twenty?"

"Yes."

"Who's building them?"

"We are."

Drake exclaimed: "Jeepers!"

"Where are they being built?"

"Yellowknife."

"Both of them?"

"Yes."

"Yellowknife. That's in Canada, way up in the wilds," Armstrong mused. "Is this stunt being pulled in collaboration with the Canadian Government?"

"Of course."

"Are these rockets near completion?"

"Yes."

"How near?"

Womersley blinked dopily, seemed to have trouble in making reply, but eventually came out with: "Nineteen is ready for its test flight. Twenty will be ready in two days at most."

"And if both pass their tests they'll be immediately ready for a shot at the Moon?"

"Yes."

In an undertone, Armstrong said: "*Phew!* They've gone a lot faster and further than I'd anticipated." To Womersley: "But neither of these rockets will reach the Moon?"

"No."

Moving close to the senator, he barshed: "Why won't they?"

"The fuel coil changes to a critical composition."

"You mean that they're using wire-form fuel fed into the motors from a spool, and that the composition of the wire alters somewhere along its length?"

"Yes."

"Who supplied this fuel?"

"Radiometals Corporation."

"Are they Norman Club adherents?"

"No."

Armstrong looked surprised. He mooched around in a circle, thinking deeply. The audience gave him their full attention. He faced the senator again.

"Are certain of its employees adherents of the Norman Club?"

"Yes."

"Technicians—and inspectors?"

"Yes."

"What are their names?"

"I don't know."

"Without the knowledge of their employers, they are modifying fuel coils in a manner calculated to cause a spontaneous explosion?"

"Yes."

"Do you know how these disruptions are timed—will they be at the beginning, or in the middle or towards the ends of the coils?"

"With maximum delay," Womersley mumbled.

"Meaning towards the ends, when both vessels are close to the Moon?"

"Yes."

Drake chipped in viciously: "Somebody ought to cut his fat throat!"

"Be quiet." Armstrong waved him into silence, said to Womersley: "Then the pilots are not Norman Club nominees?"

"No."

"So far as you're concerned, they can both go to blazes along with their vessels?"

"Yes."

Armstrong turned swiftly and pushed Drake back as the latter took an angry step forward.

Carrying on with his cross-examination, he demanded: "Why stir the world to war if you can bust rockets the way you've described?"

"Our psycho-charts show that peace means a rocket-craze which may increase despite failures."

"So?"

"They're planning on sending two together now. It will be four together next year, ten the year after. We can't continue to deal with them all successfully. Only war will

change the international psychic patterns."

Snorting his disgust, Armstrong changed the subject. "I told you a story about being offered plans of a scout-vessel by a Martian deportee. You believed that story. Can you locate any such deportees?"

"No."

"Why not?"

"We are notified of them, but they scatter immediately on arrival and we cannot keep track of them. Mad though they are, they're Martians—and very clever."

"You fear them?"

"They regard us as enemies."

"Are they many in number?"

"No. They are very few."

"Do you know anything about this torchlike weapon they've been using?"

"It is an Earth-made model of a vibratory coagulator."

"Has the Norman Club such a weapon?"

"No. We don't know how to manufacture it. Besides, it is forbidden to us."

Armstrong raised his eybrows. "Forbidden? By whom?"

"By the same ones of Mars who are in touch with us."

"On *this* planet?"

"Yes."

"Here we go again!" Armstrong looked around beseechingly. "Now we've found *another* gang—sane Martians this time!" He returned his attention to the befuddled Womersley. "Are there many of them?"

"Very few."

"How many?"

"I don't know."

"Are they allies of yours?"

"Not exactly."

"What d'you mean by that?"

"They assist us very little. They refuse to be militant. They maintain a policy of interfering in world affairs no more than is made imperative by circumstances at any given time."

"Name me one of them," Armstrong challenged.

"Horowitz."

"You assert that he is a native-born Martian?"

"Yes."

"How d'you know that?"

"He revealed it when first we invited him to join us. He proved it by providing a psychotron and training certain of our membership as operators of it."

"Some proof!" scoffed Armstrong to the others. "They get hold of Horowitz, give him the old razzmatazz, and promptly he takes 'em up on it. He's a noted physicist with more brains than the lot of them—and as few scruples. He was quick to open the door when opportunity knocked. Getting a load of their Martian obsessions, he says, 'Behold, I am a Martian!' and they fall for it like suckers."

"That doesn't seem credible," Drake ventured.

"No less credible than anything else in this mad affair. Big fleas have little fleas. And besides, any Norman shrewd enough to see that Horowitz was cashing in might argue that a religion needs a saint or two to bolster the faith. Lindle, at least, is cynical enough to accept Horowitz at face value, for reasons

of utility rather than real belief." He frowned. "I'll tend to his saint-hood once I'm out of this mess."

"Hope springs eternal," recited Drake, in funereal tones. "We're in to our necks and sinking to our ears. If you can find a way out of this muddle, boy, you're good!"

Hansen stared at him hard-eyed. "You windy?"

"For heaven's sake, quit bickering!" Armstrong scowled around at them. "We're footloose and fancy free, aren't we? We're roaming about fully dressed and in our right minds, and nobody's put chains on us yet. Nobody's going to, either!"

Drake said: "Your self-assurance is magnificent, and I truly wish I could share it. The fact remains that you've got a motley mob of pursuers ten miles long, and how you're going to swallow the lot of them is something I can't make out." He favored Womersley with a vicious look, and added: "But I'm sticking with you partly because I don't see what else I can do; mostly because I want to see that cold-blooded fish get buried deep down."

"Now you're talking," Hansen approved.

Still frowning, Armstrong spoke to Womersley: "If sane Martians ordered the Norman Club to desist, or even to disband, would it do so?"

"Yes."

"Why would it?"

"They are our superiors and we are loyal to them."

"But they have issued no such order?"

"No."

"Some missionaries!" Armstrong commented, dourly. "They have influenced this world's affairs time and time again, according to Lindle. Do you know of any especial reason why they have refused to intervene in this case?"

"This one is different. It represents an important crossroads on the path to destiny, and they feel . . . they feel"—he choked, mumbled, proceeded with difficulty—"that this is one time when Earthlings, sane or insane, must . . . work out their own . . . salvation." He choked again, slumped low in his chair.

"He's had enough." Armstrong cut the main-switch, snatched the cup from Womersley's sagging head. "Take him upstairs and dump him on the bed. He'll need hours to sleep it off once more."

Drake and two of Hansen's men lugged the limp senator away. Waiting for their return, Armstrong paraded up and down the room. He was as restless as a caged bear. The others came back; he continued to march up and down the carpet while he addressed his audience. Their eyes followed him to and fro, to and fro, like those of spectators at a tennis tournament.

"Let's take another look at the situation. We're wanted. All of us are wanted in the sense that those not wanted today will be wanted tomorrow or the day after, either as accomplices, or as accessories before or after the fact. The charges against us don't matter much—we'll be saddled with whatever charges can be made to stick.

The cops, the F.B.I., the Norman Club, the Martian Hu-mans and, for all I know, the Secret Service and the Navy would give plenty for our scalps." He studied them individually. "Whatever other antics we may perform can't get us in any deeper than we are already."

"The penalty for kidnaping is death," remarked Drake. "I can't imagine going any deeper than nine feet of rope will permit."

Ignoring him, Armstrong went on: "We need all the help we can get—and what we can get is darned little! Apart from those present, there are only four people I feel I can trust, namely, General Gregory, Bill Norton, Claire Mandle and George Quinn. It's not much use me trying to make contact with Gregory again since I can give him little more than he's got already, besides which I'd probably be pinched in the attempt. I caught him in the nick of time, and now it's up to him. As for Claire Mandle, she's out of reach. I'm not worrying about her seeing that she has disappeared of her own accord. As for Bill Norton, he can't do us much good. Unwittingly, he might do us harm. He hoots with excitement, and we can't afford to be burdened with hooters. That leaves only Quinn."

"And we know who's holding him," Hansen put in, his eyes glittering.

"And we know who's holding him," Armstrong confirmed. "So our next step should be to get Quinn free—at all costs." He paused, then said, "Any other suggestions?"

Drake rubbed his chin thoughtfully before responding. "Don't think I'm criticizing when I ask what Quinn has got that none of us has got. There are seven of us here, counting Miriam. Seven rats on the run! How much better off shall we be when we're eight?"

"We'll be one man stronger."

"I know that. But what good will it do? Look at the situation: you started off by nosing into rocketflops and that's led you to the present position where you want to face tremendous and world-wide odds in order to prevent a major war. You said yourself that it isn't sufficient for us, as a nation, to be peace-loving, animated by high ideals and a sense of justice, et cetera, because any other nation can start the holocaust. That, in turn, means that even if in some miraculous manner you bust the Norman Club in this country it can still set the world aflame by starting the fire somewhere else, somewhere far beyond your reach—Portugal or Peru, for instance. Then the flags go up, the drums start beating, and everyone sane enough to want to live will be damned as a coward and a traitor, while everyone mad enough to be willing to die will be praised as a hero. The war will be on, the slaughter started, the entire set of circumstances will acquire an impetus which couldn't be controlled by seven millions of us, much less a mere seven. Heck of a lot better off we'll be when we're eight!"

Hansen leaned forward and said,

softly: "You'd rather let Quinn stew in his own juice, eh?"

"Don't be so downright stupid!" Drake became angry. "I'm all in favor of getting Quinn out of bad sooner than immediately. He's a rocket-pilot and, as such, I'd give him the privilege of mauling that inhuman specimen upstairs. I'd like to do the mauling myself. *I've a special reason for that!* But I'd forego the pleasure in favor of George because he's a rocket-pilot." His annoyed gaze went from Hansen to Armstrong. "What I'm bawling about is that I don't see any way out of the mess we're in. It's like a quicksand. All we can do is struggle and go down, down, down until we start blowing mud-bubbles. The harder we struggle, the faster we'll sink. That's the way I see it. Maybe you see it differently. Maybe you see something I don't. If so, I'd like to know of it. I could feel I'm going somewhere, and a feeling like that is a great comfort."

"Then you may consider yourself comforted," Armstrong told him. "Our amiable friend Womersley was kind enough to point a way out."

"Eh?" Drake's jaw dropped.

"He said, 'We're at the last ditch!' didn't he? So we'll utilize the ditch —if luck holds out long enough."

"Yeah." Drake looked confused. "Yeah." He passed a hand uncertainly over his forehead. "This is what comes of being up and about when I ought to be in bed. I'm too dopey to get it." He turned his puzzled face to Hansen. "Do *you* get it?"

"No," replied the agent, unconcernedly. "And I'm not worrying about it. Worry never earned me a dime."

"George Quinn knows something we don't, something very useful," Armstrong explained. "He knows when, where and how to blow."

Drake screwed up his eyes as he looked at him. After a while, he gave it up, and said, lugubriously: "Take no notice of me. I'm too far gone even to understand plain English."

"All right. Let's accept that we go after Quinn. That gives us two more problems. Firstly, do we take Miriam with us?"

"Try leaving me behind," snapped Miriam from the kitchen doorway. She used a coffee percolator to gesture toward Hansen. "He's my only alibi. I'm sticking to him."

"There's my answer." Armstrong grinned, and went on, "Do we take Womersley, or shall we leave him here under guard?"

Hansen said: "He's worth his weight in gold to us. I don't believe in parting with gold. Besides, leaving him under guard will cut our number down."

"Keep him in sight," advised Drake. "I like him better in sight. I wouldn't trust him around the corner. I don't trust him upstairs, even if he is unconscious."

"We'll cart him along." Armstrong glanced at his watch. "We've lost too much time already. There are two cars now, Hansen's and Drake's. We've a long run ahead of us and ought to start as soon as we can get ready." He

indicated the apparatus on the floor. "And we'd better take all this junk if we can find room for it. It may come in useful if some other canary refuses to chirrup."

"Kansas City, we'll see you soon!" Hansen stood up, and his three men arose with him. "Provided we're not picked up on the way!"

XV.

Singleton's home stood wide open as if its owner had not one enemy in the world. It posed in amazing contrast with the fortresslike edifice which Womersley needed to feel secure. Evidently Singleton had no cause to share the leeriness of Norman Club leaders farther east, perhaps for the reason that he headed a cohort smaller, less active, not so deeply involved in the Club's peculiar affairs.

It was an old, rambling but picturesque house standing in carefully tended grounds, and it enjoyed that air of solid, well-established respectability favored by bankers and the more conservative types of business men. Viewing it, Armstrong felt considerably heartened. After seeing Womersley's prison he had expected yet another personal Alcatraz.

Sitting in the front car beside Hansen, who lounged at the wheel, and with the second car parked close behind, he said: "That chump Womersley has admitted that Singleton knows him by sight. We also know that Singleton is in that house at this moment. We've been mighty lucky to get this far without incident and I reckon we ought to ride our luck while it's still running. What say we use Womersley as our front—and walk straight in?"

"I like it." Hansen's sharp eyes surveyed the house across the road. "It has always paid me to move fast rather than slow. When you're slow, it gives the other guy time to think."

"Let's go. I'll tell them at back first." Opening the door, Armstrong got out. Cautiously, he looked up and down the street. He was careful rather than apprehensive. After many hours of travel, and numberless encounters with all sorts of people—including two cops—none of whom had looked at him with more than casual interest, he was not greatly in fear of recognition. This despite the photograph of him published in yesterday's sheets under an offer of two hundred thousand dollars reward, dead or alive.

It had been an old and not-too-good reproduction of his beefy pan, blown up to quarter-plate size from a slice of microfilm. Even if it had been good he'd not have been unduly worried. Most folk, he knew, could not remember what they'd read over breakfast let alone what appeared in yesterday's papers. The sharp-eyed exception with an acute memory was his only peril—so carefully he surveyed the street.

It was quiet, undisturbed. Stepping swiftly to the second car, he spoke to one of Hansen's men who was at its wheel.

"We're going straight in. Keep close behind us."

The other nodded, shifted a wad of gum. Armstrong glanced at Womersley who was jammed in the rear seat between Drake and another of Hansen's men. Womersley glared back at him without remark.

Returning to the leading car, he got in, watched the rear-view mirror as they edged across the road, purred up the semicircular drive to Singleton's residence. They stopped before the front door, the other car following suit. There were two more cars parked farther around the drive and nearer the exit, but no passengers were in evidence.

With Hansen at his side and the rest behind, Armstrong mounted the ten broad steps leading to the front door, rang the bell. A pert maid responded.

Smiling at her, he raised his hat, said smoothly. "This is Senator Womersley and some friends—we wish to see Mr. Singleton immediately. Please tell him that the subject of our call is a very urgent one."

She smiled back, eying the group without suspicion, and chirped: "Please wait a moment." She turned and went away with a flirt of frilly skirts which sent Hansen's eyebrows up an inch. In short time she reappeared. "Mr. Singleton will see you at once."

Stepping aside, Armstrong gave her his hat. His other hand remained inside his pocket, its fingers curled around his .38. Hansen entered likewise, hat in one hand, hidden gun in the other. So did his three men. With Drake close against his back and Miriam chummily linked on his arm, Womersley went through the door with disgruntled pomposity.

Dumping the hats, the maid led them across a broad hall, opened the door on the farther side. Armstrong paused, signed to Womersley. Looking like a man who had plenty owing to him and intended to collect some day, the senator passed through the doorway, still linked with Miriam, and with Drake still crowding him from behind. The other five followed. Quietly, the maid closed the door.

There were four people in this room, and Armstrong recognized three of them though not the faintest flicker of surprise crossed his heavy face. The first was a little, wizened individual struggling out of a deep armchair. This, he presumed, was Singleton. Near him, already out of his chair and advancing to greet the visitors, was Lindle. Before an empty fireplace, his legs braced apart, his hands behind him, his eyes staring owlishly through thick-lensed spectacles, stood Horowitz. The fourth person was Claire Mandle. She was near a table, one hand braced on its polished surface, the other held to her mouth. Her elfin eyes were enormous as they looked at him.

"Well, well, Eustace," enthused Singleton, in a shrill voice. "This *is* a surprise!" Finding his feet, he advanced toward Womersley with eager cordiality. "I thought—"

"You thought right," snapped Lindle, his voice cutting through the room. He withdrew a couple of

steps, his brow thunderous. "And now you've a load of trouble in your lap."

"Huh?" Singleton stopped with one foot in the air, took a long time putting it down. It looked as if he were trying to imitate a slow-motion movie. Turning just as sluggishly, he looked at Lindle. "What d'you mean? Can't you see that Eustace —?"

"Shut up and sit down!" Lindle snarled. "It takes a crazy Daniel to walk right into the den!" His dark eyes focused on Armstrong. "All right, let's have it—what d'you want?"

Armstrong ignored Lindle, Horowitz and Claire Mandle; he kept his full attention on the flustered Singleton as he answered the question in deep, rumbling tones like those of distant thunder.

He said, simply: "George Quinn!" Singleton turned startled eyes upon him, and he caught them and held them as he continued in the same inexorable voice, "And heaven help the lot of you if he's dead!"

Singleton whitened, moved backward.

"Stay where you are." Armstrong strode farther into the room. Out of one corner of his eye he saw Lindle resume his easy-chair and cross his legs with exaggerated unconcern. Claire was still by the table, still regarding him wide-eyed. Horowitz had not moved from the fireplace. He said to Singleton: "Where's George Quinn?"

The other seemed smitten dumb by sheer fright. His gaze roamed dull-wittedly around; feebly he raised his hands, put them down again.

Reaching for a nearby wall-bulb, Armstrong unscrewed it, glanced at it, screwed it back into place. He made a grimace of disgust.

"What's the matter?" inquired Hansen.

"Fifty volts. This dump must have its own generating plant. The schizophraser's no use here—it's got to have a hundred and ten."

"We can take him some place else and pick him to bits at our ease. This isn't the only—" Hansen stopped as Drake nudged him.

"You look after this slob," suggested Drake, meaning the irate Womersley. He moved out as Hansen took over, started walking slowly and deliberately toward Singleton. His face was strangely pale and little beads of perspiration lay across his forehead. "I'll tend to this," he gritted. The others watched him fascinatedly. Going right up to Singleton, he said, quietly but clearly: "I've got a personal bone to pick with you—you dirty little rat!"

Flapping his hands again, Singleton slumped backward into his chair. Drake towered over him, went on in the same quiet tones: "Remember that last one that blew apart on the deck, before it even could take off? It killed sixty, didn't it? One of them was a synchronics engineer named Tony Drake—my brother! *I saw him go!*" His voice went up in tone and became louder. "That was according to plan—*your* plan, you

shrinking louse!" His hand whipped out of his pocket and flashed a gleam of metallic blue. "Here's *my* plan! You've got ten seconds to say what you've done with George Quinn. So help me, if you don't give—and give quick—I'll splash your snake-brains over the wall—and this'll show you I mean business!"

The gun roared with sudden and unexpected viciousness that shocked the room. Singleton emitted a squeal of pain that penetrated the reverberations still bouncing from wall to wall. Dragging up his left foot, he tried to get it into his lap. His face was so colorless that it held a curious quality of transparency.

As Armstrong moved forward, his big face taut, Drake was breathing into the agonized Singleton's features: "Five, six, seven, eight." The gun came up.

"Out at Keefer's! He's out at Keefer's, I tell you!" Singleton shrieked.

The door opened, the maid looked in anxiously. Nobody had heard her knock. One of Hansen's men grasped her arm, drew her into the room, planted his broad back against the closed door.

"Alive?" insisted Drake. His optics were afire with hate as he kept them fixed on his victim.

"Oh, my foot!" moaned Singleton. He got it onto his knee. Blood dripped from his shoe, made

little, glutinous splashes on the carpet. "Oh, my foot!"

"Alive?" Drake motioned with his gun. His mouth was all lopsided. "When I ask you something you'd better reply fast! I'm not like *you*, see? I'm not *sane!*" He gave a queer, unnatural laugh. "I'm daffy. I'm so daffy that I can do almost anything . . . anything . . . especially to you!" Bending forward, he bawled right into Singleton's face. *"Is Quinn alive?"*

Singleton hooted for breath, then yelped frantically: "Yes, he's alive. He's at Keefer's, I tell you! And he's alive!"

"Where's Keefer's?"

In cool, sardonic tones, Lindle cut in with: "The place to which that pathetic weakling refers is half an hour's drive from here. It has a telephone. It would save you a lot of trouble, not to mention a modicum of melodrama, if Singleton called and ordered them to bring Quinn to you here."

For some weird reason, this infuriated Drake. He turned his savage eyes to Lindle, swung the gun toward him as well. "Who asked you to open your trap? This is the lily-livered specimen who's going to provide the answers, and when—"

"Easy, Ed!" Armstrong made a swift snatch which got him Drake's gun. "Cool down, will you? Cool down!"

Drake shouted: "But—"

"Take it easy!" Armstrong held him, eye to eye. "Quinn first. We want to get George, don't we? Business before pleasure!"

Slowly, very slowly, Drake deflated. Finally he said: "All right. Let that louse ring Keefer's. That'll be the signal for them to dump Quinn in the river before they come on the run for us."

"We'll take a chance on that." He studied the moaning Singleton. "And I don't think we'll be taking much of a chance—this guy won't sign his own death warrant." To Singleton, he said: "There's the phone. Tell 'em you want Quinn brought here at once."

"My foot!" complained Singleton, whiningly. He pulled the shoe off, revealed a saturated sock. "Let me bandage it first. I'll bleed to death!"

"Bleed to death!" Armstrong's smile was grim as he noted the other's appalled expression. "Millions are going to bleed to death if you and your kind get their way. Fat lot you care about that—and a fat lot we care about you!" He shoved the phone into Singleton's shaking hands. "Go ahead. Say anything you like. Yell for help if you want—it may reach you if you're slow in dying!"

"John!" Claire Mandle took a tentative step forward. She was shaken, uncertain. Lindle watched her with acid amusement. Horowitz turned his lenses toward her, his expression inscrutable. Armstrong ignored her.

"Go ahead," he urged Singleton.

Claire withdrew her step, sat down. Her bottom lip trembled.

Singleton on the telephone, ironed

the quavers out of his voice, and said with passable authority: "Bring Quinn in. Yes, at once!" Putting down the instrument, he started to peel off his sock.

Armstrong sent out the maid, guarded by one of Hansen's men. She came back with bandages; he sat on the arm of a chair and watched her tend to Singleton's wound.

"The incurable sentimentalist." Lindle studied him from across the room. "So far as I know, you're the first certifiably sane one who's proved too spiritually lazy to discipline his own emotions. And look where it's got you." His chuckle was self-assured. "Two hundred grand reward, alive or dead!" He shook his well-groomed head in mock sorrow. "Remember what I said to you once—see how you like the madhouse now?"

He got no response. Armstrong stared at him with sphinxlike lack of expression.

"It'll be a darned sight madder before long," Lindle prophesied. "I shall always remain amazed that anyone so fundamentally sane should choose to support the world's lunatics. I have been lost for an explanation of this contradiction. It seems to me that either the psychotron was out of order and made a wrong diagnosis of you—which our friend Horowitz, a psychotron expert, denies most emphatically—or else we never did succeed in convincing you of the facts of history past and present. Personally, I lean to the latter theory. You are sane—but an incurable skeptic. I think your bullheaded actions since we last saw each other are entirely due to your inability to appreciate what you're up against. You don't believe even your own eyes!" He sat more erect in his chair. "It wouldn't do you any harm to put some trust in them for once—and allow me to remind you that there is always time to repent."

Armstrong's face remained blank; his lips did not part.

"Our power is such," boasted Lindle, determined to make some use of the waiting-time, "that if we wished we could withdraw all charges against you and your companions today. We could make you public heroes tomorrow—and wealthy men the day after."

"What d'you mean by wealthy?" put in Hansen, displaying sudden interest.

Lindle's dark, sardonic eyes shifted to the agent. "We're no pikers. A hundred grand per man."

"Not enough." Hansen gestured to the impassive Armstrong. "He's promised me half a million. He's a better liar even than you!"

Miriam giggled. Lindle became sour. Armstrong watched Lindle steadily, still said nothing.

The surly and silent Womersley unexpectedly woke up and growled at Lindle: "You're wasting your breath. They're all completely unbalanced no matter what your psychotron said." He puffed like an angry frog. "Leave them alone and let them wait what's coming to them."

Claire Mandle stood up again,

spoke hesitantly: "John, I tried to help. Believe me, I—"

"Be silent, Claire!" Horowitz was authoritative, severe. "I have told you repeatedly that assistance and interference are totally different things. The first is permitted, the second is not! Positively not!"

His heavy spectacles turned on Armstrong. Obviously he expected a retort. Silent and brooding, Armstrong sat like a huge, cumbersome bear, his eyes hard and cold as they watched Lindle. Horowitz surveyed him as if he were a curious specimen nailed to a board.

"This man," he pronounced carefully, "knows quite well what might be done and intends to see if it can be done. If he fails, it is fate. If he succeeds, it is fate likewise." He shrugged his drooping shoulders. "And that is all there is to it!"

"Are you going as loony as the rest?" demanded Lindle, heatedly. His eyes held little red lights. "Nothing can be done, absolutely nothing!"

"Do you dare to talk to *me* like that?" Horowitz put the question calmly, evenly, but its effect was surprising.

The lights faded from Lindle's optics and he appeared to shrink in his seat. Licking his lips, he apologized: "I am sorry. It is not for us to question your ideas."

A bell shrilled loudly in the hall. The maid threw a scared glance at Singleton who promptly passed it along to Armstrong. The latter nodded to Hansen.

"You look after it. Take a couple of your boys."

Hansen lounged out followed by two of his men. Lindle assumed a look of helpless resignation, tilted back in his chair. His eyes were aimed at the ceiling with the air of one bored beyond telling, and he rocked the chair slightly, its front feet off the floor, then began to tilt it farther.

Coldly and deliberately, Armstrong blew a lump of Lindle's skull away before the back of the chair could contact the stud set in the wall behind. The body kicked twice, slid to the floor. Miriam began to emit curious mewing noises. Claire buried her face in her hands.

In the second of eternity that followed, Armstrong caught a momentary glimpse of Horowitz gravely removing his glasses. He had no time to note more. Singleton, squeaking with frenzied fear, was coming up with something which had been hidden in the cushion of his chair, and Drake was making for him unarmed. He could hear Drake snuffling like a boxer as he shuffled forward.

There was an uproar in the hall, two fast explosions, more noises from Miriam, and the stumbling of feet close behind him. He swung his gun to deal with Singleton, found Drake blocking his line of fire. Dropping the gun, he rose from the arm of the chair on which he'd been sitting, swiveled round on one heel, snatched Womersley out of the grasp of Hansen's man behind him, grunted as he swung the senator's heavy body into reverse and bounced it on its cranium.

Womersley yelled, flailed, went limp.

Another gun went off in the hall, then two more. Miriam began to perform a crazy jig, with her mouth wide open. Yet another explosion sounded within the room and Drake collapsed across Singleton's chair. Singleton shoved the body off, stood up on one foot, turned his gun toward Armstrong. He was yipping hysterically and his hand was shaking so badly that the gun's muzzle wavered erratically. He had a moment of fearful indecision as his eyes went from the advancing Armstrong to the Hansen-agent sidling around at one side, and that was his undoing.

The body of Drake shot out a dying hand, snatched Singleton's good foot from under him, brought him down, grabbed at and got his gun. The gun spat low in the carpet and Singleton screeched like a trapped cat. He doubled up violently, straightened out, doubled and straightened again, writhed around with his hands to his middle.

Down on the carpet, Drake coughed some blood, said in a weak, faraway voice: "That's a law. . . . good enough for any . . . darned Martians—an eye for an eye!" He strove to lift the gun once more. Armstrong stooped over him to take it from him as it came up, but he was too late. With horrible deliberation, Drake planted a heavy slug behind the jerking Singleton's right ear. "Job worth doing," he wheezed, "is worth doing well." Something gurgled liquidly in his throat. He released his hold on the weapon, laid his head on his bent left arm and quietly ceased to breathe.

Armstrong looked around. Horowitz was standing by the fireplace in exactly the same pose as he'd held from the start, and his expression still was completely impassive. Claire was in her chair, her face hidden in her hands. Lindle, Singleton and Drake sprawled dead upon the floor. To one side, Hansen's agent was surveying the bodies gloomily, while near the door Miriam stood like one in a dream.

Hansen himself suddenly appeared in the doorway. He urged the maid ahead of him, while George Quinn and another of his men followed him in.

"One of my boys is finished," he announced. "We got two of their men." His dark, hawklike eyes studied the frightened maid. "She gave them the high-sign somehow—I don't know how—immediately they got through the door. They went for their guns. She tried to beat it while we were busy. She'd have had the entire town on our necks if she'd got away. Quinn stopped her."

"Good work, George," Armstrong approved.

"It won't look so good mighty soon," opined Quinn, taking in the scene. "They're phoning from Keefer's in twenty minutes to make sure everything's O.K." He turned his worried gaze to Armstrong. "I know you folk have done all this for me, but—"

"Let's cut out the speeches."

Armstrong made a gesture of impatience, discovered that his hand was still holding a gun. He shoved the weapon into his pocket. "We want out. We've got to move fast. We'll leave the bodies and take the rest."

"All of them?" Hansen counted them, Horowitz, the maid, Claire Mandle and the semiconscious Womersley now beginning to stir upon the floor. "That means four more!"

"We can't leave one to start the pursuit. If we take 'em, it may delay things, and we need the best lead we can get. We've four cars available now. We'll take all the cars and all the living." He looked at Horowitz. "You for a start—come on!"

Claire uncovered her face and said: "John, I guessed that you wanted Quinn, and why you wanted him, and I—"

"Later," he told her, gently, "later on. Not now." He motioned Horowitz forward. Obediently, that glassy-eyed individual paced toward the door. Somehow, he didn't hate Horowitz any longer. He'd been satiated by Drake's dying spasm of vengeance, and now he felt only cold, cold, colder even than the dead, the multi-millions of dead who soon were to litter the earth—if planet-wide plotting could not be thwarted at one stroke. His voice was sympathetic of his coldness; a frigid-toned thing that said to Horowitz, "March!" and caused him to march without hesitation or quibble.

They locked the front door, loaded the four cars and sped away. Horowitz's own machine, a long, low-slung job, took the lead with Hansen at its wheel. It held a short-wave radio which Hansen switched on, but there had been no howl of alarm over the police-band an hour later when they rolled into a skyport, made a deceitfully sedate cavalcade across its tarmac toward the control tower.

Either Keefer's had failed to check or, getting no reply to their call, they were investigating with considerable caution. That portion of the Norman gang would be likely to prove the unexpected mess with the careful respect due to Martian Hu-mans whom they'd assume to be the cause of it. They did not fear Armstrong, but they were naturally leery of the Hu-mans and especially of their potent coagulators. The time their care was costing them was all to the good from the viewpoint of the fugitives. The ether was still clear nearly another hour later when their hired twelve-seater, low-wing jetplane was ready for them.

Obtaining the plane had proved absurdly easy. Faced by a sudden request for a hire-and-drive-yourself passenger job, fully fueled, the skyport's booking officer had felt inclined to jib. He had wavered at sight of a wad of notes and four automobiles to be left as security. George's pilot's certificate had done the rest. He read aloud the last words on the certificate, mouthing them with awe.

". . . including liquid-fuel rockets of meteorological or experimen-

tal types." He looked up, his eyes bugging. Not one wanted man was on his mind. "First rocket certificate I've seen." Handing it back as if it were the original copy of Magna Carta, he entered the booking without further argument, in fact eagerly.

With the machine waiting for them, its compressors rotating at minimum while they heated up, they climbed in one by one. Horowitz went up the portable steps as blank-faced as an image. Womersley, now on his feet, but rubber-legged and half-stupefied, had to be assisted in. The skyport's onlookers observed him with mild sympathy and total lack of suspicion. The maid turned on the steps as if tempted to yell her head off, but she changed her mind when she looked into the eyes of Hansen mounting close behind her. The rest got aboard with disarming casualness.

George gave his craft the gun, took her up to five thousand feet and headed dead south. This accorded with their declared destination and made their departure look conventional to observers on the skyport. He boosted her speed slowly but steadily. The ether remained silent.

Edging into the co-pilot's seat, Armstrong said to Quinn: "How soon can we turn north without giving ourselves away to the boys behind?"

Narrowing his eyes as he stared through the transpax, Quinn pondered a moment. "They had a rotary hemispherical antenna on the tower. That means they've got radar. Maybe it's used only in times of bad visibility, or at night. On the other hand, perhaps it's in constant use. I don't know. If we want to play safe, we'll have to get below their horizon before we change course, and then we'll have to make the full turn still below it. That means a pretty wide sweep. If we're being sought for, ground observers will spot us elsewhere."

"We're not being sought for yet." Armstrong fiddled with the controls of the radio. "I don't know why they're so slow at starting a hue and cry. I think this Singleton's mob must be a small and unimportant one compared with those we've got east." Meditatively he rubbed his chin. There was a stiff bristle on it again. "What happened to Fothergill?"

"I haven't got the full story, but I reckon you were right in one respect—he knew something. Either he bleated it or was about to do so. I heard an argument in his office, followed by a shot. Stupidly, I barged straight in, found Miller there, gun in hand, watching Fothergill die at his desk. Muller looked at me as if I were of no consequence whatsoever. He didn't bother even to turn his gun my way. Before I could recover my wits I heard a quick step right behind me and someone handed me a skull-splitter."

"Tough luck."

"I woke up traveling fast in a lorry which eventually dumped me at Keefer's, and I've been there

under guard ever since. They let me read their news-recorder, so I soon learned that I'd been saddled with the killing and was wanted by the authorities. I knew also that you were wanted for everything up to massacre." He threw his listener a sidewise glance. "When Singleton sent his call for me I decided that this was it; my time had come. Nobody was more surprised than I when the guys I thought were his men proved to be your men and opened up on my guard."

"The said guard were more surprised," Armstrong guessed. His smile was hard and craggy. "I've learned something long known to people more worldly-wise than I—the aggressor always has the advantage. That is what enabled guerilla movements to keep functioning despite German and Jap occupation—the old strike-and-vanish technique. That is what has kept us going successfully—so far." He studied the rolling countryside as the plane dipped and swung. "Turn north when you think it's safe, George. We're making for Yellowknife."

"Yellowknife?" Quinn was mystified. "What the deuce is there?"

"Mate in one move," said Armstrong. "If the luck of Old Nick enables us to make it!"

Leaving the co-pilot's seat, he went back along the cabin, joined Claire Mandle. "We're going to drop you off some place."

"Why?"

"We're fugitives from justice," he pointed out. "It wouldn't do you any good to be found associating with us voluntarily."

"But, John, this can't go on forever. You can't spend the rest of your natural life running around like a hunted crook. Why don't you—?"

"Why don't I give myself up and let the wolves eat me?" he finished for her.

"They don't punish innocent men," she protested.

He regarded her calmly, knowing that she did not believe her own words. Then he said: "We're going to put you down on our way. If you want to help, you can do so by saying nothing whatever about us for several days afterward."

She was slightly flushed, her mind full of arguments, her lips unable to voice them. After a while, she murmured: "We may never meet again—never!"

"Just ships that pass in the night," he agreed. He was watching her closely. She found an absurd little handkerchief, held it to her mouth. Her eyes were faraway and moist. Gently squeezing her arm, he went on: "Or we may meet again in the sunrise—if we can persuade Old Man Sun to come up. We're going to have a darned good try, anyway."

"You're bucking a task as tough as that of trying to boss the Sun around." Her voice was low, muffled. "You're trying to divert forces infinitely beyond your power. I know it—I tried to help you and found it futile."

"Tell me," he invited.

She was quiet for a time, toying with her handkerchief while she regain composure. Eventually, she said: "I put together all that you had told me and it made a picture of a sort. When I read about George Quinn's disappearance I deduced that it would be a major blow to you. I guessed that you wanted him, that you needed him badly."

"You know why?"

"I think so."

"And then?"

"I realized that all lines led to the Norman Club. I remembered that they had made overtures to Bob. If they were interested in Bob, they might be equally interested in his sister—and when people get friendly they sometimes talk too much." He nodded understandingly as she went on: "There seemed some slight chance of gaining their confidence sufficiently to discover whether they were responsible for Quinn's vanishing and, if so, what they had done with him. One of the men who had been pestering me for information regarding you was Carson, who described himself as Senator Lindle's secretary. I threw my shadows, went along to see Lindle."

"Go on," he urged.

"Lindle was away. Carson transfered me to Horowitz who said that Lindle had gone to Kansas City. Horowitz cross-examined me to great length about Bob's work also about your aetivities, but I professed ignorance. I don't think he believed me."

"He wouldn't," Armstrong asserted. "Being so expert a liar himself."

She smiled and said: "He assured me that he's a Martian with this world under his thumb."

"By this time, he believes it himself—he's told the tale so often."

"He had a most peculiar attitude toward me, I can describe it only as speculative cordiality. There was something in his mind, his shrewd, fast-thinking mind, which told him I could be useful to him—as an ally, or a hostage, or both. I could tell that much, but I don't think he realized that I could. Having got me there, he didn't want to detain me by force, neither did he want me to go. I think he suspected that compulsory detention might bring out the unpleasant fact that I was bait provided by the F.B.I. On the other hand, he didn't want to lose me. He found a way out by offering to escort me to Kansas City to see Lindle in person. I took him up on that."

"A nice example of angels rushing in where fools fear to tread," Armstrong commented. "You'll have to change your reckless ways at some date I've got in mind."

"You're the one to talk!" she riposted. Her eyes surveyed him from their tilted corners before she went on. "I used what wiles I possess to persuade Horowitz to give forth during our journey. I've never met a man who can be so boastful without really saying anything. All I could do was read between the lines and draw conclusions."

"At which you're too good for

my future comfort," he suggested.

She smiled again. "I decided that he is a very clever man who had a couple of inventions lying around at a moment when a glorious opportunity presented itself. He had the brains to welcome opportunity with both hands. He is another and craftier Hitler—this time with his cohorts underground."

"That's my estimate, too," Armstrong agreed. "And he's made enemies among a few who know too much. They are likewise underground—trying to steal his thunder by claiming Martianhood, even if insane. The insane touch is a nice terror weapon. Hu-mans, bunk!"

"Which is what makes the struggle so crazy," she observed. "It isn't a simple two-sided affray. It's multi-sided. The Normans versus Humans versus you versus uninformed authority. Each smiting the nearest to hand, like an Irish wedding." She pondered momentarily. "In the end, we reached Kansas City, and immediately I found myself practically a prisoner. It served me right, I suppose. But I discovered two more items."

"What were those?"

"Clark Marshall had a taste of the psychotron and got delusions of insanity. He knew enough to be a menace to them. They sought him in vain, and their opponents obligingly did the job for them." She closed her eyes, her voice went lower. "But I think they got Bob. I think Bob played with them, seeking information to pass along to the government—and they found it out."

He squeezed her arm gently. "It's our turn now. Wait and see!"

Getting up and going forward, he had a look through the transpex. "How're we doing, George?"

"East-northeast. We'll be heading north pretty soon. Still not a squawk on the short waves." Quinn flipped the radio's band-switch. "Let's try the mediums."

Promptly the radio blared forth, "... defined all these accusations of surreptitious military dictatorship as a manifest political maneuver which should deceive nobody. Continuing, General Gregory said that as newly-appointed commander-in-chief of the joint defense services he accepted full responsibility for all orders issued from his headquarters and that the armed forces would be used to maintain internal peace at all costs. It was now his task, he declared, to employ the wide powers granted him to insure that if world peace were disturbed it would not be disturbed by the United States of America. When asked whether the names of Senators Lindle, Embleton and Womersley would appear on the list which the President has instructed him to prepare, the general snapped briefly, 'I have nothing more to say!'"

Glancing up from his instruments, Quinn found Armstrong's eyes alight with joyous fire.

The radio coughed, beg-pardoned, and went on: "In a dark and foreboding speech made in Clermont Ferrand this afternoon, the French Minister for War reminded France that on two occasions she had been

caught unprepared. Announcing the call-up of another three classes to the colors, he warned his listeners that the present international line-up made the third and final world-war well-nigh inevitable. France, he asserted, was determined to preserve her integrity at all costs, and he could tell potential enemies that she now had at her disposal weapons mightier even than the atom bomb. A sensational editorial in today's edition of *Dernieres Nouvelles de Strasbourg* claims that one of these weapons may prove to be a neo-bubonic pandemic."

Again Quinn looked up. Armstrong was scowling heavily.

"It's going to be touch and go, George," he rumbled. "The sands are running out fast." He hooked his brawny leg across the corner of the co-pilot's seat, ran a hand over his forehead wearily. "There's an invisible empire sprawling right across the globe. It's old and cynical and utterly ruthless and it thinks it can last as long as the accursed principle of divide and rule. But it's got a weak spot!" He massaged his chin bristles vigorously. "Definitely, it has a weak spot! It could be made to collapse like a house of cards. Heaven help the lot of us if we don't bring it down with one blow, at the right time, in the right place. Heaven help the whole of humanity, for their monuments will be a series of those huge, mushroom-shaped clouds rising from a sea of lamentations!"

Looking serious, Quinn juggled his controls as the plane dipped and side-slipped.

"The Four Horsemen," continued Armstrong, speaking to himself, "they shall go forth through the lands and there shall be sounds of weeping wherever breath is drawn. There will be atom bombs and neo-bubonic pandemics—the arrow that flieth by day and the pestilence that stalketh by night!" His voice rasped on Quinn's ears. "Neither can we save ourselves by a world-wide smelling out of witches, for the witches are too many, too scattered, too cleverly disguised." He leaned forward, said to Quinn, "But what if all their witchcraft suddenly becomes ten thousand years behind the times?"

"Eh?" Quinn was startled.

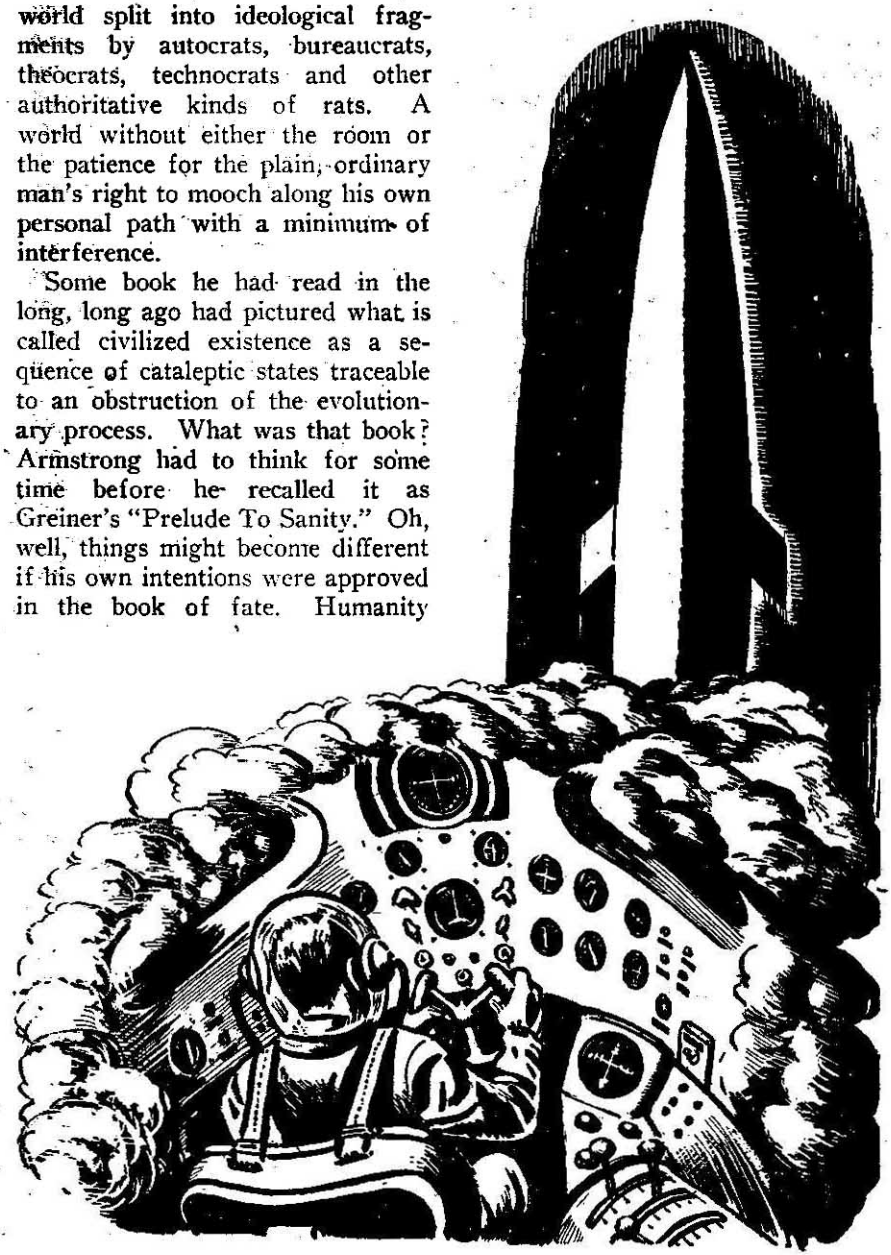
XVI.

Completing their turn, they hit the northward route at twenty thousand feet above Council Bluffs and from there followed the Missouri up into the Dakotas. Still the ether maintained silence on the short-wave bands. Either the slaughter at Singleton's had not yet been discovered or else the real perpetrators weren't yet suspected. Probably the latter decided Armstrong, knowing the obsessions of his antagonists. At this very moment, in all probability, they were making futile attempts to identify Drake from their lists of Martian deportees. The longer they continued to bark up the wrong tree, the greater the fugtives' period of grace—and they could do with every hour of it, every minute.

The plane roared on, its jets

smoking. The world turned below; the torn world, the worn world, a world split into ideological fragments by autocrats, bureaucrats, theocrats, technocrats and other authoritative kinds of rats. A world without either the room or the patience for the plain, ordinary man's right to mooch along his own personal path with a minimum of interference.

Some book he had read in the long, long ago had pictured what is called civilized existence as a sequence of cataleptic states traceable to an obstruction of the evolutionary process. What was that book? Armstrong had to think for some time before he recalled it as Greiner's "Prelude To Sanity." Oh, well, things might become different if his own intentions were approved in the book of fate. Humanity



might open out—like a flower in the sunshine.

But at that exact moment, fifty-thousand steel-studded feet were demonstrating the long forgotten *Passo Romano,* the totalitarian goose-step, along Turin's Via Milano. Atomic warheads were being loaded onto hydraulic elevators in underground factories in the Urals. A lake of broth, seething with cultures, was being strained at France's Bacteriological Research Station at Lyons. A test-shower of phosphorus pellicules was satisfactorily burning up a field of wheat in Bulgaria. British newspapers were busily hounding out of public life a leading political personality who had dared to say that the road to war is not the path to peace.

Through press-recorders, over the radio and television networks, along each and every conceivable channel of propaganda swelled the flood of lies, half-truths and willful misrepresentations which, if maintained long enough and made strong enough, would sweep the world's cretins from their precarious hold on individual life and into the sea of death. The chorus of suspicion and hatred slowly but surely was building itself up to the culmination desired by those controlling it—kill or be killed!

Already the smear-technique was dealing with those unwilling to conform. Later, when frenzied masses were psychologically prepared for it, the smear-technique would give way to the blank wall and the firing squad. First make the mob scream for Barabbas—then let them crucify their own! Like dogs salivating to the chime of the Pavlovian bell!

The rolling world was beginning to reel, but over it the solitary plane plummeted on. In London, two swarthy aliens twenty miles apart cautiously unpacked and buried special containers holding plutonium at sixty per cent of critical mass. In due time they'd be brought together—but not yet, not just yet. In Baltimore, a squad of alert secret service agents seized a cylinder of chorium oxide, killed its owner, made fourteen arrests elsewhere. In Essen, Germany, a retort full of radioactive fluorine blew apart and eighty workers promptly became those for whom the bell tolls. Ten more acquired a new and appallingly virulent form of leprosy, a phenomenon regarded by professional chaos-mongers as of immense help to humanity's backward march along the road to oblivion. But still, the plane roared on.

Quinn made a dexterous, one-minute landing on a natural runway near Bismarck, well out of sight of the local skyport. One of Hansen's toughies got out, then Claire, then Horowitz who stood on the grass blinking owlishly around.

"Maybe you're a native-born Martian, maybe you're not," Armstrong said to the latter, speaking from his vantage-point in the fuselage. "Maybe I'm a pink giraffe, myself. Maybe all this Martian stuff is a lot of malarky. Life's chock-full of maybes, isn't it?" He grinned, showing big, white teeth. "And one more of them is—maybe

we'll get where we're planning to go!"

Horowitz offered no reply, but his magnified optics were cold as they regarded the other.

"Keep him out of circulation at least seventy-two hours," Armstrong instructed the Hansen-agent. "After that, toss him to the F.B.I. Whatever you do, don't lose him. Blow his nut off if he gets out of step with you."

"It'll take him all his time to stay alive," promised the escort, dourly.

"Oh, John." Claire looked up, her tip-tilted eyes anxious. "John, I—"

"And maybe I'll be seeing *you* again," he told her, with feeling. He flipped her an envelope which she caught and put in her pocket. "Stay close with the others, and watch his Snakeship the Martian until he's handed over. Then beat it to Gregory. You'll be all right. Don't worry about us." He studied her as if photographing her piquant features in his mind. "'Bye, Pixie!"

He closed the fuselage door. Quinn boosted the machine off the ground, gained height rapidly. Sitting beside him, Armstrong frowned thoughtfully through the transpex until the three figures on the ground were lost to sight.

"That goggle-eyed bigbrain is as Martian as my left foot," he said, suddenly. "To use an Irishism, if I'm sane and he's sane then one of us is nuts."

"He can prove he's sane," Quinn pointed out.

"What of it? Suppose we end up by proving him a liar?"

"You've got something there." Quinn mused a moment. "Good liars have changed the course of history, and done it bloodily. They're a menace. I feel it in my bones that he's just such a menace."

"Me, too." Leaving Quinn, he stepped carefully along the fuselage, took the seat by Hansen, said to the saturnine agent: "We're crossing the border." He nodded toward the countryside beneath. "Another crime—illegal entry."

Hansen sniffed disdainfully. "That worries me. It's sheer defiance of authority. It's naughty." His eyes keened at the other. "Why did you dump your heart throb?"

"I wanted her out of the way on our last lap. We're gambling—win or sink. I won't risk her sinking with me. So she's taking a letter to Gregory telling him what has happened so far, and what we're aiming to do. He can work out his best moves from that." Ruminatively, he paused, added. "What's of most importance, though she doesn't realize it, is that I've got her out of the way before the end comes."

"The end?"

"The end of this chase."

Hansen said, "Oh!" and looked mystified.

In front, Quinn gave the radio another whirl. A brassy blare came forth: "Skiddin' With My Shiver-Kid." With a pained expression, he switched to another band, got the tail-end of a talk on the international situation.

". . . and in themselves the peoples of these countries do not want war any more than we want war. Like us, they have troubles enough and desire nothing better than to be left to solve their own problems in peace. Like us, they believe in the four freedoms." The speaker's voice hardened. "These are their natural instincts, the instincts of little people who want to be left alone. But when they are not permitted to exercise their natural instincts, when their every channel of information is poisoned at its source so that they are hopelessly misled about the sentiments and intentions of their nearest neighbors, when they are forced to live in a false and illusionary world which constantly is depicted to them as murderously hostile, then eventually may they be persuaded to run amok, sword in hand, willing to die in defense of a way of life which has never been threatened. Reluctantly, regretfully, with heavy heart but powerful hand, we, too, shall then be compelled to draw the sword to protect all those things which we hold dear. There is no other way out, no other alternative. We must be prepared to fight—or be prepared to die!"

Cutting off the radio, Quinn twisted around in his seat, pulled a face at Armstrong. The latter turned and looked at Womersley glowering two seats behind.

Armstrong said to Hansen: "That speaker was right, of course. I'd say we've more sane ones in this country than anywhere else, but that won't keep us out of the resulting mêlée once the rest of the world's lunatics stampede."

"It might be better if the darned world did go haywire," suggested Hansen. "Everyone would then be far too busy to bother about small fry like us—the F.B.I. and the cops would have bigger game to pursue."

"You don't mean that. I know you don't mean it. You wouldn't wreck the planet just to insure that you became one of the forgotten."

"No, I reckon I wouldn't. Ultimately I might find myself in a worse fix—a wandering savage, maybe." His dark eyes were meditative. "You know that as a nation we aren't a warmongering crowd. We're not the kind to spill blood and gloat over it. Collectively, we're of a type which enables the President and Gregory and their supporters to have a better chance of keeping things cool than they'd have anywhere else in the world. If anything starts, it won't be us who starts it. Perhaps it's because we're a little less loony or a little more sane than they are elsewhere."

"Perhaps," Armstrong admitted.

"I know that you've got some plan on your mind," Hansen continued, "and I don't doubt that it's so nutty that even the world's imbeciles will know you're mad—and what beats me is how you hope to influence *them*. In America you can summon more plain, ordinary common sense to your side than you could dig up any place else, but what good will it do if you can't cut the ground from under millions of other lunatics? When

they stampede, boy, it's going to be some rush!"

"Once when I was a kid I saw a herd of cattle panic," Armstrong said, reminiscently. "About four hundred of them. Black ones, brown ones, white ones, piebald ones; some with long horns, some with short. Cattle of all kinds. They milled around, set their heads the same way, charged off hell-bent for they knew not where. They thundered two hundred yards to a narrow bend, turned it, found two cussing cowpokes fighting like maniacs right in their path. They slowed down, milled a bit, slowed more, then stopped. Finally they stood around the fighters and watched the battle. By the time it was over they'd forgotten what started them on the run." His elbow dug Hansen gently in the ribs. "Spectacular diversion, see?"

Hansen said: "Uh?"

"Then the boys turned up, urged the steers back to their pasture. Soon the birds were twittering in the trees and all was tranquil once more." He called to Quinn: "Where are we, George?"

"Over Peace River. Not much longer to go."

"Peace River," he said to Hansen. "Do you believe in omens?"

The sun had become a ball of flaming orange low in the west when eventually Quinn called him forward. He stared through the transpex, his face intent, his pulse beating heavily.

Yellowknife lay dimly in the distance a few degrees to starboard. Beneath, copper colored by the setting sun, sprawled the glistening area of the Great Slave Lake. To one side reared the Horn Mountains, tipped with snow sun-tinged a bright red.

They jetted arrowlike across the lake between Yellowknife and Providence, followed its northward arm toward Rae. This kept them free for a while of direct observation from the ground. Gaining height before they reached the shore, they made a wide sweep east, then south, eventually found the railroad spur running from Yellowknife to Reliance. The rocket assembly plant stood on this spur twelve miles east of Yellowknife.

Approaching from the north, they permitted themselves only the briefest glimpse of the plant. One snatch of recognition was sufficient, and Armstrong snapped quickly: "That's the dump!" Quinn promptly turned his plane around, dropped it earthward in a direction away from the plant. They came down to two hundred feet, spent a quarter of an hour zigzagging over dangerously craggy terrain before finding a suitable landing place. Expertly, Quinn dropped the machine on a half-mile flat, let it trundle to a stop. The assembly plant was now out of sight just over the southern horizon, while Yellowknife was barely visible to the west.

Abandoning his controls with a sigh of relief, Quinn stood up, stretched himself, exercised stiff muscles. "Now to see whether we get a bang on the beak." Opening the fuselage door, he studied the

darkening sky with wary eyes. "If there's a radar lookout at that plant, and if it spotted us coming down, something will come buzzing over to examine us mighty soon."

"I know it." Armstrong squeezed past him, got out of the plane, stamped on the hard, cold earth. "But I still think luck is riding with us—and I want to play it to the limit, while it lasts. Heck, we've been lucky even in that it had to be this time of the year—some other time all this would have been ten feet deep in snow."

One of Hansen's men growled from his seat behind the soured and silent Womersley: "Right now I could do with being ten feet deep in hamburgers!"

"Me, too!" indorsed the agent.

Womersley licked his lips moodily.

"There's a big lunch box in the tail," Armstrong told them. "It was put in at the skyport." He smiled as the hungry complainant dived from his seat toward the rear of the fuselage.

Quinn jumped down from the doorway, kept careful watch on the sky. The rim of the sun had now disappeared below the Horn Mountains and a pall of darkness was spreading from the east. The entire southern terrain was grim, silent, devoid of life as far as the eye could see, but there was a faint, primrose glow beyond the horizon where the rocket plant stood, and tiny twinkles of light were beginning to appear in Yellowknife, to the west. No planes came roaring through the twilight, intent on investigating the grounded machine. Either their cautious approach had passed unnoticed, or suspicions had been lulled when they'd turned away.

Bearing a load of sandwiches, Hansen got out of the plane, handed some to the others, munched with them while he observed the onward creep of night. He shivered, spoke around a mouthful of food.

"If this is the far north, give me Miami!" He looked inquiringly at Armstrong. "Now we're here—what next?"

"The remaining step is to take up one or both of those rockets—or die in the attempt," Armstrong replied, slowly and thoughtfully.

Hansen dropped a sandwich, picked it up, bit into it, dirt and all. He bit his thumb as well, swore, transferred the sandwich to his other hand. He ate mechanically, like a man who hardly knows what he is doing. Twice he paused as if about to say something, changed his mind, chewed hurriedly, swallowed with difficulty.

"George, I was never more serious in my life. You know the situation; in every particular it's designed to prevent any rocket getting some place external to Earth. That is the fundamental purpose of the whole set-up, and beside it all other purposes fade into insignificance. So unscrupulous, so determined and so desperate are world-wide machinations aimed at preventing any rocket from reaching the Moon that it makes obvious two very important points."

"Go on."

"Firstly, it tells us that the saboteurs have satisfied themselves beyond all doubt that the latest types of rockets represent a stage of development where Moon-conquest is in the bag—if the rockets aren't tampered with beforehand. That's something worth knowing, for they've got technical details not available to us, and have some basis for judgment. Secondly, it also tells us that if—despite all their attempts to prevent it—one rocket does get to the Moon, it will thus create a new psychic factor of such potency that world-circumstances will undergo radical alteration and the world-plot will collapse. It will collapse for the excellent reason that it will have been deprived of its prime purpose. The plotters will disperse, powerless and discredited, like end-of-the-world cultists when their long prophesied Day of Judgment fails to arrive. Their fanatical function has been to stop John Doe and Richard Roe from breaking his bonds, stepping out of this world and into the cosmos." His body loomed huge and bearlike in the gathering dusk. "So it's up to Richard to open the door! As I said before, a rocket on the Moon is mate in one move!"

Quinn protested: "I'll give you all that, but how do we know those rockets are ready? And how do we know that they won't be shot off at the appointed time, without any help from us?"

"Womersley blabbed under the schizophraser, when he was in no condition to tell lies. He simply had to tell the truth. He said that one rocket has been officially reported as ready for its test-flight. The other was then so nearly prepared that it ought to be ready by now. Test-flights and resulting modifications and large dollops of snafu will waste another month or more. If the holocaust starts before then, you know and I know that those two ships will never take off for the Moon—they'll be altered and blown somewhere else where they'll do plenty of damage. Moreover, just in case someone does get smart and tries to beat the plotters to the draw, the fuel coils have been fooled with. They're slated to blow apart near the Moon."

"So we take 'em up and blow apart with them?"

"Not with fuel for a thirty-thousand miles test flight also on board! Not if we gamble on long odds and take them away *without a test flight!*"

"Yes, ye gods!" admitted Quinn. "That's true enough. If they take off untested, they'll have a ten per cent fuel overload at the very least. A good margin! And if that explosion point is set at a stage where the remaining fuel represents less than the overload, the ship will have landed before its consumption reaches that point." He flourished his hands in nervous excitement. "But what a risk! What a plain, downright, lunatic gamble! Only the goofiest of galoots would try it!"

"I'm willing."

"Without a preliminary test flight we've no way of knowing

whether those boats are really fit to make the long trip. A hundred to one both of them will need modifications of sorts to be discovered only in free flight. How the deuce can a solitary pilot do an engineering job on his vessel when he's halfway to the Moon and going faster than zip? Besides, we don't know precisely where that explosion point is. Suppose that it's timed for one hour after take-off—the extra fuel will do no more than postpone the big bang by five or six hours. It'll occur just the same, and down will come cradle, baby and all!"

"I told you the blowup is due near the Moon. It's staged near the end of the fuel coil. The ship should go to blazes on the braking approach, about where most of the others busted. Womersley said so. The extra test flight fuel ought to cover that margin three times over, in my opinion. As for going up without a test, there's no alternative that I can see. If we leave those boats alone, they'll go their own bureaucratic way, wasting weeks while they accord with officially prescribed formula, and eventually getting nowhere. Time is the critical factor. Time waits for no man—and the whole world is betting its collective life on a few potent hours, a few potent minutes. George, we have got to bounce those rockets higher than a kite—either that or we backslide through eternity!"

"*We* bounce them?" Quinn stared around as if seeking a ghost. "Who's the other pilot?"

"Me."

Hansen bolted a piece of sandwich and said: "Now I *know* this world's a madhouse."

"Oh, *you!*" Momentarily, Quinn was lost for words. Then he said: "What d'you know about piloting space rockets?"

"A fair amount theoretically, but my practical experience doesn't exist. It's high time I learned. I'll have to get it from you."

"Mother, listen to him!"

"There are two rockets because they're intended to go together," Armstrong explained, patiently. "That means they'll share a microwave channel. Their pilots can talk to one another. You're going to talk and tell me what to do."

"Boy, I can see myself! Let me tell you, you oversized hunk of stupidity, that handling a space rocket at take-off is worse than riding a drunken comet. Can you imagine me clinging desperately to the controls, juggling with hundreds of tons going up like a bat out of hell, and calmly lecturing you how to do the same?"

"Of course not. So I take off first, under your instructions—you'll be telling me how. When either I've got safely away or have smeared myself over the bottom of a crater, you blow free. If I'm still running, it's up to you to get within talking distance again—if you can."

"It's abetting suicide!" Quinn declared, positively.

"That's exactly how I felt about you when I was concocting those gadgets for number eighteen. What makes you think you're the only guy with a right to break his own neck?"

"You're both batty," opined Hansen, gloomily. "Batty and scatty. Thank heavens there's not a third and fourth boat. You'd have me piloting one and Miriam the other."

"I wish there were," said Armstrong. "You'd be in them!"

"That's what you think! I know I'm sane without needing any psychotrons to tell me!"

"Suppose that I refuse to take part in this crackpot scheme?" Quinn asked.

"You're our key-man. Without you we're sunk. You know that, George. But, sunk or not, I'd go and try it by myself. I've not come this far merely to turn back."

"So you'd step in and snatch all my glory?" Quinn wagged his head sadly. "What a friend, what a friend!" He looked up, grinning. "Not while I'm standing under my hair, you won't!" He sobered, and went on, "For myself, I don't care a hoot—if I did I'd never have been chosen for number eighteen. I don't like the idea of you trying to handle the other boat. You'll crush your thick, stubborn skull, and that will do you no good—and it'll do no one else any good, either."

"Two chances are better than one, even if the second is amateurish and with greater odds against it."

"Yes, I know." Quinn kicked a pebble viciously. "There are two fully qualified pilots somewhere inside that assembly plant and there's a topnotch chance that they're people I know and who know me. I think it would be wiser to get in touch with one of them and persuade him to collaborate."

"A very good idea. Now tell me how we're going to search that place for a pilot without being pinched in the process, and how we're going to persuade him—all before dawn."

"Dawn?" Quinn gaped. "Are you thinking of taking off tonight?"

"If we can get into those ships without mishap."

Solemnly, Quinn extracted from his pocket a heavy automatic which he'd acquired during the fracas at Singleton's. Ejecting its magazine, he made sure that it was full, rammed it back into place, returned it to his pocket.

"Give me another sandwich and I'm ready."

Hansen gave him one, said hoarsely to Armstrong: "Where do I feature in this daffy performance?"

"I want Miriam to guard Womersley and the maid until you return. I want you and the other man to help us bust into the plant and reach those ships."

"And after that?"

"Beat it back here, if you can. You'll manage it, I think. If one or both of those ships suddenly blow free, it'll cause such a hullabaloo that a dozen could march out of the plant without being noticed. When you get back here, collect the rest, make for Yellowknife, put a call through to Gregory, tell him everything you know, and leave it to him to protect you. If one of us gets away safely, and makes it to the Moon, Gregory will be in a powerful position. He'll be able to

whitewash you so that your own mother won't know you."

"If this, if that and if the other," said Hansen, with open skepticism. "What if you don't blow free?"

"We'll all be in the soup, and said soup will be red-hot." His laugh was harsh. "We're in it already, aren't we, so what's the difference? This is our only out!"

"You win!" Hansen went to the plane, issued instructions to Miriam, came back with the other.

No further words were spoken as the four tramped steadily toward the southward glow. A cold wind blew briskly across the rocky ground; the sky was now devoid of any random gleam from the buried sun but brilliant starlight and a sickle Moon served to make clear their way. They were grim as they marched onward, each occupied with his own thoughts. The glow on the horizon grew stronger as they neared.

The rocket assembly plant covered considerable acreage, had a ten-foot high wire fence around it, and was patrolled on the outside by armed sentries. At one end of the huge compound lay the administrative buildings surmounted by a large flagpole on which no flag could be seen by the shifting light of wind-tossed arcs; at the other end bulked machine shops, test shops and stores. In the great space between, half a mile apart, soared the tremendous finned and tubed cylinders which were Moon-rockets numbers nineteen and twenty.

A long, narrow boarding-ladder ran high up the side of the nearest rocket whose entry port was closed. Keeping well out of sight of the sentries, the four sneaked around the area to the opposite side, found a similar ladder mounted against the other rocket.

There were several entrances through that intervening fence which, in the dim, uncertain light, looked as if it might be electrified. Large gates, heavily guarded, broke the fence on two sides where the railroad spur entered and left the forbidden territory. Four very small gates were set in the fence at its corners. At regular intervals of twenty minutes, each sentry went through one of these small gates, pressed a button set on a post within the compound, relocked the gate and resumed his beat.

Lying low in the semidarkness, the four watched the sentries for more than an hour while they gained a proper understanding of the routine. Pairs of sentries started from each corner, patrolled at fast pace to the center of each side, turned back when within recognition-distance of each other, pressed the button on reaching the corner, and started all over again. Each individual made regular contact with two others, one on the corner and one at the middle, and this meant that the knocking out of any one of them automatically would alarm all the rest within a few minutes.

"There are eight altogether, not counting those at the railroad gates," Armstrong whispered to the others. "We can't flatten the lot

of them. The only thing to do is to deal with a pair of them at a corner, just after they've stabbed the security button. It'd take the others about ten minutes to reach the middle and find nobody to meet them, maybe another three minutes to race back to a corner gate and sound the alarm. That gives us say thirteen minutes to reach those ships and start climbing fast. It could be done easily to the nearest one. The farthest means an extra half-mile sprint. I reckon I can make it if nobody stops me in full gallop."

"Stops you?" hissed Quinn, in low tones. "Who said you're taking the farthest one?"

"My legs say, Shorty. They're twice the length of yours."

Quinn emitted a disgruntled: "Humph!"

"Let's get round to that corner and snake up as near as we can get while those patrols are near the middle. We'll give them time to prod the button, then rush them." He grasped Hansen's arm in the gloom. "See that those guys don't utter a squeak after they've been downed. Sit on them until the other sentries start whooping—then beat it yourselves as fast as you can go. Don't wait to see what happens to George and me—shift your dogs as if you're after a million dollars!"

Wraithlike, they stole through the shadows to the corner, waited for the sentries to near the middle, slipped to within twenty yards of the fence and lay flat among the boulders. Twenty minutes later the sentries returned. Armstrong watched them unlock the gate, press the button on the post. Decidedly those corner gates were weak spots, but for the double locks needing two keys they might have been able to bust in without rushing anyone. The sentries came out, began to close the gate. Despite the cold wind his body was strangely warm as he arose, poised on his feet.

That twenty yards seemed like fifty, and the pounding of his shoes on the hard rock sounded like warning thunder. Someone was snorting beside him, two more hammering noisily to his left. The sentries were amazingly slow of hearing. He'd got to within jumping distance of one of them before the fellow turned and blinked uncertainly into the darkness. He hit the sentry like a runaway elephant, knocking him flat. The other was still fiddling with a key in the gate when Hansen and Quinn fell on him simultaneously.

Armstrong didn't wait. Leaving his victim to Hansen's man, he reversed the key, shouldered the gate open, grabbed Quinn, lugged him through.

"Quick, George—take the nearest!"

Lifting big, pistonlike arms to his sides, he hurled his great body along beneath the waving arcs. Quinn was five yards behind him when he passed the first rocket.

No alarm yet had sounded, no voice had bellowed warningly when Quinn reached the ladder and started scrambling up it like a scared monkey. The little pilot was talking to himself as he climbed.

"Let that lock be open! Let it not be fastened!"

He glanced aside when fifty feet up, saw the dim outline of Armstrong's burly figure plunging onward in the distance. There were few people about. Three men were talking outside the administrative building apparently quite unconscious of what was going on. Two more were standing under an arc a hundred yards away and staring bemusedly after the running Armstrong. From a large steel building to the north came sounds of music and much laughter. A camp concert. Quinn spat downward, continued to climb rapidly.

Two men in gray denims were passing the base of the second rocket as Armstrong raced up to it. They gaped at him, blinked uncertainly, gaped again. With delayed presence of mind, one of them stepped into his path.

"Hey, you, what's the hurry? What d'you think you're—?"

Armstrong handed him a haymaker. The fellow arced backward under the powerful blow, his feet leaving the ground. Armstrong whirled sidewise, swerved and ducked elusively before the other man, found that the fellow's startled confusion had made him easy meat. Giving him no time to gather his wits, he laid him out like a corpse, scrambled frantically up the ladder.

Hell broke loose as he reached the thirteenth rung. A chorus of enraged shouts and several shots sounded beyond the fence. Pink gouts spurted in the distant darkness and something whined shrilly off the administrative building's steel roof. The three talkers outside of it promptly dropped and scrambled for safety on all fours. He was twenty rungs higher when a great number of auxiliary lights flooded the entire camp and an alarm gong began its clamor.

Now halfway up, he continued to climb in brilliant illumination. At one corner of the assembly station a thirty-inch searchlight shot its beam skyward, lowered it, swung it over surrounding terrain. The shooting had now ceased. Men, shouting and gesticulating, were pouring from the main doors of the concert building. Five more, two of them bearing automatic rifles, raced at top speed past the base of the rocket without looking upward. The two he had bowled over had now regained their feet and were gazing after the five runners.

He was gasping for breath and still striving to increase the speed of his climb. The thought that the lock might prove to be fastened did not occur to him. Neither did he remember that one of the rockets might not be ready, or ponder whether this were the one. Two things only filled his mind. One was the thought of a clot; if, unknown and unsuspected by him, he had a clot, this would pump it into his heart. A black-wrapped mind, a failing grip, legs devoid of strength, and a sudden fall would be the first and only indication. His other worry was that someone with a rifle might look up, see him

and bring him down like a plugged rat. Eight more men, all armed, sprinted past the bottom of his ladder and toward the fence. The two at the foot made up their minds and ran after them. Obviously they had not seen him jump the ladder.

The searchlight swung right round, its beam passing directly over him, spotlighting him for a second like a trapeze artist in a circus. Still he was not noticed. All attention remained on that far fence. A second searchlight opened up, then a third. Twenty more rungs . . . ten . . . five. He shoved frantically at the closed door of the lock. It opened.

Thankfully, he writhed through the small, circular hole. Temporarily he was out of sight of those below and therefore out of mind. Unhitching the top of the ladder, he shoved it away, heard it clatter noisily to the ground. Sooner or later that would draw attention to the ship as nothing else had done. But getting him out now that he was in would be a tough task. In effect, he was in a vault, or a cylindrical fortress. Gulping as he drew in great lungfuls of breath, he secured the door of the lock.

Finding the pilot's seat, he fastened himself in it, fixed the headphones on his head, pressed a stud marked: *Intercom.* The phones livened up.

"You there, George?" he murmured into his larynx-mike.

"Yes, I'm here."

"Can they hear us on this?"

"I don't think so. There's a stud marked: *Ground* on the board. That's their channel. We've got one of our own, to cut out interference." Quinn paused, then said: "You were a deuce of a time! thought you'd failed to make it."

"Time goes mighty slow when you're waiting and jumpy—like at the dentist's." He coughed, enjoyed deep breaths. "All right, George—I'm ready. Start talking."

"Take it easy and keep cool," advised Quinn. "You could squat there for weeks and keep them at arm's length. Blow your stern jets whenever they come near and you'll scald their feet off."

"I don't want to burn anyone's dogs. I've nothing against them. Say your piece and let me blast off."

"O.K.," Quinn's voice had a metallic timbre in the phones. "Lever on your right, marked: *F.F.*, is the fuel-feed control. Move it one notch. Detonate with the red stud immediately in front of you. Your tubes will start blowing at minimum power and they'll need a full two minutes to warm up. Watch the chronometer—it won't be safe to give them any less."

Phlegmatically, Armstrong did as instructed. His foam-rubber seat began to quiver under him. The whole fabric of the vessel developed a rhythmic tremble from end to end. Dust rose from the ground, obscured the observation port over his head. He could imagine a tremendous sensation throughout the camp, with much scurrying around, much bawling of

hasty orders, but he could see nothing, hear nothing.

Quinn went on talking, his tones calm, even, unhurried. Armstrong lengthened the blast. His hands, his hair and the back of his neck were warm and wet when Quinn suddenly shouted, ". . . and for the love of heaven keep that swing-indicator centralized! Now—*boost!*"

He rammed the control over to boost point. The ship produced an organlike and eerie moan, rose slowly, very slowly. The cloud thickened over the observation port. The moan grew louder and half a note higher. The ship seemed almost to crawl through the cloud. Quinn was gabbling fifty to the dozen.

"Ignore the port. Ignore the sky. Keep your eyes on those instruments. Correct the side-swings. Don't let her drift away from the perpendicular. *Watch that swing indicator!*"

The sluggish upward creep ceased all of a sudden, and the vessel increased speed perceptibly. It rose faster, faster. It was going up like an elevator. It was going up like a jet fighter. It was going up like a rocket!

In the phones, Quinn's voice began to fade gradually as he continued: "Keep her going that way. Don't reduce power on any stern-pipe. Maintain the full blast. *Watch that swing!*" He stopped, then his voice returned very weakly. "Can you still hear me, John?"

"Only just."

"All right. My turn now. I'm taking off."

Silence for a long time. Armstrong sat heavy-pressed in his seat while the ship shuddered and moaned. He kept his whole attention on his instruments, avoided looking at the increasingly brilliant glitters in the sky.

The swing indicator registered a two degree tilt. He corrected it by swift angling of the stern-stream stabilizer vanes. Gradually the tilt came back, slid to three and a half degrees. He corrected it again with an overboost on the appropriate tubes. The ship ran straight for a while, resumed its tilt. He compensated once more.

After a full hour, Quinn's voice speared into the ether: "Are you with me, John? I'm up, way up. Can you hear me?" Silence while the moments crawled by, then, sharply: "John, can you hear me? Are you still running?" A long lull, followed by: "I can't see you, John. What's the matter? For Pete's sake don't start acting funny at this time! If you can hear me, come back, will you? John . . . John . . . are you all right? Are you still moving? Have I got this . . . all to myself?" Nothing responded, nothing. The steady moan of his own ship was the only detectable sound in the whole of creation. Finally, Quinn said, "Oh, heavens!" His voice vanished from the ether as he released his stud and closed the channel.

XVII.

Leaving the telephone, General Gregory marched restlessly up and

down his carpet. Seated in a deep chair, not reposefully, but erect and taut, Claire Mandle watched him with wide, tip-tilted eyes.

"That was Hansen. Whether I can clear him and his aides—and all the others for that matter—depends entirely on what happens next. Senator Womersley is the crux of my problem; Womersley and the mob he represents both in this country and out of it. If he chooses to make yet more trouble, as is likely, he can make plenty. He and his tribe can make more than I can cool down despite the support given me by the President and certain influential members of the government. This Norman gang is all over the place, and our jurisdiction doesn't extend everywhere. That makes things tough." He gnawed his mustache savagely. "But if this crazy venture of Armstrong's comes off, well, Womersley's crowd won't be able to find hiding-places quickly enough. Armstrong, Quinn, Hansen and the rest automatically would be cleared. World opinion would demand it." He looked at her, smiled reassuringly. "No matter what laws may say, or how they may be written, public heroes cannot be burned at the stake. There are times when the law must give way to expediency—because the people say so, with one voice!"

"What did Hansen say?" she asked.

"He's in the calaboose at Yellowknife along with his secretary and one of his men. Womersley is stamping around breathing fire and fury and reciting a long list of charges against all and sundry. Womersley won't like it when he finds I've got Hansen out and have ordered a plane to bring him here."

"What did he say about the rocketships?" she persisted.

"They got away."

"Is that all?"

"Isn't that enough, young lady?"

She nodded reluctantly. "I suppose it is. Can't we find out what has happened to them? Are they really on their way, both of them? How far have they got? How soon shall we know whether—?"

"As soon as I can learn anything definite, I'll tell you," he promised.

"But surely we should know something by now? They've been gone fourteen hours. They should be about a third of the way there if—" She stopped, her expression pathetic.

"If they've been lucky," he finished for her. "There is nothing on the newscasts and won't be anything unless it's too spectacular to suppress. Those rockets were rather secret, see? Admittedly, how secret has become a matter of considerable doubt, but for reasons of high policy we don't want to advertise them before it is necessary."

"Don't the observatories know how they're progressing?"

"What the observatories know they will keep to themselves until it becomes something well worth telling. All news will be withheld as long as possible. That's just in case we're unfortunate and have two flops dumped in our lap—

there's a small chance that they'll pass unmentioned, unnoticed."

She regarded him levelly, her discontent obvious. "Would it matter if the public knew that those two men had tried and failed?"

"In present difficult circumstances, I'm afraid that it might matter a great deal. Some of our jingoists would be swift to blame foreigners for the disaster, and their foreign prototypes would reciprocate by whipping up more antagonistic feelings against us suggesting that because we built in secret we had an ulterior and probably treacherous motive. There may be even an organized outcry against the completion of number eighteen in New Mexico. All is grist to the propaganda mill when the war gods are sharpening their swords. When world-wide hysteria mounts steadily it is because those unseen forces manipulating international channels of opinion are utilizing every circumstance and craftily exploiting them to the utmost." He resumed his restless pacing on the carpet. "The world is a powder barrel with people prancing around it waving lighted candles. It's taking all we've got to postpone the big bang, and eventually it may come somewhere else in spite of us. Only the attention-diverting roar of rockets on the surface of the Moon can change the situation. Armstrong was right in that supposition, though sometimes I suspect him of being as mad as anyone." Ceasing his pacing, he faced her. "Call it insanity, stupidity, an obsession, or plain, ornery pigheadedness—it's inspiring and not without a certain amount of logic. He is trying to counter madness with madness, like fighting fire with fire."

"That was one of the arguments Horowitz gave me—who is to say what is rational and what is not?" she commented. "Does the end justify the means, or the means the end?"

"Horowitz!" he scoffed. "Already it has been discovered that he was born in Linz—and Linz isn't on Mars!" His mustache bristled as he added, "And we've a shrewd notion of what we've yet to discover—that he's a newer, craftier, more inventive version of Hitler, the self-appointed messiah of a revived Germania."

She consulted her watch. "The noon newscast should be on the air now. Could we hear it?"

General Gregory flipped the wall switch, watched the screen glow to life. He was a little late, for the announcer was partway through his newscast.

". . . from Concepcion, bound for Wellington, radioed that an immense rocket descended from a clear sky at dawn, at bearings given at 37 50S by 80 OW, this being about three hundred miles south of the island of Juan Fernandez, better known as Robinson Crusoe's Island. The *Southern Trader* reports that the object swept into a shallow curve which caused it to strike the sea at a tangent. Ricocheting like a flipped stone, the alleged rocket skipped across the surface of the ocean at tremendous

pace and eventually disappeared over the southeast horizon." Finishing that item, he started with: "An uproar at this morning's meeting of the new Pan-European League resulted when M. Pierre Dieudonné, the French—"

Claire Mandle was standing up, her hands clasping and unclasping. Stony-faced, Gregory switched off, turned to the phone. He was on it some time, putting through five calls. Finally, he turned to her, faced her questioning eyes.

"The *Southern Trader's* report came in only twenty minutes ago. It should have been kept off the air. Somebody blundered—or someone is being awkward. Anyway, nothing more is known except that the Chilean Government is investigating. One of our carriers, the *Jefferson,* is at Valparaiso. It has been ordered south to search the area."

"Then, you think—?"

He nodded gravely. "I'm afraid that one of them is down. There's no point in deluding ourselves with false hopes, my dear. It's almost certain that one of them is down."

"Which one?" she said. "Oh, if only we knew which one!" Her look at him was appealing. "And if only we knew about the other."

"All in good time." He patted her shoulder with fatherly confidence. "A little waiting, and the rainbow comes!"

"Can't we *do* anything?"

"No more than we're doing now." He led her toward the door. "Go out, have a look around the shops, buy yourself a pretty hat. Forget all about this for another twenty-four hours. No amount of worrying will make the slightest difference. As soon as news comes through, I'll phone you."

She left, for an hour wandered aimlessly around. Her eyes looked at shop windows without seeing what was in them. Buy yourself a pretty hat—tomorrow pretty hats may not be there to buy. How futile! Which one was down, nineteen or twenty? Who was its pilot? Where was the other boat, and who was piloting that?

She couldn't stand it any longer. Hastening to her hotel, she spent a fruitless afternoon waiting by the news recorder. And all evening. And half the night. There was still no news with the dawn radiocast, no *real* news. Heavy rioting in Afghanistan, massacres in India, fighting on the Turco-Syrian border, a mystery explosion in the naval port of Ferrol, Spain. But no news about rockets—nothing.

Is no news good news? Or bad news? Or even what it purports to be, namely, news?

Gregory's promised phone call drew her eagerly from her breakfast table at precisely nine o'clock.

"A stratosphere jet plane is waiting for you at the skyport, my dear," he told her. "It will take you to New Orleans. You will find some of your friends already on board. Take a taxi and get there just as fast as you can."

"But, general, why—?"

He had cut off. A quick utterance of words, and he'd gone. She gazed at the phone, a little dazed

by events, then moved fast. Doing little more than snatch up her hat and handbag, she was out of the hotel and into a taxi in short time.

The three awaiting her in the plane were Hansen, Miriam and Bill Norton. The latter helped her as she entered breathlessly, and the plane took off immediately.

Hansen grinned at her. "Quite a welcoming committee, aren't we?"

"I don't know a thing. What has happened?"

"We got in from Yellowknife, under escort, late last night, had a long talk with Gregory and the F.B.I. This morning, they dug us out, rushed us here. Gregory thinks that for the next few hours we'd be safer some place else. Having said all there is to say, we've become a liability—so we're going with you and Norton."

"Going where?"

"To meet Armstrong," Norton put in. He had the expansive air of one well satisfied with life. "Didn't General Gregory tell you that?"

"Then he's safe? He's not hurt?"

"He's a bit damaged, and maybe his dignity is hurt," said Norton, offhandedly. "Beautiful women will find him even more repulsive than he used to be. Otherwise, he's all right."

"Thank goodness!" she breathed.

Norton raised an eyebrow. "He's not such a bad ape," he conceded, weighing her up, "despite that he's so big and so stupid." He expanded his chest. "Gregory is permitting him to talk to one reporter only—all others warned off. Armstrong nominated me. That's friendship. He doesn't forget old friends."

"No, I suppose not," she murmured, her mind in a whirl.

"And I hope he continues to remember them in the future," Norton added, pointedly. He eyed her again. "Can you cook?"

She was taken aback. "Cook? Can I cook?"

"Steak smothered with button mushrooms, and stuff like that." He licked his lips.

"Of course."

"That's fine. That's real fine." He patted his stomach. "I see no reason to withhold my approval."

Hansen and Miriam swapped significant glances, and the latter said to Norton: "That's mighty white of you, Roderick."

"The name is not Roderick," Norton reproved, glowering at her.

Claire put in: "Just what has happened to John? Why are we going to New Orleans?"

"They're flying him there," Norton told her. "As I've got it, he skidded across half the Pacific Ocean and thumped into Chile, wrecking his ship and distorting his own profile at the same time. Planes from one of our carriers found him. We should be in New Orleans about an hour ahead of him, and will meet him when he lands."

"I see." Peeking through the window, she watched the landscape rolling far below. Her thoughts were elsewhere.

Hansen said: "Well, that's one

floppo. Maybe Quinn's another, some place far from the beaten track, and—"

"What's Quinn doing?" Norton demanded. His eyes were sharp and curious. "I thought the cops wanted him. I thought he was on the run. What's he up to now?"

"Don't you know?"

"Would I be asking you if I did?"

"Then I won't tell you," Hansen said, easily.

Leaning sidewise, Norton scowled at him and spoke between set teeth. "Come on—give! What's all this about Quinn?"

Studying him calculatingly, Miriam baited him with: "What is it worth? Is it worth a mink?"

Waving outraged hands, Norton argued with her while Hansen grinned sardonically and Claire continued to gaze absently through the window. The argument was still in full swing and had become slightly acid when the plane touched down at its destination.

The navy courier arrived ninety minutes later. With jets spouting long columns of mist, it hit the runway, trundled to a stop. Armstrong was first out.

He limped awkwardly down the ladder, his left arm in a sling, his beefy face crisscrossed with strips of plaster, a heavy bandage around his head. His hair stuck out of the bandage in a weird fringe of spikes. His smile was lugubrious and lopsided as he met them, and the

plaster crinkled on that side of his features.

"This is what's left," he announced. "Worn but still serviceable." He took Claire's cool, slender hand in his huge paw. "Didn't expect to find you here, Pixie, Who arranged it—Gregory?"

She nodded, looking at him and saying nothing.

Sniffing the air, he gazed around appreciatively. "Though I say it myself, it's good to be back in the madhouse. Let's go some place where we can eat as well as talk." Calling a taxi, he helped Claire into it, climbed after her with one or two painful grunts.

Seated at a table, with Hansen and Miriam listening intently, Claire watching him slant-eyed, and Norton busily scribbling, he said: "I'm sort of on parole until they learn where Quinn's got to. If he has failed, they won't be able to pinch me fast enough! I've Gregory to thank for these few hours of freedom and peace—I'll have George Quinn to thank if I stay free. It all depends on him."

"You did your best," Claire comforted.

"Maybe I didn't do so bad. Maybe I stopped George picking the wrong ship. I got a wobbler. It wasn't quite ready, and I picked it. That was the point where my luck ran out. I don't know what was wrong. It seemed like a couple of tubes hadn't been fitted with linings. They held up for less than a couple of hours before they burned out. I turned into a huge parabola." He rubbed one side of his face, winced visibly. "That brought me neil-busting for the South Pacific with my heart trying to squeeze itself between my ears. I guess I could never have been torched by Sandy-hair and his gang. The capers I've indulged would have pumped a clot ten times around my system by now. I thought I was a goner in any case."

"You're reserved for the hangman," Norton assured. "Carry on."

"I managed to blow her into a shallow curve just before she struck. She whacked the sea with her belly and hopped like a kangaroo. By heavens, she must have covered about four hundred miles in gigantic, ten-mile leaps! In the end, she walloped an island off the Chilean coast, smiting it so hard that she slid right up the beach and dug her nose into the sandhills. I tried to embed myself in the control panel. I waited for someone to hand me a harp, but after a while some planes came zooming around and a gang of navy boys broke in and lugged me out." Picking up his cup of coffee, he sipped it awkwardly but with gusto. "Reckon that's where my luck came up with one final spurt. I'm the luckiest guy on this crazy planet!"

Norton said: "You never did know the difference between being lucky and being downright bull-headed! Now what's this stuff about Quinn? Where is he?"

"Yes, George," Armstrong murmured, his tones low, anxious. "Now that I've made a mess of it, he's our last bet. If he's sunk,

we're all sunk. But if he makes it, and lives to say so, it'll prove beyond all shadow of doubt that this Martian claptrap is a lot of neo-Nazi hooey."

"Prove it?" Norton looked dissatisfied.

"You bet! Look, sonny, if as these Normans assert, a gang of Martians have been visiting this world repeatedly for centuries, you can accept one certainty—that they maintain an outpost on the Moon. There are good technical reasons for that, as well as strategic ones. If Martians are on the Moon, they're going to button the lip of the first guy who lands there. So if anyone lands and talks—there aren't any Martians! You couldn't have proof more conclusive!" His bothered gaze went to the great clock on the wall, noted that it said four-thirty. "We ought to have heard of him by this time. If he's down, he may be unidentifiable, or the news of his crash has been suppressed, or he's busted himself some place far from anywhere." His fingers started tapping nervously on the table. "I wish we knew, one way or the other."

"Perhaps he's still going," suggested Claire.

"I like to think so, but it's not probable because he ought to have made it by now. His flight-duration is such that if he hasn't reached there yet, he'll never get there."

"Get *where?*" yelped Norton, almost beside himself. "Is this half-pint Quinn up in another rocket? Where did he obtain the darned thing? How many rockets are float-

ing around? If you took up number eighteen and converted it into scrap, how the deuce did Quinn—?"

A big wall-recorder interrupted him. Its huge screen lit up, flickered wildly, cleared, revealed massed military bands. The recorder's matched loud-speakers blared forth a rousing air. Automatically, everyone stood up, heads erect, shoulders squared. Armstrong arose beside Claire, stood with all his weight on one foot, his hand supporting him against the table. Norton was erect as if on parade, a puzzled expression on his features. Hansen looked serious. Miriam was apprehensive.

Something special coming. Massed bands, and the flag under uniformed escort, and the sounding of the anthem. Prelude to war? The dour warning, the appeal to unity, the affirmation of aims? Something very special coming! The marching bands faded out of the screen as the tune ended with a martial flourish of trumpets. An anouncer loomed large. Everyone sat down, nervously, attentively.

The announcer for once had lost his suavity and sang-froid. There were papers in his hand, and the hand was shaking slightly but visibly.

"Emergency news bulletin," he enunciated. "Forty-seven minutes ago, for the first time in human history, a voice spoke to us from our satellite the Moon! It was the voice of George Vincent Quinn, an American citizen, and the official pilot of rocket number nineteen which took off from a secret starting-point and reached its destination in the amazing time of thirty-eight hours, eleven minutes!"

Claire felt the powerful grasp of Armstrong's heavy fingers on her wrist. Her eyes were shining. His were fixed with burning intensity on the screen.

"Quinn's vessel does not bear fuel sufficient for a return journey, but Washington experts state that it is now a comparatively simple matter to send a robot-piloted vessel which Quinn can land by remote control and from which he can obtain the necessary supplies. Instructions have already been issued that number eighteen, our rocket in New Mexico, be modified for automatic operation with all possible speed, and it is confidently expected that the vessel will be ready to take off within seven weeks. Meanwhile, Pilot Quinn has all the facilities needed to preserve life for six months."

Glancing at his papers, and obviously agitated by the importance of the occasion, he continued: "Amateur radio stations, picking up Quinn's calls, were first to disseminate this epoch-making news which already is electrifying the civilized world. Messages of congratulation have started to arrive from foreign governments and from a host of individuals. Some of the former were accompanied by offers of partly-constructed rockets suitable for swift conversion to relief vessels. Commenting on these offers, Columnist Henry Coulthard says in his current review of affairs, 'Yesterday,

we were being threatened with rockets by all and sundry. Today, we're being offered them as gifts, freely, willingly, by people quick to realize that the world has changed beyond recognition in a few tremendous minutes. The scientific worth of Pilot Quinn's triumphant Moon-trip is as nothing to the psychological value thereof. The trumpet of peace has been sounded effectively—in a distant and lonely crater!"

Armstrong said, softly, reverently: "Good boy! I'm glad he made it. It was meant for him, and not for a ham like me. It was George's job right from the start."

"Further information will be broadcast as it comes through, but"—the announcer made a dramatic gesture—"before we go on to the next item we bring you the voice of Pilot Quinn speaking from the Moon!"

The screen blanked. The speakers coughed, emitted scratching noises, spoke harshly through a haze of static.

". . . am getting your strength five . . . middle of Copernicus . . . undamaged. Will blow flare port side . . . half an hour's time." A long, noisy pause, followed by, "Glad he's safe. Tell him . . . bigger they come the harder . . . fall."

The distorted voice and the static cut off abruptly. The announcer came back. "The last part was a reference to John J. Armstrong, official pilot of Quinn's companion rocket number twenty which made

a forced landing off the coast of South America. Armstrong, recently listed as a public enemy, is now revealed as having been engaged on highly confidential work under command of General Gregory, and the F.B.I. has announced that all calls for him have been withdrawn." Switching papers, he went on, "Working in concert, police and armed forces of several countries are raiding the haunts of an international band of saboteurs known as the Norman Club who were fanatically opposed to rocketry and it is reported that—"

"Finish!" remarked Armstrong, not listening any further. "They'll catch some, not others, but the escapees will be impotent. Time has passed them by." He massaged his jowls thoughtfully. "I hope they don't overlook any remnants of Sandy-hair's mob, either. That crowd represented the inevitable schism which always occurs in a cult. Maybe they didn't like Horowitz. Or maybe he overdid it with his psychotron, convincing them that they were indeed mad Martians. Or more likely they had the monopoly of this newfangled coagulator, thought it made them the elite of the elite, fell out when they refused to hand over its secret to the rank and file." He sighed reminiscently. "History repeats itself. Horowitz had his enemies on his own territory—just like Hitler. And like Hitler, he's come to the end of the trail."

Hansen jerked a disparaging thumb toward the screen on which the announcer was still gabbling. "Wasn't he sweet? He cleared your character absolutely—but said nothing of mine."

"Nor mine," supported Miriam. She mooned at her boss. "I've never been out of trouble since I entered your employ. Some day, I'll get used to it, I guess."

Grinning with the unplastered side of his face, Armstrong said to Claire: "Do you dance?"

"You can't. Not with that leg," she pointed out.

"As the Man in the Moon said, the harder they fall. I've tumbled for keeps." Impudently, he ate her with his eyes.

She pinked a little.

"My scoop!" moaned Norton, viewing them with disgust. "My scoop gets shot to blazes—and you two have to sit and coo!" He wiped his lips with a handkerchief, making an insulting ceremony of it. "*Pfah!* you make me sick!"

Leaning across the table, Armstrong jibed: "Square roots, eh?"

"All right, all right—take her." Norton waved an airy, disinterested hand. "I can find my own." His sour stare shifted to Miriam, became speculative. "Do you dance, Fair One?"

Linking an arm through Hansen's, she thinned her lips, regarded him with distaste. "I read the papers—and sometimes I wonder."

"Wonder what?" Norton invited.

Miriam said, nastily: "How you know you're sane."

THE END

BRASS TACKS

He's got an interesting question there—but the effect of cheap automobiles was comparable.

Dear Mr. Campbell:

Just for the sake of speculation I wonder if any of your writers have thought about a story based on the social effect of the so-called "Hopti-copter"? According to reports they are to be mass produced in the very near future. If a lot of people get to flying around as-free-as-the-birds, what might it do to the atmosphere of the country in so far as the people are concerned? Will it make people more independent or will it make them indolent and easy prey for totalitarian propagandist? The theme has possibilities has it not?

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Studies at the University of Oregon are my excuse for not commenting on the stories in detail except to say that I should like to see you publish something like van Vogt's "Ship of Darkness" and his "The Cataaaa" in S.F. once in a while. Your readers surely must be brilliant enough to take it.

—Rosco E. Wright, Rt. 2 Box 264 Springfield, Oregon.

Toward the end of the war, as much as ten megawatts was being generated on pulses!

Dear Campbell:

I was very interested in J. J. Coupling's article on the magnetron, the more so because Professor Randall—who with Dr. Boot in-

vented the cavity magnetron—is my physics professor here at Kings College. In the lab we have a fine selection of maggies with outputs up to 2½ megawatts. (I can't imagine any *terrestrial* application for the last one!)

There was nothing chancey or particularly spectacular about the evolution of the magnetron in Professor Oliphant's microwave group at Birmingham University—just the usual development once the original ideas had been worked out. Certainly no one stuck a cathode in a revolver chamber to see what happened. But I know how that story arose: a revolver barrel *was* used as a jig to make one maggie, as it happened to come out about the right size.

Oddly enough, the Russians were the first people to make cavity magnetrons, years before we did. There's a paper about it in the Proc. I.R.E. in the early 1940s. Some of the designs were strikingly like the final Allied ones. But they were low-powered, c.w. jobs as far as I know and I don't think the Russians realized just what they'd got.—Arthur C. Clarke, Kings College, University Of London, Strand, London, W.C.1., England.

Null-A—and how it got that way.

Dear Mr. Campbell:

I would like to answer the letter headed *"Non-Sanity of the Non-Aristotelian Systems"* in the Brass Tacks section of April Science Fiction, written by one Willis E. McNelly. Mr. McNelly questions the basic premises of non-Aristotelianism—which is all right—but, apparently, he has a mistaken idea as to just what those basic premises are supposed to be. Mr. McNelly mentions that "contemporary math and physics is non-Euclidian and non-Newtonian" but "can we then assume that contemporary thinking or thought processes should necessarily be non-Aristotelian." He has implied that this is the "logic"-step which convinced Korzybski that a formulation of a non-Aristotelian system was necessary. That is inaccurate.

Alfred Korzybski, during the first world war, began to wonder at the tremendous gap between the successes of technology and the more human sciences, and at the psychological conditions of the world, in general. Bridges, airplanes, telescopes, and radios were being constantly improved upon and put into extended service; the sciences of physics, chemistry, astronomy, et cetera, were making tremendous strides forward, but human, cultural institutions were constantly being demolished in the faces of depression, booms, and wars; the general level of sanity was dropping rapidly. Korzybski decided that there must be some radical differences between the methods employed by the mathematicians, scientists, et cetera—*as* scientists . . . et cetera—and those employed in our personal and national lives. Being familiar with those methods employed by the

former—he was an engineer and mathematician—he decided to acquaint himself with the evaluational methods used in our private and national lives; he studied psychiatry. In other words, having already studied the most successful known methods he was studying those employed by the most unsuccessful—from an adjustment viewpoint—people; those inside our institutions for the "insane". He discovered that the most outstanding factor in those unsuccessful methods was a habit, or trait, which he labeled "identification" — *the unconscious identifying of words with objects.* Now, every little child *"knows"* that the word "chair" is not the object to which it is applied, the one you sit down upon, and that the word "pain" isn't that which you feel when someone jabs you in the seat with a pin, *but they, and adults included, continue to act and think as if they were. (Warning:* These statements are oversimplified.)

As Korzybski said—page lxiv, preface, 1st edition, "Science and Sanity"—: "Identification is found in all known primitive peoples; in all known forms of 'mental' ills; and in the great majority of personal, national, and international maladjustments. It is important, therefore, to eliminate such a harmful factor from our prevailing systems."

My point on the foregoing, then, is this: Korzybski formulated a system of sanity, based on the denial of identification, and *then* applied the label "non-Aristotelian" to it;

he didn't decide to create a so-called "non-Aristotelian" system *just to be contrary*—he did not reverse the order of abstractions.

For Reader McNelly's information, the basic premises of A are two in number and negative in character:

1) *The word is not the object to which it is applied;* and

2) *There is no such thing as an object in absolute isolation from all other objects.*

The whole edifice of A "logic", which is based mostly on formulations concerning structure and relationship arose from the second premise.

If anyone is to disprove these two statements, he must show their falsity by demonstrating that the word *is* that to which it is applied and that there are objects in absolute isolation from all other objects. I'm fairly confident that none will do it.

It is rather amazing the way your various writers have interpreted A and general semantics. Van Vogt interprets it, rather admirably, in the light of his favorite "Toward the Superman" theme (World of Ā); Heinlein presents it as the science of propaganda (If This Goes On); the Kuttners speak, rather glibly of "semantic blockages" (The Piper's Son) and mention that Korzybski's teachings are "only commonsense" *(Fury!)*; Williamson implies that it is "a fad" (With Folded Hands—); Grendon speaks of it in connection with mathematical logic (The Figure); and William Bade, an antireligionist, is apparently using it as a substitute for religion (New Bodies For Old). As Mr. McNelly says, it is rapidly becoming stock in trade.

What you need, Mr. Campbell, are one or two competent articles on the subject.—Arthur Cox, 1203 Ingraham Street, Los Angeles 14, California.

Yes, we are now about a twenty minute ride outside the city, in Elizabeth, New Jersey. Visitors still welcome though!

Dear Mr. Campbell:

I see that it pays to subscribe. Still a full week to go before the April issue of Astounding hits the newsstands, but mine came bright and early this morning. One of the first changes I see is the advertising that will later on enter the magazine. If it helps balance the books and at the same time give the SF bugs some information on where to get books, back numbers, et cetera, I'm game to see a few hundred words of the poorer works get cut out.

Another item of note is that ASF seems to have taken over offices in New Jersey. Must remember same come December 31st and the renewing of subscription. Another move I'd like to see is that of Mr. Bonestell as a permanent artist sharing the spotlight with Rogers and Alejandro, especially with the latter.

Well, here we go at rating the issue:

AN LAB:

1. "He Walked Around the Horses." Piper. Originality

plus, but the matter-of-fact presentation detracted.

2. ". . . And Searching Mind" (II) Williamson. Serial is developing momentum as it progresses. The conclusion should be worth while waiting for.
3. "Ex Machina." Padgett. Finally connected Galloway (story no. 1.) and Gallegher (all other stories) but same old situation.
4. "The House Dutiful." Tenn. He tried hard, but the theme of animated houses or radios (Twonkey, "Logic Named Joe") doesn't resonate with me.
5. "New Wings." Chandler. Now it's LiH that does it. I still think that Homo sapiens himself and not some chemical or meson will be the destroyer or savior of this our planet.

COVER, ART:

Wonderful. Mr. Bonestell and Mr. Alejandro should alternate as cover artists, each working on his specialty. Inside, it seems as if Pat Davis is developing into a better than average artist, with something resembling Schneeman in the offing. Cartier, of course, needs no commenting on. See you are keeping him in trim, against a possible renaissance of *Unknown*. P. 104, Brass Tacks gives a hopeful hint.

ARTICLE:

Richardson's articles are always welcome. Looking forward to one on S Doradus, if much ma-

terial can be gathered on that feeble spark.

In conclusion, I notice on P. 110 a slip up on your part. J. Williamson's second installment is this month, not next month. But I hope you give us Van Vogt's opus first before L. R. Hubbard's. If VV can spring a sequel on his Ezwals and on his "Recruiting Station," he should be able to climb up to the top again, after the "Child of the Gods" toboggan. "Scuttlebutt" says, he has worked out something on the latter theme (Masters of Time to quote the flyleaf on the binder of "Book of Ptath" by Fantasy Press). Sequels on "A" and "Slan" might fill out otherwise incomplete plots, and a second Asylum would make it all perfect. Weel, that's my bit for the month, more like a mouthfull.—William E. Dorion, 180 Riverside Drive, New York 24, New York.

So many theories do show negative correlation to relevant data!

Dear Mr. Campbell:

Of course the Bugstrom Factor —known to engineers, college students, and other infidels as the "Bugger Factor," "Finagle's Constant," et cetera—is a variable. This factor was designed by Professor Perennial V. Bugstrom of the Technische Hochschule in Oslo to correct the erroneous values given by Reisringer functions. These functions are of the general form:

$$R = Ae^{-X-K}$$

where X is the independent variable, A is a constant determined from boundary conditions, and K is the "Bugstrom Factor." Reisringer functions, first formulated by the noted statistician, Rudolf Reisringer, of the Prinz Eugen Institute in Hamburg, are characterized by a negative correlation with whatever data they are supposed to fit. This negative correlation obviously led to all manner of contradictions in experimental physics, and several solutions were empirically devised. The most notable of these was that of Finagle in 1871 and has correctly been given by Mr. Schaumburger in his letter printed in the April Astounding. However, in 1930, shortly after De Broglie's wave theory of matter, Professor Bugstrom devised this factor using many of the assumptions which are now second nature to theoretical physicists. The recent psychokinetic researches of Professor Rhine at Duke have substantiated Bugstrom's work beyond all possible doubt. Much other theoretical work in the literature shows similar tendencies.

No doubt Finagle's Constant will fit a given set of data sufficiently for the purposes of engineers, applied scientists, and the other "lesser breeds without the law" mentioned above, but for the accuracy required by theoreticians it is painfully inaccurate . . . sometimes deviating as much as one per cent from the data. Bugstrom's Factor, however, will fit any set of data to a Reisringer function *exactly*—i.e.: without deviation. —James H. Ray, 223 Congress Street, Brooklyn 2, New York.

Mr. Micawber was only half-right!

MR. MICAWBER'S financial advice to young David Copperfield is justly famous.

Translated into United States currency, it runs something like this:

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