

A NOVEL OF THE FUTURE COMPLETE IN THIS ISSUE!

# STARTLING STORIES

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Rudolph Belarsky

A THRILLING  
PUBLICATION

THE  
**Laws**  
OF CHANCE  
A Novel of the  
Atomic Age  
By MURRAY  
LEINSTER

# STARTLING STORIES

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A THRILLING PUBLICATION

March, 1947

An Amazing Complete Novel



## The Laws of Chance

By MURRAY LEINSTER

Survivors in a bomb-blasted land, Steve Stone and "Lucky" Connors discover that they alone possess the miracle mineral which can lead America to the pinnacle of victory in the strangest and deadliest of all wars..... 13

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Cover Painting by Rudolph Belarski—Illustrating "The Laws of Chance"

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Steve brought up the foil just as the man emitted a bellow and charged, running straight into the point (CHAPTER I)

# THE LAWS OF CHANCE

By MURRAY LEINSTER

*Survivors in a bomb-blasted land, Steve Sims and "Lucky" Connors alone possess the miracle mineral that can lead America to victory in the strangest, deadliest of wars!*

## CHAPTER I

### *Amid Debris*

**S**TEVE SIMS, former Professor of Physics at Thomas University, delicately pushed aside a brushy tree-branch and looked down to where the little town had been. It wasn't there any longer. But there wasn't a single monstrous atomic-

bomb crater, as he might have expected. Half a dozen relatively small craters—no more than two to three hundred feet across—had obliterated a third of the town entirely and flattened all the rest. Then there'd been a fire. There was nothing left.

He regarded it without shock, but with a grim regret. This had been his home town. He'd spent a long time making his way to it from the vicinity of Thomas University,

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## A NOVEL OF THE ATOMIC AGE

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after there was no longer any hope there. He'd waited nearly four months, in the rapidly-appearing waste-land on the edge of the campus, hoping against hope for someone like himself to turn up able to help him on the work he still believed might partly repair the world catastrophe.

After there was no more chance there, it had taken him three months to get here—four hundred miles. There'd been interludes, of course. Once he stopped and joined a group who called themselves guerillas. Before he left them he'd killed a man in cold blood, an act he still remembered with satisfaction.

Then he'd had to hide from his late companions, and then he'd stayed on at a tiny community where the people were uninformed but resolute—too resolute entirely—and now he'd reached his home town and it was waste.

"Let's go out and cut our throats," said young ex-professor Sims to no one in particular.

It was a quotation, and he grimaced wryly to himself. He squatted down to watch the area of blackened debris which had been the scene of his childhood.

Since the bombs began to fall, like everybody else he'd learned that it didn't pay to take things for granted, or to be unduly brave, or to frank about yourself, or anything which had been normal and excusable as little as a year ago. So Steve—no longer professor because there weren't any colleges or students left—Steve Sims squatted close to the trunk of a tree and attentively regarded the ruins of his home town.

It was utterly dead and completely uninhabitable. It must have been destroyed a long time ago, because green things were already growing between the fire-blackened timbers where the town was merely flattened and burned out.

There was a greenish scum on the ponds at the bottoms of the bomb-craters, too, which proved that this was a high-explosive job, not atomic. And that proved that They—the people with bombs and planes—hadn't an unlimited supply of the atomic bombs which melted the surface of the ground to a sort of crackled, glassy substance which was highly radioactive.

Nothing like that was visible here. So if they used ordinary high explosives to flatten a small town, their stock of atomics was limited.

**T**HAT was good. Steve recognized it as good, and then he wondered why he thought it was good. Whoever They were—and all of civilization had been smashed, and nobody knew who had started it—They couldn't be touched by people like Steve. The atomic war had degenerated into an indiscriminate, hysterical mass slaughter of everybody by everybody else.

Steve was a wanderer, like most of the people left alive. He was homeless, and his only possessions were a very small lady's automatic pistol, with only two clips of cartridges, a pair of fencing foils with the buttons broken off and the blades filed to needle-sharp points, one blanket—plastic-coated on one side so it was water-proof—six child's copy-books nearly filled with writing, and one-half of a roasted chicken. He'd stolen the chicken two days before.

"The obvious thing," he repeated presently, "is to go out and cut my throat. But—"

"Oh-oh!" he said then.

There was a movement in the debris. An infinitely cautious movement. For an instant he couldn't make it out, and then he saw a small figure crawl out from under an indescribable mess that looked like a heap of oversized black jackstraws. The figure looked about in a hunted manner, seemed to listen fearfully, and then came scrambling over the wreckage in Steve's general direction. It moved with frenzied haste.

Steve watched, immobile. When somebody ran away, there was usually somebody else after them. It was not the business of a mere Wanderer to interfere. Especially, perhaps, not the business of a former professor of physics with six child's copybooks full of a partly written treatise on "The Paradox of Indeterminacy." But the discovery of his home town in ruins had pretty well removed that last reason for non-interference.

Still, he watched without any movement. The small figure scrambled over a tumbled heap of bricks. Something loose rolled down, and other shattered stuff followed. There was a miniature landslide and a cloud of white dust arose.

"That's bad!" said Steve.

The figure raced on. It was very small and pantingly in haste. It seemed filled with desperation. But it was the only moving thing in sight except a lazily soaring buzzard, flying in tranquil circles in the sky.



As Steve leveled the tube, the bomb overhead exploded, and the whole sky seemed to crack open under the force of the blast (CHAPTER XIV)

Except for the buzzard it was the only moving thing in sight. Then another figure stirred. This one appeared in the shoulder-high weeds which grew everywhere over what had been cleared land around the edge of town. The second was a larger figure. It moved swiftly to cut off the smaller one.

Steve watched. It was none of his business. The world was in ruins. There was no law. There was no government. There was no hope. So he could see no reason for him to risk his life interfering between two unknown persons, one fleeing and one pursuing. But on the other hand there was no longer any special reason to be careful of his life.

The smaller figure gained. It came to what had been a street, where the blast of the nearest bomb had blown straight along its length. Trees had fallen, but there was little wreckage. For two hundred yards the running small figure fled without hindrance, unseen by its pursuer and not seeing him. Then it stumbled and fell headlong, and scrambled to its feet and fled again. But now long hair tumbled about its shoulders and streamed behind.

"The devil!" said Steve Sims, in disgust.

He rose smoothly to his feet, slid the pack from his back, and pulled out one of the fencing-foils. He ran lightly through the trees, vexed, arguing with himself that this sort of thing happened too often for him to be responsible, that he might have to use a highly precious cartridge, that he might get killed, and generally assuring himself that he was a fool.

It was almost a quarter-mile before he really saw either of the two figures again. Then he reached a spot where he could look through the trees again upon the town. Much had happened. The girl had discovered her pursuer. He was almost upon her. Somewhere and somehow she had snatched up a splintered bit of wood.

As Steve reached the woods' edge the man snarled and plunged to seize her. She flailed the stick around in a typically feminine desperate sweep, without accuracy and without real force. He flung up his arm and the stick broke against it. But then he roared and plucked blindly at his eyes while she gasped and darted for the wood, her wild tresses fluttering behind like yacht pennants billowing in the winds of a happier day.

**B**ELLOWING, the man raced after her. He'd been dust-blinded only for a moment. She was barely ten yards before him when she dived between the first trees. There was utter horror upon her face when Steve appeared before her. But he jerked his thumb to one side.

"That way," he said sharply.

She swerved and fled like a desperate deer. Steve stepped into the line she'd swerved from. The pursuer, raging, plunged into the woods.

He saw Steve and roared again. He, charged.

And Steve brought up the needle-sharp foil and he ran right upon it, up to the very hilt, so that there was a sickening impact against the hard guard. Steve simply stepped aside and let him crash to the ground. He did not move after he had fallen.

Some five minutes later, Steve cleaned the foil painstakingly. There had been tobacco in the dead man's pockets, and he'd had a rusty knife, and a flask of poisonously vile liquor. Also there were four diamond rings and a child's necklace. Somehow the child's necklace removed any distaste Steve might otherwise have felt for what he had done.

He straightened up and tossed aside the leaves on which he'd cleaned the foil. Then there was a faint stirring. The girl's voice came shakily, although she remained invisible.

"Th-thanks," she said.

"Don't mention it," said Steve. He paused, and added, "I split my loot. You may need this."

He tossed the knife from the dead man's pockets in her general direction. Leaves stirred. She came into view. She picked up the knife. She was smudged all over with the charcoal of the timbers in which she had hidden, but she was pretty. He regarded her detachedly. She wiped off her face with the sleeve of the man's coat she wore.

"Also, you might like these," said Steve. "He had them. I'm not a professional assassin and I don't like to take jewelry. Can you use them?"

He held out the rings and necklace. She searched his face with a hunted expression on her own.

"I'll put them down and walk away," he said drily. "Seriously, you might be able to use them for barter. People want odd things, these days."

She took a deep breath and moved forward.

"N-no," she said, breathing fast. "I'm—not afraid of you. You—you did that." She looked down at the dead man and swallowed. "He was horrible! Have you anybody else with you?"

"I'm a lone wolf," Sims said. "No, I take part of that back. I'm not a wolf. Just alone. How about you? Friends? Is there some place you can go and be safe? I'll try to take you there if you like."

She swallowed again, and then shook her head. She looked at him appealingly. He weighed the situation. In the last seven months the ordinary, everyday world had crashed into small and mangled fragments.

For a man to stay alive alone was difficult enough. Also, there were the implications of that work on the "Paradox of Indeterminacy," which was either sheer nonsense or very much more important than the life or safety of any one girl, even though she looked as frightened or as desperately appealing as this one.

"I've got half a chicken, very badly roasted, about a quarter of a mile away," Steve said without warmth. "I can offer you part of it. In my wandering around I've found one or two communities that are hanging together after a fashion. I'll help you try to find one that will let you join them if you want me to. I'm afraid that's about all I can do, though."

She gasped:  
"P-please!"

He did not like to see such gratitude for so problematic a benefit. He turned and walked away. After half a dozen paces he looked back, and she was following. She wiped her eyes with the sleeve of that man's absurd coat. He went on, scowling. Nobody knew who'd started the atomic war of which this girl, and he, and the dead man left casually back in the woods were all casualties, in common with most of the human race.

Nobody knew whether it was ended or not. There was civilization of a sort maintaining itself somewhere; that was certain. But what was really positive was that there was no hope for anything but a wandering, wild animal life for the few who survived and were not members of the small and embattled communities of farmers who fought ferociously to keep their own membership alive. Steve himself had not an ounce of

fat left on him. The girl looked hungry.

He reached his pack and slipped it over his shoulders, and then let it slip down again. He took out the half-chicken and handed it to her. Her lips moved hungrily.

"You said this was all," she said.

"Half a chicken for you, and half for me," he said untruthfully. "Go on and eat it!"

With a sharp little intake of breath, she did. She was starving, but even so she did not gobble. In the months since the bombs began to fall, he'd seen a great many human beings deteriorate to the level of animals. She hadn't. He watched until she had devoured the last morsel of the half-chicken. She was still human. She smiled at him apologetically.

"I was greedy," she said ruefully, "but it was so good! What now?"

He debated. No supper for him. No shelter. A girl to look after, and the paradox of indeterminacy a completely hopeless effort since his home town was smashed and the only man who could have offered a fresh viewpoint, which he needed badly, was doubtlessly dead in its ruins.

"What's your name?" he asked mildly.

"Frances." She looked at him expectantly.

"Listen, Frances," he said detachedly. "What say we go out and cut our throats?"

## CHAPTER II

### *Fugitive*

**A**FTER it grew dark they talked quietly. Steve made a camp of sorts, a mile and a half from the place where he'd first seen Frances. Its basis was the trunk of a monster seed-tree that had crashed to earth in a thicket of its second-growth descendants. It meant a supply of rotted, punky wood which would make a flameless, smokeless fire, and the trunk was raised above the ground for part of its length so the fire could be built under it and be invisible from the sky.

On the way to that place the girl had spotted blackberry bushes and gathered a comforting supply. And after Steve had walled in one side of the tree-trunk with leafy branches, and drawn down his blanket over the other, they ate the blackberries, stumbled through the new-fallen darkness

to a nearby brook and drank, and returned to the encampment.

"You can choose your half of the shelter, and fix your bunk of leaves," said Steve. "I'll take the other half and we'll have the fire between us instead of a sword. And a few leaves on the coals from time to time will keep insects away."

"You didn't tell the truth about the chicken," the girl said suddenly. "You let me eat it all!"

"I'm full of berries anyhow," Steve assured her. "If you want to go to sleep, go ahead. I'm going to write a little."

They were in the cramped and improbable shelter. Frances blinked at him in the absurd dim glow that came from the coals.

"Write?"

"A master-work," said Steve in conscious irony. "A treatise on the Paradox of Indeterminacy. It is possibly a triumph of logic and theoretic physics, but it is certainly the most futile thing that anybody ever worked his head off at."

He grinned mirthlessly at her across the glow from the smoldering rotted wood.

"In the old days alchemists were frequently thwarted by the fact that their chemicals wouldn't do what they wanted them to. So they talked of affinities and caloric and phlogistin and various other things that didn't exist. They were excuses. We modern physicists have been thwarted by the fact that our experiments didn't work as we wanted them to, either.

"When you get down to a few thousand atoms or electrons or whatnot, your experiments begin to go haywire. You can predict how a billion atoms or electrons will behave, but you can't know what a hundred will do.

"So we began to talk about indeterminacy. When you're working with such small numbers of objects that the laws of chance come into play, your results are governed by the laws of chance rather than the ordinary laws of physics. The result is indeterminacy. That's an excuse, too."

She listened to all this gravely. There was still a smudge on her cheek from the charcoal of the ruined town. She'd washed at the brook, but that hadn't come off. Steve went on with ironic detail:

"So I began to question the laws of chance. All the other physical laws we know explain how forces act. We can identify the forces—electric charges and the like. Maybe

the laws of chance explain how forces act, too, but we've never identified any forces to fill the bill. I've worked up some clues. I've imagined and described some forces that would operate to make heads come up a thousand times in succession, if applied that way.

"But I haven't the least idea how they could be generated or detected, unless you consider that Rhine detected them in his psychokinetic experiments. I'm in the position of a man who had imagined electricity on theoretic grounds, but had never heard of it and didn't know how to generate or detect it. He just knew there must be such a thing and that if he could get hold of it he could go to town."

Then Steve shrugged.

"Mmmmmmm, you could win at any card-game," the girl said. "You could make anything happen that was even faintly possible. Is that it?"

Steve jumped. He had talked with deliberate ironic intent, because the last man on earth he'd hoped, and that only faintly, could understand his reasoning and help him carry it farther was undoubtedly dead in the wreckage of the town two miles away.

The man in question had been a putterer and a visionary who was more or less responsible for the fact that Steve had been a professor of physics. The loss of the last hope of another mind to work with him had been a blow. But this girl hadn't listened blankly! She'd understood!

"My father'd have liked that idea," she added, after a moment. "He'd have loved it! He was killed when the town was bombed." She nodded calmly. "I was away then. I came back on foot because the gasoline had already given out. The town was gone when I got here."

STEVE blinked. Then, tentatively, he said a name. The girl stared at him.

"That was my father! You—"

"I'm Steve Sims," said Steve wryly. "Maybe you've heard of me. I know you now! You were twelve years old when I went off to college. How do you do?"

They looked at each other across the double-cupful of embers on which Steve put leaves, for smoke, every now and then. Then the girl's drawn look relaxed.

"This is—nice!" she said unsteadily. "Of course! You used to write to my father sometimes! It's like—it's like finding one's



family again!"

She blinked to keep back tears, and impulsively reached over to grasp his two hands in hers.

"It doesn't take much to make some people happy," he said gruffly. "How'd you manage to live this long?"

She told him, in the shelter which smelled of leaf-mold and smoke and dampness. The town was wreckage when she returned to it. She'd had an ancient aunt living in a now-shattered cottage on the edge of town. The old lady had quite incredibly survived the bombing, and indomitably had taken possession of a sawmill-shed beyond the town's limits. Frances had found her.

The two women—the one so old and feeble and therefore helpless in adversity, and the other so young and therefore in deadly danger as civilization ceased to be—the two women kept themselves alive. They gathered crops from fields whose owners had been killed by the strafing planes which followed the bombers. They stored food and lost it to plundering Wanderers from whom they hid.

The aunt had died two weeks back. Frances found her shot dead. There was no explanation and no cause for it. She was simply shot. Frances knew of no person or any community she dared attempt to join. Three days since, a group of Wanderers—the restless displaced persons who roved everywhere like locusts, these days—had come upon her.

There were women in the band. At first Frances had hoped for safety with them, but one single day taught her better. Before nightfall she slipped away and hid. The women were glad of her going, but some of the men hunted her. One had been close at her heels when she hid in the wreckage of the town. Steve had seen the rest. He'd killed that man.

"And then I suggested that we go out and cut our throats," said Steve. "Which still seems as good an idea as any."

He put leaves on the fire. Smoke filled the shelter, to drive away mosquitos. But Frances smiled at him.

"I want to give you something back," she said quietly. "I don't need it now. Here!"

He was fumbling in his pocket, but he



The farmer stayed close to Steve as he searched the ruins, holding the knife ready in his hand, while Frances watched breathlessly (CHAPTER X)

looked. She offered him the rusty knife he'd taken from the dead man's pocket.

"I don't need it any more," she repeated. She smiled, but there were tears in her eyes.

Steve grunted. He took the knife, but he put something else in her hand. It was the small automatic and the bullets which had been his greatest treasure.

"It's not enough," he growled. "Not if there are Wanderers around, and they're that kind of Wanderers. You keep this handy, but for Heaven's sake don't waste the bullets! There simply aren't any more!" Then he added firmly: "It's better for you to have it, because in case of trouble we're both in, they'll be watching me for surprises like that, and you'll have a better chance to make good use of it."

She hesitated, and he reached over and dropped it in her coat pocket.

"Now go to sleep!" he commanded. "I want to get to work!"

She obeyed him to the extent of curling up on the bed of leaves. But her eyes stayed open, watching him. He scowled at the tiny bed of coals. This was bad! Existence had been precarious enough with only himself to think of.

It would have been worse with a girl to whom he felt no obligation, and whom he might be able to place with some grimly defensive group of farmers' families banded together against those who called themselves guerillas, and those who simply looted without excuse. But a girl he knew, whose father had started him off by interesting him in physics . . .

**A**FTER a long, long time, during which he did not even open a copy-book to write in it, she spoke softly.

"I've thought of something, Steve," she said. "In that bunch of Wanderers there was one man who didn't seem to be really bad. I think he'd have protected me. But the others frightened me so. . . ."

Steve grunted. He'd take her away from this locality tomorrow. Somewhere. There had to be some plan he could make, but there was nothing to plan with and nothing to plan for. Civilization was smashed.

The world was headed for barbarism unless some nation, somewhere, had improbably succeeded in keeping itself intact while the rest of the world went headlong toward destruction. And if one nation retained its

civilization, the odds were that it would eventually enslave the survivors of all the rest. No, there was nothing to plan for.

"But mostly I mention him," said Frances, her eyes very large in the nearly complete darkness, "because maybe he could help you. He says his name is Lucky Connors. He says his luck is fool-proof. He says he's never missed a meal since the bombs fell, and he's never had a bad break, and—well—the other wanderers wouldn't play cards or anything with him, because he always wins. He is phenomenally lucky, Steve! If you could find out what makes him that way—"

"There's what you call a series," said Steve ungraciously. "It's a sequence of unlikely happenings. It may be of any length, even infinite. He may be in such a series. Those things gave me the clue I had."

The girl was silent, her eyelids drooped. Presently—half-asleep—she woke with a start and looked about her in terror. Then she looked pleadingly at Steve.

"I—started to dream you'd gone away and left me," she told him apologetically. "Would you—mind holding my hand until I'm asleep? It's been—pretty terrible, Steve."

He reached over and took her hand in his. It was small and it had been very soft. There were work-worn places on it now. He held it gently fast. She relaxed. She dozed off, and opened her eyes again and saw him still close by, and smiled sleepily and drew a deep breath. Then she suddenly went off into the slumber of complete security and weariness.

Steve swore under his breath. He sat very still so she could rest.

Half an hour later he heard sounds which did not belong in the night. Thrashing noises. They stopped, and began again. Something was moving about in the darkness. It was close by. It was coming closer.

Steve wriggled out from the shelter he'd contrived. He crouched down in the shadow of the giant tree he'd utilized as a ridge-pole. He had one of the sharp-pointed foils ready in his hand. He listened with all his ears.

Something drew closer still. Presently he could see it as a moving bulk amid the lesser shapes of tree-trunks. It was human. It stopped, and sniffed, and he knew how the shelter had been found. By the smell of the leaf-smoke he'd made to drive away insects.

The figure moved forward again. Steve tensed. There could be no friendly human

being, and he had the girl to protect. The figure shifted something it carried, and Steve saw starlight, filtered through the trees, glint upon polished metal. The other man stopped, and stared specifically at the shelter, and moved cautiously toward it. The gun-barrel moved to a readier angle.

Steve lunged, quickly and expertly and silently. The needlepoint of his foil slid smoothly forward.

It stopped. With the impetus of the lunge behind it, the slender foil bent double and the figure whirled with a grunt of pain, and then there was a lurid coruscation of light and the feel of a terrific blow.

Steve knew vaguely that he was falling, before he ceased to know anything at all.

### CHAPTER III

#### *"Lucky" Connors*

**F**ROM a vast distance he heard a voice speaking in reassuring tones.

"Hey, quit cryin', Frances," it said. "He's gonna be all right! I ain't had a bad break yet."

Then Steve became aware of his body's existence. He was lying on his back, with a bit of fallen branch sticking into his flesh. Then he knew that his head ached. Horribly. He opened his eyes and saw leafy branches and twinkling stars between them.

"My luck's holdin'," repeated the confident voice. "Didn't that sticker of his bend it-self all up on my rib? What's the odds against that, Frances?"

Steve heard the girl crying quietly.

"After all, I woulda shot him," the man's voice went on persuasively. "But instead, when I swung around my gun-barrel slammed him on the head. So that makes it right! He'll have a headache. And I got a hole in my skin that stings like blazes. All even! I've been pullin' for somebody to explain my luck to me and kinda show me how to use it. I got a hunch he's the guy who can do it!"

Steve's brain went round and round in his skull. All this did not make sense. But nothing made sense. Then, abruptly, it fitted together into something like lunacy.

It must be "Lucky" Connors! The man with the wandering band from which Frances had hid, but who would have pro-

tected her. The one who always won. Whom Frances had mentioned because if Steve could find out why he was so persistently fortunate, he might use it to solve the paradox of the indeterminate.

"I guess you're right," said Steve painfully. "About the headache, anyhow."

He stirred. Frances made a gasping exclamation and bent over him eagerly. Even in the dim starlight he saw the expression of unbelieving joy upon her face.

"Of course, though, I may simply be crazy," he said dizzily. "Tell you in a minute or two."

He managed to sit up. The man he had tried so painstakingly to kill—silently and without warning, as it was necessary to kill, these days—regarded him without animus.

"Me, I'm Lucky Connors," said the stranger amiably. "That sticker of yours was sharp enough, I figure, and it musta been at just the right angle, to stick a little way into my rib and bend, instead of slidin' off and goin' on through me. Lucky, huh?"

"Lucky," conceded Steve. This was completely insane. The man he had tried to kill, and justly enough, in the current state of things, was completely devoid of either anger or of triumph. In fact, he had leaned a perfectly good rifle against the fallen tree which was the shelter, and seemed to be taking no care of his life at all.

"It's like this," said the other man eagerly. "I got luck. Whatever I pull for, seems to happen. When Frances ducked away from the gang I was with, I pulled for luck to go with her. She's a good kid. And I've been pullin' for somebody to help me figure out what I can do with this luck I got. I don't understand it, but I figure it's something that could do a lotta good if it was handled right. You get me?"

"It's a series," said Steve. He put his hands to his head. "Gosh, this is crazy! Didn't we try to kill each other just now?"

"Uh-huh," said Connors placidly. "But we didn't. That's my kinda luck. D'you know anything about that stuff?"

"Yes!" said Frances eagerly. "He knows just what you want to find out, Lucky! And you—I told him not long ago that you could help him! It's the paradox of indeterminacy! It's—"

Steve held his head in his hands while it throbbed. He honestly doubted his own sanity. By all the laws of probability either he or this intruder should have been very

dead, by now, and failing that by all the rules of human conduct, they should be at each other's throats. But, quite impossibly, they were both alive, through a sequence of improbabilities that couldn't happen once in a million years.

Frances talked quickly. He heard his own explanation of indeterminacy rephrased much more simply than he had put it. And then Frances went on to explain urgently that Steve had figured out some forces that would cause luck to be what one wanted it to be, only he didn't yet know how to generate those forces or to detect them.

**I**T WAS stark lunacy, there in a second-growth thicket by the site of a bombed-out town, with no law and no civilization and no hope for anything in the future, within a few minutes of a mutually attempted assassination.

An abstract discussion of probability at such a time and place was simply not one of the things that happen! And Steve's head throbbed horribly and he was somehow ashamed of his failure to defend Frances, even though she couldn't have needed defense or it would have been far too late by now.

"I got it!" said Lucky Connors' voice contentedly in the darkness. "He's the guy I've been lookin' for, all right! Listen, fella! We'll talk in the mornin'. You gotta headache. So you go get some shut-eye. My rib aches where you stuck it, and I ain't sleepy anyhow. I'll poke around an' set some rabbit-snares and we'll talk things over while we eat breakfast. Right?"

Steve expostulated in one last protest for the normal.

"How'll you see to set snares? This is awful! I'm crazy or dead or something!"

"It ain't you that's cracked," said Lucky Connors comfortably. "It's the facts. Listen! I got enough string for three snares. If I got three rabbits in the mornin' you'll know I'm right, huh?" He did not wait for an answer. He stood up briskly. "Okay. You go get some sleep. I'll be around in case of trouble. But I'm pullin' that there won't be any."

He moved away, and Steve stared dizzily after him. Frances took his hand and urged him to rest. She seemed extraordinarily encouraged. Which, Steve found himself thinking absurdly, would be luck for Lucky Connors, for Frances to feel safer and happier when he was around.

It was all impossible. Too impossible. But his head ached. He crawled back to the shelter and held his head over the heat of the few remaining coals. The heat stung the raw place where the rifle-barrel had hit, but somehow it soothed the headache. He grew sleepy. He lay down. Suddenly he slept.

He woke to the sound of movement outside, and instinctively reached for weapons. Then Frances disentangled her fingers from his and smiled at him.

"That's Lucky," she said confidently.

Steve went out. A bearded, stocky figure was cleaning the last of three rabbits. He nodded to Steve.

"Mornin'," he said cordially. "I got three, like I said."

He held up the rabbits.

They ate breakfast, a rabbit apiece, cooked over Steve's revived small fire. As they ate, they talked—or Lucky did.

"Y'see, I' been pullin' for somebody to explain this business, and I' been thinkin'," he said earnestly. "What Frances said checks up. You claim there's some kinda force, like electricity, maybe, that decides what things happen, like chemistry decides whether things will burn or not. Rock won't burn. Wood will. That's chemistry. You can't throw a seven every time shootin' crap. That's kinda like what you're talkin' about. Only if you knew what kinda force makes seven come up sometimes, you could make it show every time. Right?"

Steve nodded wearily. All this sequence of improbabilities seemed to him to hint at the verification of the theories in his treatise on the paradox of indeterminacy. For that exact reason, he suddenly felt a hopeless doubt of their validity. Theories like that shouldn't be proved by eccentrics like Lucky Connors. It wasn't the scientific method! One should know what one was about!

"Okay," said Lucky Connors. He drew a deep breath. "I got something that works that way. This is it."

He fumbled inside his shirt, and Steve noticed the bloodstain where his foil had punctured it and—it was still impossible—stuck fast on Lucky's rib instead of killing him. Lucky brought out a curious lump of some glassy substance, covered with minute crackles. He handled it with what was patently assumed carelessness.

"A talisman, eh?" said Steve.

"I dunno what it is," admitted Lucky. "I

come on a place where a bomb went off, an atomic bomb. It was a whale of a big crater, a coupla miles across. And it had a funny kinda smell to it. You know?"

"I know," agreed Steve grimly. "They're good places to stay away from. When they smell, that's ozone, and the place is plenty radioactive."

**L**UCKY made a gesture, indicating his indifference.

"Yeah? I didn't know that. This was where there'd been a city, and right close to the edge of the crater there was some lumps in the ground under that glassy stuff the bombs make. It was like there'd been a concrete foundation to whatever'd been there, and it wasn't quite smashed or melted.

"I camped by the edge of the big hole, lookin' over the place and kinda thinkin' about the people that'd been in the city when the bombs struck. When it got dark there was little misty lights down in the bomb-crater. It looked spooky. But down behind those lumps that mighta been concrete foundations, there was a bright spot that didn't look like the rest.

"It was a spot of kinda purplish-greenish light. Real bright. And I went over to it—it wasn't far in the crater—and it stayed put. Then I dug it out. It still shines in the dark. I keep it covered up so's people won't notice."

He put the stone from the crater into Steve's hand. And Steve stared at it and held it up to the light, and then examined it minutely.

"Well?" said Steve at last.

"It was interestin'," said Lucky Connors. "I looked at it. But I was hungry. I sat there holdin' this thing in my hand and I says to myself, 'This is pretty, but I wish I had somethin' to eat.' An' the thing felt kinda warm all of a sudden. It warmed up considerable. I got interested wonderin' how come it turned warm like that, an' then, *plop!* I heard somethin' fall on the ground a little ways away."

Lucky Connors paused, and looked de-  
fiant.

"You ain't goin' to believe this, but when I went over there, there was a big barn-owl flappin' around like he was lookin' for somethin' he'd dropped," Connors went on. "He'd tried to make off with a rabbit that was practically full-grown, and the rabbit had got loose somewheres up aloft and come

plop down on the ground. With the fall and the owl, he was barely kickin' when I found him. It was creepy! Me wishin' I had somethin' to eat, an' this thing gettin' warm in my hands, an' then '*Plop!*' that rabbit fallin' outa the sky. It scared me to blazes and gone. But the rabbit sure tasted good! So—I figured the thing was like a lucky stone and I kept it and I' had luck ever since."

"What you've got there—*hm!*" Steve said slowly. "It was a bit of yellow ore, once. Uranium ore, I'm guessing." He looked up suddenly. "The town was Chicago, eh?"

"Sure!" said Lucky. "How'd you know?"

"Uranium ore doesn't hang around everywhere," said Steve. "The south side of the ruins?"

"There ain't any ruins," Lucky told him. "But it was on the south side of where there'd be ruins if there was any."

"University of Chicago," said Steve. "Nuclear Research Laboratory. That's it!"

He felt Frances' eyes intent upon him. Lucky Connors grinned and nodded.

"I was pullin' for somebody to explain it. What have I got?"

"Heaven knows!" said Steve grimly. "When you bombard uranium with a cyclotron, you get neptunium and plutonium. That happens in a laboratory. But this is uranium that was bombarded by an atom bomb, something a lot more powerful than a cyclotron!

"It's not neptunium or plutonium, obviously. It's something else that's probably beyond either in atomic weight. It's something quite new, I suspect. Something that couldn't be anticipated, and I'm fairly sure it couldn't be duplicated. But it's probably dangerous."

He handed back the odd bit of matter.

"I wouldn't carry it on my body if I were you," he said detachedly. "Sheathe it in lead, anyhow. Nobody can guess what it's like or what it will do. It couldn't be made in a laboratory because you can't bombard anything with an atom bomb and have anything left. But it happened here. I suspect pretty strongly that it's at least as active as radium, though probably in some different way. Better not carry it. A radio-burn is bad business!"

"Not carry it?" Lucky Connors regarded the object, and then shrugged. "I ain't missed a meal or had a bad break since I had it. I pull for good luck for Frances and she gets it. I pull for a guy to explain it to me, and I meet you: I pull for three rabbits

in three snares this mornin', and I get 'em! And you tell me to throw it away?"

"They could all be coincidences," said Steve doggedly. "The improbable is a part of probability. Things as improbable as these—even a sequence of them—have to happen sometimes."

"Yeah?" said Lucky. "Do they have to happen to me?"

**B**UT the girl was obviously puzzled. "You said something about a force that would make heads turn up a thousand times in succession if applied that way, Steve," Frances said quickly. "Maybe this generates that force. Maybe you'd better try it. You'll let him, Lucky?"

Lucky handed the object back to Steve.

"I pulled for it that he's a square guy," he said calmly. "If my luck holds, he'll play fair and give it back."

Steve took the thing in his hands. He asked curt questions. You held it in your hand, said Lucky, and wished for something. Mostly it worked. Sometimes—occasionally—it didn't. That was when you wished for something that was impossible, like a glass of ice-cold beer. If what you wanted could happen by any conceivable accident, the thing would warm up. Sometimes it got fairly hot. If it warmed up, you knew that it had worked.

Steve held it in his hand. He frowned. His expression grew sheepish, but he concentrated doggedly. Then he stared sharply at the jagged thing in his hand. It had warmed perceptibly. It was hot! He dropped it with a sudden exclamation. A dried leaf, where it had fallen, suddenly turned brown-er, then black, and then sent up a thin, wispy curl of smoke.

"That was a tough one you gave it," said Lucky. "I never knew it to get that hot before!"

"If it works," said Steve, unbelieving but still staring at the scorched leaf, "I'll be raving crazy!"

Apparently, however, it didn't work. Nothing happened. Nothing at all. Minutes passed. Frances gazed all about her. She listened and she looked. Steve was tense without knowing why. He had an explanation of how a lump of uranium ore bombarded by an atomic explosion might just possibly arrive at an insane condition in which it could generate the forces he'd imagined. But he didn't believe it would. He'd

put it to a test, and he was enormously wrought up about it, but he assured himself grimly that it was all nonsense.

A quarter of an hour. Nothing. Then Steve could look at the new and quite crazy theory with something like regret. It was impossible, but it was so plausible! It wasn't scientific, to be sure, in one sense, but when you are dealing with the laws of probability, ordinary reasoning doesn't apply. All you can do is estimate your answers by statistics. One hundred per cent positive reaction would violate all—

There was a noise overhead. A thin whistling sound. It grew nearer and louder and rose in pitch. It became a scream; a shriek.

Then something flashed down out of the sky nearby. It was not a bomb, but one instantaneous glimpse of it proved it to be bright metal. It hit nearby. It smashed into trees a quarter-mile away, created a monstrous tearing noise and a stupendous crash. Then there was silence.

Steve went deathly white.

"It worked, all right," he said through stiff lips. "Let's get away from here! Fast!"

## CHAPTER IV

### *The Crater-Stone*

**T**HINGS looked good. They looked amazingly good. Steve had considered that the most improbable of all possible events would be the crash-landing of a plane—one of those planes which groundlings never saw, but which now and again dropped death out of utterly empty sky wherever traces of surviving or reviving civilization appeared.

Somewhere there was civilization which was intent upon the destruction of all rival civilization. But in seven months Steve knew of only one other plane that had actually been seen, and the place from which it was sighted was now a bomb-crater. So in wishing, or "pulling for," the crash-landing of a plane which was not to explode and whose radio was to have failed before its fall began, Steve had assuredly put the crater stone to a brutally savage test.

Thrashing away through brush and occasional blessed pine woods where one could move swiftly, he knew that every stipulation

of his wish had been met. A plane had fallen. They'd seen it. It had crash-landed. They'd heard it. It had not exploded, because they were still alive. Even its radio must have gone out before its fall, because there were no hovering specks above the scene of the crash even an hour later.

It was in fact, three full hours before his searching of the sky showed something monstrous and mechanical settling down out of midair to the scene of the plane-wreck. Other flying things soared nearby. But by that time the trio was ten miles away.

"It worked," he told his two companions. "In every detail. I was a fool to pick that for a test, though. Too dangerous, for us. They'll be checking over the wreckage now, to see if it was an accident, or if somebody on the ground managed to do something to cause it."

"They?" said Frances. "Who?"

"I don't know who," said Steve savagely. "The people with planes and bombs. Maybe the people who started bombs to falling. Maybe people who wiped out the ones who started it. But people who drop bombs now!"

The large mechanical thing had landed among the trees in which the plane had crashed.

"They'll pick up the wreck," he went on grimly. "If they're sure it was just an accident, they'll blast the place it occupied so there'll be nothing to encourage us groundlings with the idea that their planes can have accidents. If they think we used some weapon, they'll strafe this whole area. But I think they'll call it an accident. In a sense, it was. A coincidence. An improbable happening. Something like heads coming up a thousand times in succession."

They were on the slope of a small hill ten

miles distant from their late stopping-place. The planes soaring above the wreck began to move in wider circles.

"Into the woods—quick!" snapped Steve.

They dived into undergrowth under trees. They toiled on where leaves were so thick that the sky overhead was blotted out.

Half an hour later they heard a drum-fire of explosions—of boomings which sounded like the deepest possible bass thunder. And Steve drew a breath of relief.

"They called it an accident and blew up the woods where it happened. They probably looked for tracks leading to it and didn't find any. That's luck, all right! But I wasn't too bright, bringing down a plane. We could all have gotten killed."

"No," said Lucky Connors comfortably. "I been pullin' we won't."

Steve stared at him. Then he said soberly:

"Sense! I didn't think of that! If you ever lend me that crater-stone again, Lucky, I'll tell you what I have in mind before I try it. I agree that the thing works, now. There's nothing else to believe, and I think I know how."

"I'm waitin' to hear," said Lucky. "The thing bothers me! It seems kinda spooky, like that guy had a lamp and he rubbed it and a spook come and asked him what he wanted done and then went and done it."

"It's no Aladdin's lamp," insisted Steve. "It's perfectly rational. It's inevitable! But it's devilish hard to believe."

**T**HEY continued to move away from the scene of Steve's test of the enigmatic object. Frances toiled valiantly to keep up with them.

[Turn page]

"Every normal happening in physics and chemistry," said Steve, "is a case of things seeking a lower energy-level, like water running down-hill or two highly active chemicals combining to make an almost inactive compound. Cause and effect everywhere must be the same—happenings taking place to arrive at a lower energy-level. If I chop through a tree, though, I don't knock it down. It falls of itself. All I do is cut away the stuff that keeps it from falling. In the same way, when a ship is launched, one man with an axe can knock away the prop that holds a ten-thousand-ton ship from sliding overboard."

"You sure knocked somethin' down outa the sky," said Lucky with a grin.

"I don't think so," said Steve. "I think I just greased the skids for it to fall. Whenever there's a possibility of a thing happening, there's a force acting to make it. Back in Nineteen-Forty-Four or Forty-Five Professor Rhine at Duke University proved that some people shooting crap can make dice come seven oftener than chance would allow. They just pull for it."

"Not thought energy, Steve!" protested Frances. "It isn't enough to do anything!"

"It built cities and civilization," Steve reminded her. "And then it smashed them. My guess is that it's a sort of energy which does not affect matter directly, but only other energy. It controls other energy. And Lucky, here, has a step-up amplifier which increases its power to control. The stuff he's got is undoubtedly radioactive in one fashion or another. I think, though, that it's unstable in a fashion which is affected only by thought energy. Thought waves—call 'em that for lack of a better term—increase its activity. And it greases the skids for what you want to happen."

"Radioactive, huh?" Lucky asked as he grunted. "That's why it gets hot? Like radium?"

"Like an atom bomb," said Steve grimly. "Lucky, it's self-limiting. In effect, it amplifies your wishing, which makes what you want more likely. Suppose you're shooting crap and you pull for a seven. Your brain sets up a pattern which makes sevens come easier. But this stuff, affected by your thought, amplifies that pattern and pulls for sevens too. And it pulls harder than you can, and harder and harder—getting hot the while—until nothing but sevens *can* happen. And it's limited—"

"Steve, it only warms up if it's going to work," Frances said mildly, panting a little in her effort to keep up with him. "It doesn't stay warm."

"It warms while it's pulling. You can't pull for a seven after it's come. You can't will it to be daylight now. It *is* daylight. That thing can't pull for a seven after the seven is bound to happen—after it's sure to happen. After, in the space-time continuum, it *is*. And apparently it can't pull for an impossibility, either.

"Lucky can't wish for ice-cold beer because there simply isn't any. That stuff is an amplifier which works only when it's tuned to a possibility. When the possibility becomes a certainty, the tuning cuts off. But anything Lucky pulls for while he's got it, is going to happen if it conceivably can."

"I'm pullin' for somethin' now," said Lucky blandly.

They had been climbing steadily for several minutes. They came to open space again. They stopped short, but looked out beyond the brushwood to where ground fell steeply away to one side. They were able to look far back and see a thinning, dark-brown dust-cloud where the flying things had circled. The last of those soaring motes seemed to aim itself at the sky. It went up and up and up, increasing its speed as it climbed. It vanished.

"Blast 'em!" snarled Steve suddenly. "They smashed us! We'll get 'em now! We'll get 'em! Their own bombs made the stuff that'll bring 'em down."

"I'm gonna look yonder," Lucky Connor said comfortably. "I been pullin' for something."

Here had been a winding mountain road. No wheeled vehicle had passed along it in months, now, and what had been a highway was a meandering trail of weeds and grasses. But Lucky was wading through those weeds toward a curious green mound where the woodland started up again. There was a curious glassy reflection from one place within it. He yanked at the vines which covered it.

It was a car, parked off the highway when its gasoline gave out. Its owner had never come back for it, but creeping green things had crawled over it and moulds infested it. When Lucky wrenched open a door, there was only mildew and decay within. The sheet-metal body was rusted and leprous. The upholstery was furry with mould.



**L**UCKY grunted with disappointment and went to the back. He kicked off the rusted trunkback lock. He fumbled inside. "It's okay," he said, beaming. "My luck still holds."

He brought out one fungus-covered object and then another. They were suitcases. But they were the plastic luggage that had only been on the market a scant two months before the atom bombs began to fall. Metal or leather would have perished long since. When Lucky kicked them open, though, their contents were intact. And there were whipcord slacks and a girl's corduroy jacket which Frances seized upon with shining eyes, and a pair of shoes she declared would fit her, and other feminine oddments. She darted to one side to don the new finery. The second suitcase yielded a steamer-rug and shirts, a shaving-kit, and a revolver with a box of shells.

"She's dollin' up," said Lucky, jovially. "You shave, guy, and get beautiful, too."

"Listen!" Steve said fiercely. "I want to use that crater-stone of yours and bring technically trained men together. I want to make it find us books and tools and fuel and the chemicals we'll need. Then we'll smash these people—whoever they are—who have planes and bombs and use them! Afterward we'll start to build up again the civilization that's been smashed."

He was trembling with the fury of a man who has seen his whole world torn to bits and who at last feels that he has a chance to strike back.

"Just tell me when you wanna use it," said Lucky. He tapped his body where he kept the precious object. "It's all yours. But I better keep it meanwhile. You—uh—you might forget to use it to pull for the kinda breaks we need right along. Like—look at Frances, huh?"

Frances came back to them, radiant. The whipcord slacks and the corduroy jacket fitted her. She looked not only neat but smart. She'd combed her hair, with a comb from the suitcase. She'd used lipstick found in it. She was, for the first time since Steve had met her, filled with the infinitely precious feminine consciousness that she looked well.

But Steve hardly looked at her. A substance existed which had been made by the utterly uncontrollable violence of an atomic bomb. It was so sensitive that its rate of radioactive decay was controlled by thought-

waves in its vicinity.

The long known, indirect effect of will upon matter was enormously increased by it. The paradox of indeterminacy had been resolved. Chance itself could be subdued to the purposes of men. He was filled with a grim exultation. He didn't notice Frances.

But she noticed that he didn't notice. Much of the radiance left her face. They went on. Nothing was said of a destination, but they would need food, presently. The way to find food was to keep on the move. At noontime they came upon an abandoned farm, its buildings ashes. But there was an orchard. Steve and Frances gathered fruit, and Lucky slipped away and came back triumphantly with two clucking, protesting chickens.

"It's a wonder the foxes ain't got 'em," he observed. "Or maybe it's just luck. Huh?"

They ate. They went on. And on. And on. Toward sundown they saw the rusted tracks of a disused railroad. There were other signs that they were near what had been a city. They camped in a small structure which had been a tool-shed for a track-maintenance crew.

After darkness had fallen, Steve held out his hand to Lucky. He hadn't seen Frances' first enormous satisfaction fade away as he seemed oblivious to her changed appearance. He'd spent most of the day planning, in absorbed, vengeful satisfaction, the use to which he would put the controller of chance.

"I'll use that crater-stone now, Lucky," he said.

"Wanna tell me how?" asked Lucky.

"Bring together trained men," said Steve. "Supply them with the materials to make and service planes. Smash the places where bombs and planes are based, and then start to build up civilization again. Bring law back. Bring back order and food and safety for everybody."

**Q**UICKLY Lucky scanned Steve's face. Then he shrugged.

"Go ahead and try," he said drily. "If it was luck that'd broke down civilization, maybe luck could build it up again. But I think you're missin' somethin', fella. The bombs smashed the cities, but if folks had wanted to keep law and order and such, they coulda done it.

"Some places they wanted to, and they did—for a while. But this thing, it won't

change people. The way people are ain't a accident, and no accident or any luck will make 'em somethin' else. I tried to make the gang Frances seen me with act different, but it didn't work. But you go ahead and try."

"I'll manage!" said Steve.

He took the small object and went confidently outside. In the outer dark it shone brightly with a greenish-purple light. It seemed alive. He stood in a warm and starlighted summer night. There were the innumerable noises of night things in full voice; insects whirring and clicking, and the occasional cry of a nightbird, and somewhere close and very loud the croaking chorus of bullfrogs in a swampy place. They were loudest of all.

The other sounds could only be heard through the frog tumult. He was absolutely confident that he had in his hands all the power that was needed to remake the world. He had control of chance! He could control the accidental and the irrelevant!

The power of a single human will to control other forces had been proven long before, of course. The most careful scrutiny of Rhine's results, and their duplication elsewhere, had made it certain that dice and coils do not fall quite at random when the human will intervenes, though the amount of energy applied as thought had always been too minute to be measured or even detected save in the statistics of its results.

But Steve had brought down an aeroplane from the stratosphere with the crater-stone in his hand. He'd seen it grow unbearably hot from the mere waste energy of its action. He had the power of millions of wills in his hand—perhaps billions.

He thought, in grim carefulness, of the things he wished to have happen that civilization might return. He had no doubt at all. Not even of his own wisdom. He pictured what he wished to occur, and knew that as his wish became certain to occur, the thing in his hand would grow warmer and warmer and warmer. He thought vengefully, and waited for the heat which would tell him that his thought would come to pass.

An hour after he had begun, he stumbled back inside the little shed. Frances had been dozing wearily. She started awake and looked anxiously at his face. He was white and stricken and despairing.

"Did you hear the bullfrogs all fall silent for a solid minute?" he asked in a ghastly

facetiousness. "I made them do that! I pulled for the coincidence that they'd all shut up at once. And they did! But that's all I could do! Apparently there's not a trained man left alive to join us. Not a tool-shop or a store of fuel or a motor or explosives or anything else. I pulled for everything that would make civilization return and the thing stayed cold. They were all impossible. But it warmed up nicely when I tried to control the bullfrogs."

He swallowed, and it was almost a sob. Frances stared at him. Lucky Connors listened in silence.

"I'll tell you what let's do," said Steve. He grinned at them, and it was more tragic than tears. "Apparently the way the world is, is the way the world is going to stay. Let's go out and cut our throats!"

## CHAPTER V

### *Fight for Life*

**M**ORNING came and Lucky was missing. The revolver and cartridge from the abandoned motor-car were set out beside where Steve had finally fallen into bitter slumber. And Frances was gone, too.

Steve got up. He went out of doors. Emptiness. No sign of Lucky or of Frances, either. He went cold all over. Then a surge of such terrible rage as he had never felt before in all his life swept over him. He stood shaking, quivering with a lust for the blood of Lucky Connors.

There was bright sunshine all about. There was the now weed-grown double embankment with its twin lines of rusty railroad track. Day insects stridulated. There were green things on every hand, blandly indifferent to the destruction of all that man had built, and birds flitted here and there in complete obliviousness to mere human tragedy.

Steve stood still for a long time. Then he spoke aloud in a reasonable, a calm, and a totally unconvincing voice.

"Well, she showed sense. While he's got that crater-stone, she'll have plenty to eat, anyhow. She'd have married a rich man in the old days, because he could give her a car and a fine house and jewelry. Now she's sure of a stolen chicken or a snared rabbit

every day. That's riches. He even gave her a trousseau!"

Then, suddenly, he cursed thickly and shoved the revolver and cartridges in his pocket. There were weeds growing on the railroad embankment. They were trampled and bent where two people had walked through them. Lucky Connors and Frances had left Steve and gone along the embankment toward what had once been a city. Steve followed.

His head did not clear at all. For more than seven months he'd clung to an insane hope that the highly theoretic and essentially unlikely facts he had gathered in six child's copy-books might mean the return of civilization. He'd hoped that they would lead to the discovery and the subjugation of a force which men have always experienced but never suspected, and that the force would bring back safety and hope and decency to the world.

Now he knew that the force existed. He'd handled a crude but sufficient atomic generator and control. And it was utterly useless. It would not bring back a dead world. It would bring stolen chickens, and it would stop bullfrogs from croaking, and with it he had destroyed an aeroplane of the enemies of all he'd ever believed in. But it would do nothing more. And now Steve, raging, abandoned the thought of remaining civilized. He wanted Frances. He hated Lucky. He would kill Lucky, and though she hated him and screamed, Frances would be his.

He passed a place where three houses still stood, unpainted and long abandoned. Presently he passed a two-acre space of mere black ashes, where fire had raged unchecked and weeds now grew luxuriantly. A heap of debris where houses had been pushed violently from one side and had collapsed upon everything within them, and strangely had not caught fire. Then a building of reinforced concrete, now an empty shell.

Then he heard a muted *pop*! He heard a keening yell. He heard a second *pop*. It was a pistol—a small pistol, like the one he'd given Frances. At the thought of her, fury swept over him again. He broke into a shambling run.

Then he heard a cracking sound which was no pistol, but at a guess Lucky's rifle. A chorus of yells followed the explosion. And these were not the voices of Frances and Lucky, but of others. Wanderers, perhaps.

Human beings sunk to the level of wolves, like the man he'd first killed in her behalf.

On the instant, his rage evaporated, and the revolver he found out and in his hand was no weapon with which to meet such folk. A pistol was wealth unimaginable, these days, and it carried all the risks of riches. A man with a pistol, having none to punish him for murder, was supreme among his fellows, until one of them managed to kill him for it. One man against twenty or thirty or forty, even though he had a pistol, was not only helpless but doomed. They would take any risk to win it. He might kill half a dozen. The rest would close in because the pistol was a prize worth any danger.

Steve found himself running. In his hand he held one of the slender, needle-sharp foils drawn from his pack. He had the pistol ready for a last resort.

**T**HEN, quite suddenly, he reached a place, where he could see the crater which occupied most of this city's site. About it was tumbled wreckage in which human scavengers might still hope to find some booty and even food in rusty cans. The crater was two miles across and chasm-like, save that it sloped down—all barren, glassy stuff—to sheer emptiness at its center.

And at the very edge of the crater, Frances stood at bay. Lucky lay flat on the ground. It was apparently his fall which had brought the triumphant howling which guided Steve. Stones on the ground—half-bricks and bits of rubble—told what had felled him. And Frances crouched desperately, her tiny pistol upraised.

She looked clean and trim and desperate, and her immaculacy and the completely feminine look of her caused some of the howling. The creatures who had stoned Lucky to unconsciousness yelled at her. They were horrible things. They hid behind remnants of concrete and rubble which had been left standing in that freakish skip-distance of a few hundred yards beyond a crater's rim before devastation replaces the annihilation of the crater itself. The ragged figures yelled and darted from one hiding-place to another, edging in for an irresistible surge upon her.

Steve's arrival was unheralded. His weapon was silent. He ran toward her, and paused to make a savage attack upon a group of four once-human things who

seemed planning a simultaneous volley of stones.

His foil licked out and stabbed again and again, like the fang of a striking snake.

He darted forward with a bubbling scream following. He attacked and struck once more, and a shriek arose. He zig-zagged closer, crazy with blood-lust and fear for Frances.

He had struck three times before attention turned from her desirable figure to his deadly one. Then a bearded thing with maniacal eyes leaped at him with a club. His foil darted in and he ran on. Stones fell about him. He darted and dodged, striking when he could, and arrived at Frances' side as an uproar of animal fury filled the air.

Frances did not look ashamed or conscience-stricken, but uplifted and desperately glad. She smiled at him shakily.

"L-lucky was pulling for you to come, Steve," she said.

"How the devil did you two get into this mess?" Steve snarled.

A stone crashed close to him.

"We came to—get another crater-stone if we could," Frances explained unsteadily. "Lucky said it wasn't likely, but he—pulled for it and his stone warmed up. So we came. We h-had to look at night because the stone glows. We did find— Steve! Behind you!"

Steve whirled. His pistol spoke. They were doomed now in any case. He saw bobbing figures in the distance, called by the shots and yelling and now scrambling over wreckage to be in at the kill. There had been perhaps forty caricatures of humanity in sight at the beginning.

Now twenty or thirty more were on the way. The city had once held half a million people. A hundred or more could exist on what remnants even an atom bomb had left.

Lucky stirred. But he was dazed. Steve took his rifle. He fired three times—once at a nearby figure, twice at distant targets. The fall of the distant men filled their fellows with terror. They flopped down and ceased to advance. They would not encourage the nearer besiegers by arriving as reinforcements.

But there were yet other creatures popping out of holes, like rats. Steve saw men creeping toward the bodies of the two he had dropped. Not, of course, to offer aid, but to rob them of what poor loot they might offer.

More stones fell near the three at the crater's rim. They were not heavy enough

to kill, but a lucky blow might stun, as Lucky had been stunned, and Steve saw a stark horror at the back of Frances' eyes. The girl was picturing herself at the mercy of these utterly brutalized scavengers in the wrecked remains of slums.

"Can't you use the crater-stone somehow, Steve?" she asked desperately. "Those rocks may hit us, and we can't keep shooting forever."

"The crater-stone," said Steve in bitterness, "will make anything happen that could happen by accident, but not a blamed thing more. It looks as if we're finished. We may be able to fight our way through, if Lucky comes to, but they'd trail us forever. If not for our guns, then for you."

A STONE missed his head by inches. It slithered over the crater's edge and went bouncing and skittering over the glassy lining toward the center a mile away.

He fired. A man shrieked. Purely animal, utterly unhuman yells arose all about them. The sound from the half-hidden, gesticulating creatures was not like that of any other animal on earth. When men become beasts, some dim remnant of perverted intelligence guides their descent into an abyss of bestiality. No mere beasts would have shouted such things to Frances. And there were some cries which made it terribly clear that sooner or later a rush like a starving wolf-pack would be made upon them, and they knew what their fate would be.

Lucky stirred again. Steve fired once more. Every inequality in the ground sheltered some scarecrow. They were snarling and yapping and regarding the embattled humans and their weapons with almost equally frenzied desire.

"I used the crater-stone, Steve," Frances spoke quietly. "It got warm. We can go now. W-will you try to carry Lucky?"

Steve did not relax his grim watch over the howling besiegers. But he suddenly noted that the number of those who exposed themselves to fling stones decreased. Second by second, almost, it seemed to lessen. In a minute, the number of missiles had dropped to half. They continued to grow fewer. The distant scrambling figures no longer advanced.

In three minutes the howling was as great as ever—if anything, it had increased—but there were no more stones at all. And Lucky had turned over and was trying groggily

to get to his feet. Steve still watched savagely.

"I—used the crater-stone," said Frances again. "I think we can go now. L-lucky's getting up."

"Yeah!" said Lucky dizzily. "What a con-in' I got! That ain't my kinda luck!"

He steadied himself by Steve and rose to wabbling erectness. There was a ululating uproar all about them. But there was no longer a single stone in the air.

"What happened?" Steve asked. "What did you do, Frances?"

"I used—all the crater-stones and—pulled for them not to throw any more stones or come any closer. I—wished they couldn't. And—they can't!"

Steve ignored Lucky's dizzy swaying. He thrust the rifle back into Lucky's hand. He strode forward, his foil once more in readiness.

A few moments later he stood above a hollow in the ground in which three scarecrows writhed and wriggled. One snarled at him helplessly, working feverishly at his right hand and arm. A second lay doubled up kicking, clutching at his middle. A third wheezed and coughed and blasphemed stranglingly. His eyes upon Steve were terror-filled, but his paroxysm of coughing did not cease.

Steve went back to the others.

"But that ain't my kind of luck!" Lucky was saying querulously. "I got conked on the head! It's the first bit of tough luck I've had."

"Sling one arm around my neck, Lucky," Steve said. "We'll all get going. Frances hit on the trick that we didn't know, last night. They won't follow us."

Frances put herself on Lucky's other side. Bracing him between them, they moved toward the railroad embankment. They climbed it, while the noise of those who had besieged them rose to a new climax of imprecation and hatred.

They moved along the knee-high weeds which grew even in the gravel between the disused rails. Lucky recovered strength, with movement. In half an hour they had passed the tool-shed in which they had camped the night before.

"But that ain't luck!" Lucky protested again, after a long period of painful meditation. "I got a headache! That guy knocked me cold with a half brick. It's the first bad break I had yet!"

Steve had been silent, too. Not because

any trace of his former suspicions of Lucky and Frances remained—they had vanished, somehow, with the discovery of the two of them embattled and about to become prey to the man-pack. He had been putting two and two together in the light of a mentally revised chapter of his treatise on the Paradox of Indeterminacy.

"Listen," he said drily. "I used the crater-stone last night. I couldn't do a thing except make frogs stop croaking. Remember?"

"Yeah," said Lucky. "But I pulled—"

"My guess is that you pulled for us to find out how to make the crater-stones work all the time," Steve told him. "You had to be knocked on the head for it to happen. So you got knocked on the head." He grinned with grim amusement. "You want to be careful how you pull for things with your luck, Lucky! Especially when you're being altruistic. That conk on the head was probably the luckiest thing that's happened yet. But if you keep on you'll luck yourself into getting killed!"

## CHAPTER VI

### *Hiding Their Trail*

DDLY enough Frances and Lucky had found no less than three lumps of brightly shining glassy stuff in the crater. They were upon the line the railroad must have taken before it had ceased to be, together with nine-tenths of the city. At a guess, a shipment of uranium ore might have been in the area of annihilation when the bomb dropped. Perhaps it had been on its way to one of the atom-bomb plants the United States kept in operation. Or perhaps the fragments had been in a collection of mineral specimens in some school or museum.

The odds were incalculable against Lucky—having found the first one—finding more of the things Steve believed the result of the bombardment of uranium by the blast of an atomic bomb. But that finding had not been impossible, and he had pulled for it, and the first crater-stone had grown warm as he did so.

Now the three of them had breakfast and lunch in one, at a spot some ten miles from the ruined town. A small wild piglet poked an inquisitive snout at them from a cane-

brake and Lucky shot it. There were wild grapes nearby.

Lucky scooped out a hole in the ground, built a roaring fire of fallen branches, rolled the piglet in clay, and covered it in embers. The piglet cooked comfortably while Steve wrote feverishly in his copy-books. When the meal was ready he had organized his notions.

"It fits into a pattern," he said exultantly, his mouth full of tender roast pork. "Probability is anything that can happen. If you know how many different things can happen, you can figure out the odds against every one. When you throw two dice, just so many combinations can turn up. They can't make more than thirty-six combinations, because there aren't but that many combinations possible.

"A seven can be made in six different ways, so the odds are six in thirty-six you'll make it on any given roll. A two or a twelve can be made only one way each, so the odds are one in thirty-six you'll roll them. But with Lucky's crater-stone he can pull for a twelve, and the stone will warm up and he'll get a twelve every time. Because it supplies energy in a pattern so that nothing else can turn up! That is, nothing else will turn up by chance, because the crater-stone controls chance. Right?"

"Yeah, I guess so," said Lucky gloomily. "But I just got conked on the head, and that ain't luck any way you look at it."

"Wait a while!" said Steve. "When you roll dice, there are thirty-six combinations possible somewhere in the future. Your crater-stone picks out one and blocks all the rest. But suppose you pulled for your dice to roll a thirteen! There's no thirteen in the future to be picked out. The crater-stone can't pick it out, and it simply doesn't work, eh?"

Lucky grunted. "Wrong, fella! I tried that once and it scared me to death."

"One of the dice was cracked, eh?" asked Steve. "And when you rolled, it hit something and split into two parts? And read thirteen?"

"Y-yeah! How'd you know?"

"That was the only way it could happen," Steve told him. "There was a thirteen in the future of that particular pair of dice. So you got it. But on an uncracked pair you couldn't."

"But this conk on the head?"

"You pulled for us to find out how to make the crater-stone work all the time," Steve

reminded him. "When you did, there were any number of things that could happen in the future. Instead of thirty-six combinations, there were hundreds of thousands. But only one set of events would show us how to use the crater-stones. So that was the one that had to happen."

"I don't get you," answered Lucky, looking puzzled.

"If you hadn't been conked you'd have been trying to use the stone," Steve explained. "If I hadn't been there, Frances would have been too busy defending herself to try. But when the one possible set of things happened, she used the crater-stone in the way that only she would have thought of using it, and those creatures couldn't attack us!"

"What happened to them, Steve?" asked Frances uneasily. "Did I—kill them with it?"

STEVE grinned, without too much amusement, and cut himself another bit of roast pig.

"You did better than that," he told her. "You found the trick we needed. Last night, I tried to make some detonators explode. I tried to make some physicists come to where they'd meet us. I tried to pull for tool-shops, and aeroplane parts, and fuel-stores, and the like. I knew too much about what I wanted. I made what were practically blueprints of what I intended to have happen.

"And those things weren't in the future. They couldn't happen by accident. But all the frogs would stop croaking sooner or later. For every one to shut up for no particular reason—by accident, you might say—was in the future. So pulling for them all to be silent at once simply meant wishing for a coincidence. And it happened!"

He took a huge bite, enjoying himself. Frances shook her head. He went on, his mouth full.

"You wished they'd have to stop throwing stones. You wished they couldn't attack us. And in the make-up of every man there's a possibility of some happening that will incapacitate him. Maybe abdominal cramps or a paroxysm of coughing. A nerve-block that will make one arm useless for a while. Those things happened to different men.

"Maybe some threw epileptic fits. Maybe some fainted. There may have been heart-attacks or sudden malarial chills—anything

that could chance to happen to any man to stop him from attacking was bound to happen, by chance, because the crater-stones control chance. You see?"

Lucky blinked at him, chewing slowly. Frances stared, frowning, and slowly her forehead cleared.

"I—think so. If I'd wished for them all to drop dead, it couldn't have happened, because it couldn't happen by chance. You might say it wasn't on the dice."

"Exactly!" Steve nodded emphatically. "Lucky can't do miracles. He can't do the impossible. But he can do the improbable—the wildly unlikely. The one-in-a-million or one-in-a-billion chance. The indeterminate stops being indeterminate when a crater-stone works on it. Most results are somewhere in a possible future. Not all, but most. If they are possible, they're available to him."

Lucky chewed, and swallowed.

"Fella, I pulled for somebody to explain my luck to me," he grunted. "I got my explanation. And I got some extra hunks of that stuff back yonder. One goes to Frances. You take the rest. I pulled for you to be a square guy. Now I'm just gonna watch."

"I don't know what you'll see," Steve told him. "But that ought to make it possible for people who want to live like humans instead of beasts to do so. And if it can, it surely will."

His lips set. There'd been a small community he'd seen, on his way from Thomas University to his home town. It was after he'd withdrawn from membership in a gang that called itself guerillas, and after he had evaded their attempted vengeance for the killing of one of their more prominent members. The community was a village of a

dozen or so houses and some surrounding farms.

Steve had gone to them to warn them of an intended foray by the guerillas—a foray in quest of food and women. He joined them in an ambush of the guerillas. The looters were driven off. And Steve, scouting after the battered, wounded, snarling band, had been absent from the community when bombs fell on it. He saw the flares in the sky and felt the shocks in the earth.

Steve returned to find gigantic craters where the village and most of the farms had been, and the blast-effect had destroyed all the rest. And he knew, then, that the falling of bombs on that small and resolute village was not an accident. It followed too closely their success in defending themselves against looters. It was the consequence of that success.

The people who had planes and bombs wanted all other civilization destroyed. They preferred it to destroy itself. But they would let no seed of future rivalry survive. Unquestionably, among the looters and bandits there were agents of the people with planes and bombs, watching lest any sanity or decency remain anywhere.

"It occurs to me," said Steve suddenly, with narrowed eyes, "that if some of our friends recovered, back in town, they just barely might trail us, or they might tell some other people who'd take entirely too much interest in Frances' system of self-defense."

Frances regarded him with unquestioning eyes. Lucky frowned meditatively. Steve considered—and Lucky handed him no less than two of the crater-stones, and passed one to Frances. They varied in size, those three, but they were essentially duplicates of Lucky's own.

[Turn page]

**B**UT Steve only nodded absently, for he was thinking. They went on along the abandoned railroad. Presently they came to a trestle across a small, fast-flowing stream.

"In case our fine feathered friends back yonder trail us," said Steve, "or in case they tell somebody else, we'll build a raft that would carry us downstream. And our trail will definitely end."

Lucky unquestioningly set to work. They had no ax, so chopping was out of the question. But they dismantled a wooden fence and bound its bars together with wire from a single-strand cattle-fence of wire. They made three bundles and fastened them together into a raft, fifteen feet long and four feet wide. They launched it.

"And I'll try out my new crater-stone," said Steve.

He put his hand in his pocket. His expression grew satisfied.

"It warmed up," he observed. "Fine! Now we'll cast the raft loose and wade upstream."

Lucky's eyes crinkled with amusement. Frances stared.

"Look," said Steve, with a wave of his hand. "Anybody could tell we made a raft here. Anybody who wanted to trail us would follow the stream down. And I just used my crater-stone and pulled for the raft to float on merrily without grounding anywhere until it gets to a fair-sized river. So even if it's finally found, they'd still think we got off somewhere downstream from here."

Lucky chuckled.

"You got a hunch, huh? You think things ain't as disorganized as they look? I'm gettin' me an idea, too."

He splashed into the stream, joining Steve. But Frances rolled up her new whipcord slacks before she began to wade.

Steve seemed now to have a definite destination in mind. He pushed the pace. Walking in water was tiring, but he moved briskly upstream, Frances followed, and Lucky brought up the rear. Lucky had a long, stout, sharp-pointed stick in his hand, split off from a fence-rail. For the first mile or so he seemed to use it as a walking-stick. Then he reversed it. Now and again he halted. Once he fell so far behind that Frances paused anxiously.

"Hadn't we better wait for him, Steve?" she asked.

But then Lucky came into view, strolling in rippling water six inches above his an-

kles, and Steve went on without comment. They walked, altogether, nearly seven miles in shallowing water, by which time the stream was barely a brook and it was very late afternoon, and practically dark.

"It's about five miles more to where I want to go tonight," said Steve, in worried tones. "We'd better hit it up a little."

Frances looked very weary, but she rolled down her dampened slacks and uncomplainingly prepared to go on. Lucky glanced at her. "You tryin' to make Frances work up a good appetite?" he said humorously.

Steve shook his head.

"I'm trying a new trick with the crater-stones. I'm trying to make them yield information, indirectly. There used to be a house up this way that would be ideal for us to hole up in. A man I knew had it as a sort of hunting cabin. It's out-of-the-way and as likely as any place to be still standing. So I pulled for it that we'll sleep in it tonight, in safety, after a meal we've gathered on the way. The stone warmed up.

"If the house weren't standing, it wouldn't be possible for us to sleep in it. It wouldn't be on the dice, so to speak. If there weren't some happening tied in to it to be arranged, the stone wouldn't have needed to warm up. When the two things are linked, the warming of the crater-stone means that both have to happen, and the house must still be standing and in shape to sleep in."

Lucky blinked.

"Hey! That's—" He stopped. "Migosh, I see it! I pull to roll a thirteen on dice and the crater-stone won't warm up unless one of 'em's cracked. So if it warms up I know one's cracked without lookin' at it. Sure! Sure! So you know there's a house there and it's okay."

"We haven't the grub yet," said Steve.

"Shucks," said Lucky. "I had a sharp stick in my han'. I been stabbin' at fish all the way upstream. I got seven, two big fellas and five little ones. Grub's all set. Let's go on and get a good night's rest."

**H**E TOOK the lead, now, exuberant and happy. Steve and Frances followed. Frances was tired, but she smiled at Steve as he waited to help her up a steep place on the way they had to go.

"That's an awfully good trick," she said. "Using a crater-stone to find out things. If you can make things happen and find things out—"



"We can," he told her. He held her hand to ensure her balance on tumbled rocks. "And I've found that all three of us are going to live through what's coming. I pulled for the three of us to be together five years from today. And the crater-stone got warm. Thousands of millions of states of affairs could exist for all three of us five years from now, but now none are possible which don't allow us to be alive and in the same spot."

It was very late dusk. The first faint stars winked into being. Shadows of the tall hills into which they made their way made it almost dark where they moved. Lucky, on ahead, was singing lustily to himself. And the footing became quite secure, but Steve still held Frances' hand, as if unconsciously, and she let him, as if unaware. Yet the pressure of her fingers was warm and strong against his palm.

"I didn't realize it, but I know something of the future, too," she said softly. "I wished for something. And it will happen."

"What?"

She shook her head, smiling up at him.

"You don't want to fool with the things," he said anxiously. "We've still got to find out how they work. Lucky got hit on the head as the result of one of his wishes only this morning. You've got to be awfully careful. They're dangerous!"

"Not what I wished for," said Frances.

Somehow, they were standing still and facing each other. Frances' hand was firm and soft. She looked very wistful. She was very pretty, but as she looked up at him her smile was wavery and a little bit frightened, too.

Suddenly he took her in his arms and kissed her. A dozen times over, with long-pent-up enthusiasm. And then he released her.

"I'm sorry, Frances!" he said contritely. "I wanted you to feel safe with me, but you're such a swell girl—I just couldn't help it!"

He gulped. He suddenly realized that he still had his arms around her, holding her fast so she couldn't flee until he had placated her.

Then he realized that she wasn't trying to flee. She still looked a little scared. But she looked glad, too.

"S-silly," said Frances shakily. "Of course you kissed me. What do—what do you think I used the crater-stone to wish for?"

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## CHAPTER VII

### *Lucky Takes a Jaunt*

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**D**ESPITE their haste, they reached the house late; when the moon in its last quarter was barely above the horizon. It was a small house and a snug one, built into the side of a hill, with many trees around it and tall second-growth beginning not far away. Steve and Lucky scouted it cautiously, weapons ready, and at last stood sniffing at smashed-in doors, and it was empty.

But they searched it thoroughly in the darkness before they gathered in the big living room and Steve made a fire in the great stone fireplace. As its first flickers rose, he pounced upon long drapes, bunched in untidy heaps upon the floor. He was hanging them across window-openings before Lucky realized what he was about.

Then, as the light in the fireplace increased, the two of them prowled about—and Lucky went outside to make sure that no ray of light escaped, and Frances regarded Steve with shining eyes and he kissed her again very satisfactorily—and made everything quite light-tight.

"They blacked out cities back in old war times," said Steve. "Later radar made that useless. Now that there's no more civilization, a lighted window means somebody trying to get back to it. So the old-fashioned blackout comes in again."

"And the old-fashioned fish-fry comes back too," said Lucky re-entering the room. "Only these got to broil before the fire."

As Lucky began to cook the fish he talked, meditatively.

"You said somethin' today that set me to thinkin'," he said. "And you went to a lotta trouble to make sure we weren't trailed here. What makes you so positive there's somethin'—uh—phony about the way things are?"

Steve told him of the small community he'd found in which the folk had resolutely tried to cling to all of decency and civilization that remained. He also told of the band which called itself guerillas, and how he'd killed a leading member, and how he had gone ahead to warn its prospective victims. Then he told of the victorious defense, and the bombs which fell upon the defenders afterward, obliterating them and all they'd fought for.

"So somebody doesn't want civilization to come back," said Steve. "You see why, of course."

"Nope," said Lucky.

"There can't be an atomic battle," Steve pointed out. "There can only be atomic massacre. There can't really be an atomic war. There can only be a contest in destruction. And there can't be conquest by atomic bombs. You can kill people with 'em, but you can't conquer them. So when this thing started, the United States couldn't be conquered. It could only be smashed. Which it was! Most of the world was smashed, too. But the part where the aggressors live, escaped. Not completely, I suspect, but after a fashion. Left alone, we Americans would start to build up our civilization again, because even an unharmed other nation couldn't occupy all of America. These people probably didn't have nearly enough people left. They certainly haven't ships and supplies to carry and maintain an occupying force. But if we built back, we'd be dangerous some day. So what would they do?"

Lucky grunted.

"I'm beginnin' to guess, fella, and I'm mad!"

"So am I," Steve told him. "It isn't all guessing. Those people would establish bases where they'd store planes and bombs. Those bases wouldn't be used to conquer anything, just keep us from rebuilding anything. They'd send out spies with pocket radios, to roam around with looters and so on. They'd have their planes keep up surveys. Ploughed fields mean people still holding on. Where they found civilization hanging on, the spies would lead looters to rob and wreck it. If the looters failed, they'd use planes and bombs."

Lucky Connors growled a little.

"It adds up, I think," said Steve, carefully. "If they can keep us at the level of animals for fifty years or a hundred, we'll be merely savages, those of us or our children who'll be left. And meanwhile the people who keep us degraded will be breeding feverishly in their own country, so that some day they can come over and occupy a nearly empty continent, peopled only by savages and not many of them. Possibly," he added evenly, "it's not only one continent they plan to reduce to savagery for their descendants to swarm over. Maybe it's all the world. Maybe they plan one great nation of one blood which will people the whole

earth. All they have to do is exterminate all other nations."

Lucky growled again.

"They ain't goin' to get away with it."

"No," said Steve. "I'm beginning to hope they won't."

Lucky stared at the fire.

"Yeah," he said presently. "I'm beginnin' to see somethin' I'm goin' to attend to, come tomorrow. Let's get some sleep."

They curled up before the fireplace, all three of them, and slept. Steve woke when Lucky shook him gently. He was wide awake on the instant. Lucky had pulled down one of the drapes they'd hung over the windows, and early sunlight streamed in. Lucky put his finger to his lips and nodded at Frances. Her fingers were intertwined in Steve's, and he flushed awkwardly. But Lucky seemed not to notice. He beckoned Steve outside, leaving Frances still sleeping.

"She's a nice kid," he said without expression, once in the open air. "You're goin' to look after her, huh?"

Steve looked at him sharply.

"What's up, Lucky?"

"I'm duckin' out," said Lucky. "I'm kinda crazy about Frances. She's kinda crazy about you. And I got that crater-stone that brings me luck, only it's got limits. I wanted somethin' the other day, and I got it, and I got a conk on the head because that was the only way I could get the rest of it. I learned somethin'."

Steve did not hear all of this very clearly. His mind was on Lucky admitting he was crazy about Frances.

"What're you driving at?" he demanded sharply. "If you think—"

"Guy," said Lucky wryly, "I think Frances is a swell kid. A long time ago I pulled for luck for her. And she met you, and it was luck for her. Remember how you come to be with her? Okay! I pulled for luck for Frances. Then, presently, I pulled for her to like me. That was easy.

"I went further and pulled for her to be crazy about me too, that was no go. It wasn't on the dice. If she's to be lucky and happy like I want her to be, lovin' me ain't in the layout. There's limits to what those rocks outa the craters will do. So—I'm clearin' out."

Steve frowned, aware of very many mixed and incompatible emotions. There wasn't

much to say.

"But you're needed, Lucky!" he said honestly. "Frances and I can't do all that's got to be done, even if we have crater-stones too!"

"I know," said Lucky, "I'll be back. I'm gonna hunt me down one of those guys that reports to the fellas with planes and bombs. It'd be kinda interestin' to hear him talk, if he got confidential. I—uh—think I can get him talkative. And I'll be comin' back from time to time. Bein' crazy about Frances the way I am, don't mean hatin' somebody she does care about. Only—she's a good kid, fella! Treat her right, huh?"

He looked searchingly at Steve, and then suddenly turned on his heel and marched away. Twice, Steve opened his mouth to call him back. Both times he closed it. Then Lucky disappeared in the thick undergrowth which began to grow a bare hundred yards from the house.

He had been gone an hour when Frances woke and smiled at Steve. He was puttering about the fireplace, and his expression was grim.

"Good morning!" she said brightly. Her smile vanished. "What's the matter?"

"Two things," he told her. "For one, Lucky's gone off."

Her face went blank. Carefully and painstakingly, he repeated everything Lucky had said. Frances' face softened.

"He's kind of sweet, isn't he, Steve?"

"He's probably a better man than I am," said Steve with some bitterness. "I couldn't leave you to someone else because you'd be happier with them! I couldn't give you up even for your own happiness!"

"But Steve!" said Frances convincingly. "I wouldn't want you to. I wouldn't want to be happy with anybody else."

His expression did not lighten.

"There's something else. After Lucky left, I went poking around. I told you I was here years ago. There've been improvements. A dam across a stream half a mile away. There's an electric generator there, big enough to light this house and heat it too, in winter. And the man who owned this place must have survived the first bombings, because he tried to get set to last things out. He got hold of some supplies. Seeds, and so on. Seeds of various staple crops that could be grown in this neighborhood. He even had machines to clear the land. All looted or spoiled now, of course."

**H**E STOPPED. Frances watched his face.

"Well?"

"Looters came," said Steve without expression. "You've seen what they did to the house."

Frances looked about her. She'd known the place was not intact, of course. Broken-in doors. Hangings on the floor. Now she saw books flung contemptuously about. The place had been looted and fouled and smashed. It had not been fired, because it was built of field-stone. It had been ransacked for anything that human beasts had desired, but they wanted little more than food and drink and weapons, these days. They smashed or threw aside everything else.

"What happened, Steve?"

"They smashed his skull in," said Steve. "I just buried him. Not that one dead man more or less amounts to much these days. It all happened months ago. But there are looters who know about this place. They've been here. They'll probably come back. Staying here means taking a chance."

"Chance, Steve?" Frances said. "Aren't you the man who said we can't do miracles, but that we can do the improbable and the wildly unlikely and the one-in-a-million and one-in-a-billion tricks? You want to stay. I think we'd better. Maybe we can make a garden, for food, and with an electric generator and such things to work with, Steve, couldn't you set to work to—try to find out how to make the crater-stones start to build back a world fit to live in?"

"Pretty words," said Steve bitterly. "But right now the people who have planes and bombs have made us no better than beasts. Look here; I love you, and you love me. It ought to be something magnificent, something we could boast of, something to fill us with pride, but how can we get married? Hang it, human beings can't even marry any more! They can only mate. And that's not enough for the way I feel about you."

Frances went a little bit pale. Then she smiled.

"Thanks, Steve. I feel that way, too. But what would you do? Start out on a probably hopeless pilgrimage to find a surviving preacher?"

"Useless," growled Steve. "And stupid! If you're not afraid of looters, we'd better stay here. Lucky will look for us here. I've got work to do. Somebody's got to do it. Hang it, the world can't stay like this!"

He swung on his heel, suddenly, and stamped out of the house. And Frances looked at the third finger of her left hand. There was no ring on it. She looked at it very queerly.

But presently, while Steve explored the possibilities of the electric generator, she set to work to clean house in a very housewifely fashion.

## CHAPTER VIII

### *Echoes of Battle*

**W**HILE driving a nail that had bent unexpectedly, Steve had mashed his finger and he could not write. So he was dictating, and Frances faithfully put down his words in the fourth of six child's copy-books which already contained a good part of a treatise on the paradox of indeterminacy.

"Indeterminacy, then," said Steve, scowling at the wall, "is merely a term for a normal state of balance among particles, caused by an equilibrium among forces. The laws of chance are the laws of this equilibrium. Variations from probability, then, are results of changes in the forces acting at a given spot and time. But as a new equilibrium is arrived at, variations from probability cancel out. Er—have you got that, Frances?"

She nodded.

"But the important thing is the way the crater-stones work, Steve," she said. "We don't know that. It still seems like magic."

"But it isn't," he protested indignantly. "It isn't even new. Rhine, at Duke University, proved that you can pull for things and change the laws of chance. And he had the devil of a time separating tests for extra-sensory perception and telepathy from tests for fore-knowledge.

"Rhine even found he could prove occasional fore-knowledge so easily that it messed up the evidence for telepathy. You see what that means? Back in Nineteen-forty-four and even Forty-three, his test subjects were making seven come too often for chance, on dice, and proving that somehow they could tell in advance what a later check-up would disclose. So what does a crater-stone do that wasn't normal scientific observation a long time ago? That wasn't text-book stuff? It's perfectly natural!"

"I said we don't know how it works," protested Frances.

"We've got blamed good guesses," he protested in turn. "Look, Frances—you've heard of sympathetic vibration and you've heard of resonances. You've held a coffee-pot when a railroad whistle or some particular note from a radio made it vibrate violently, haven't you? And you've heard of forced vibrations?"

Frances smiled at him. While she wrote at his dictation, she could not look at him. Now they were in the big living room of the house they had appropriated for their own. Steve had made stout wooden shutters—he'd torn down an out-building for material—which closed all window openings at night and not let a particle of light escape. But this was daytime, and light streamed in.

The books that had been flung about in a frenzy of destructiveness were back in place, though with great gaps where looters had burned some for fuel. There were obvious emptinesses where furniture had been, and the pieces which remained were mostly slashed or scarred in sheer wantonness.

What could be done to retrieve a feeling of normal life had been done. Quite possibly, Steve and Frances were better housed than any other two people in North America—outside of the places where people had planes and bombs.

"It works like this," said Steve firmly. "Suppose I have a violin-string tuned to the note A. I pluck or bow it. It gives off an A. Then suppose I leave it alone, but sound the same note with a pitch-pipe or another string? The first string will vibrate by sympathy, won't it? By resonance?"

"Oh, yes—and so will the octaves," said Frances. "If you push down the loud pedal of a piano and strike an A, all the A octaves up and down will vibrate too. You can feel them with your fingers, if the piano's in tune."

"Only there probably aren't any pianos left, so we can't verify that," said Steve drily. "What I'm getting at is that if I have a violin-string tuned to A and I sound a D note with something else, then if the D note is loud enough—but it has to be very loud—the string will vibrate a D. But not all of it—the length that tunes to D—the length that would vibrate if I fingered the violin to make it sound a D instead of A."

Frances considered, and then nodded and shrugged her shoulders. "Well?"

"Something that happens makes a mental impression just as a plucked violin-string makes a sound," said Steve. "Seeing a thing happen is like hearing a note. Remembering or imagining a thing happening is like sounding a note. When—without the crater-stone—I pull for a seven to come up on dice, it's as if I were sounding an A-note for a violin-string to respond to. My brain, unassisted, can't sound that note very strongly, but it can sound it strongly enough to make a seven come up more often than it would otherwise."

**S**TEVE paused for a moment, to find the right words so she would understand. "But the crater-stone echoes my piping little note and amplifies it," he went on. "It's like humming into a microphone hooked to a monstrous public-address system. The same hum comes out a hundred thousand or a hundred million times amplified. What I get is a note that's strong enough to force a vibration.

"With my voice I can't make a violin A-string sound a D. But with a speech-amplifier I can. With my mind I can only make things more likely. With a crater-stone, using the energy of breaking-down matter to amplify what my mind does, I can make happenings, if they're possible."

"And sometimes," said Frances, "sometimes the trick doesn't work because—"

"Sometimes," said Steve, "I can't make an A-string sound D because it's broken. Or maybe it's tuned to E, and none of it is long enough to vibrate a D. Sometimes a happening—well—isn't on the dice. All clear now?"

"If you'd dictate something like that," admitted Frances, "it wouldn't sound quite as much like gibberish as your technical manner. But Steve—"

"What?"

"We haven't anything for dinner."

"We'll go look in the fish-trap," he told her.

Two or three minutes later they emerged from the house together. Neither of them ever left the building alone, or unarmed. Their arms consisted solely of the tiny automatic Steve had given Frances within an hour of their first meeting, and the revolver from the plastic suit-case. Both were very short of shells.

Of course, both Steve and Frances carried a crater-stone each. Steve had fashioned

holders for them out of a bit of lead drain-pipe, but he could not discover that the crater-stones had a normal rate of disintegration capable of producing burns.

Apparently the enormous bombardment of uranium by the radiation of an atomic bomb produced a substance completely new in all its qualities. In all likelihood, for example, it was capable of resisting even the temperatures of an atomic explosion.

"If my father hadn't been killed," said Frances presently, "and if I knew him, by this time he'd be trying to make an artificial device to do what the crater-stones do."

"Do you think I'm not working my head off at that?" demanded Steve. He added bitterly, "But I'm working practically at random. I've got to try ten thousand or a hundred thousand things until I hit on it practically by chance—"

Then he stopped and swore disgustedly.

"I'm a half-wit! By chance! And the crater-stones control chance! If I could find out that this house was intact, without seeing it, I ought to be able to find out if a given line of experiment will turn up what I want, without trying it. All I have to do is pull for it to work, and if the crater-stone warms up—"

They came to the place where the fish-trap was. A dam a hundred feet wide held back a small brisk mountain stream and made a pond all of half a mile long. Steve had put a distinctly unethical fish-trap in it, which every day produced perch and trout sufficient for their needs.

In odd spots, too, he had tiny crops growing. The looters had taken everything they could use, and doubtless intended to spoil the rest, but spilled corn-grains remained for Steve to plant in little clumps of no more than half a dozen stalks at any one place.

In the looted pantry, too, there had been some rotted vegetables. Tomato-seeds were salvageable from a dried-up mess on the floor. With electric power for warmth, and a snug house, Steve planned to move some plants indoors and have food during the cold weather by hot-house cultivation.

He fumbled in the fish-trap and hauled out a good-sized trout by the gills. He reached in again, trying to corner another of the wildly darting, imprisoned creatures.

"I'm a half-wit!" he repeated bitterly. "Of course I can duplicate what the crater-stones do. I can practically make them tell me how. I can work out a line of research

and see if the answer's there by pulling for it to turn up. If it can, the crater-stone will warm up and make it sure I'll find it. Oh, I'm an imbecile!"

**H**E STRAIGHTENED up, and Frances raised one hand. She had turned her head and was listening with a desperate concentration. She was a little bit pale.

Steve froze. He listened, too. Then he quietly put down the still-flapping fish and drew his revolver. Both of them, then, waited very tensely.

Two hundred yards away, a head appeared. There was a blood-stained bandage about it. It was unshaven and haggard. A second head. A third. They stared at the house. They conferred. Three men broke cover and ran stealthily toward it, but dragging their feet as if at the last gasp of exhaustion.

One of the men carried a shotgun. Another carried a six-foot bow. The third had an unwieldy contrivance which, at a guess, was a cross-bow made with automobile-spring leaves to hurl its bolt. All three men were ragged. Each had been wounded and bandaged and wounded again. They ran heavily toward the house, dodging exhaustively behind trees to cover their advance.

"Hello, there!" Steve called sharply.

Frances started a little and unconsciously moved closer to him. The three stopped as if shot. They wheeled. Then they came toward Steve. The man with the shotgun held it ominously ready. The man with the bow had an arrow to the string. The cross-bowman had the wire cord of his contrivance drawn back, and doubtless a bolt ready in the groove. But as they came closer to Steve, they bunched as for mutual support. They moved with the air not so much of menace as of desperation.

"The devil!" said Steve, looking from one to another of them. "You're honest men. Wonders will never cease."

"Sure we're honest men," one of the three said in a choked voice. "How many cutthroats have you got hidden, you that stand there and laugh at us!"

"No cutthroats," said Steve. His eyes narrowed suddenly. "You're scouts, eh? Going on ahead to try to find—"

Very, very thin and far away, a high-pitched yell came through the bright morning sunshine. After it came the muted, distant sound of a shot. The three men turned their heads from Steve to that sound. One

of them sobbed.

"Blast 'em! Oh, blast 'em! Come on, let's get killed!"

He whirled.

"What's that?" Steve snapped. "Your rear-guard? How many of you?"

"Fifteen men and the women and kids," the bearded man with the shotgun said heavily. "There's a gang of guerillas been chasin' us four days. They got near half of us. Now they'll get the rest."

He turned drearily to go where a thin, shrill, triumphant howling rose. There were two more shots. The bearded man's face worked.

"Get the women in the house," said Steve fiercely. "It's stone. They can't burn you out. We'll hold 'em off there."

"What with?" panted the crossbowman, despairingly. "Might as well get killed right off."

"Come along, Frances!" said Steve angrily. "We'll find the women, whoever they are. You lead 'em to the house and barricade the doors and windows. I'll take the men and we'll see what the crater-stones can do."

He was already running with her, hand in hand, in the wake of the three wierdly assorted individuals who now toiled exhaustively toward a confused and intermittent sound of battle.

Where they ran all was quietude and peace—a bright summer sun drenched trees and grass and weeds with shimmering golden light. The small valley below the house, and the forests which covered the hillsides, were empty of any sign of life save the green things themselves. Insects sounded everywhere in the bland and warmth-intoxicated shrilling of midsummer. Somewhere a bob-white quail called tranquilly.

But a man's death-shriek came faintly from far away. There was another shot in the distance. Steve and Frances dived into the trees after the drearily running trio they had intercepted.

"What can you do with the crater-stones?" asked Frances, between panting breaths.

"I don't know," grunted Steve, pounding on. "But they're honest folk, those three. They bunched when they came close to us instead of spreading out. If they've got women with them, they're what the guerillas are after. The worst of it is, there'll be somebody with a pocket radio among the guerillas, most likely. There was in the gang I met, once upon a time."

Yells—far ahead, but nearer than they had been. They saw a scared, flurried movement in the underbrush. Women.

"You mean—if we help beat off—the guerillas," panted Frances, "the—people with planes and bombs will—bomb us?"

"That's the idea," Steve growled. "Take the women to the house and barricade it! I'll be back."

"Be careful!" she called desperately after him. "Please be careful!"

But he was gone, diving through brush-wood, jumping fallen tree-trunks, running through thick woods toward an inchoate, spasmodic tumult in which men fought like beasts and some died quite otherwise. There were two sides in that battle. Steve was known to neither. Each was likely to think he belonged to the other side.

## CHAPTER IX

### *Besieged*

**N**IGHTFALL descended and the battered, oak-beamed living room of the house was very dark. Children slept in the abandon of absolute exhaustion close by it. There were other figures lying on the floor. Women tended some of those figures. There were three women with babies, which they held tightly in their arms. Some men squatted against the wall, crude weapons at hand, drooping in utter weariness.

Frances found Steve peering from an upper window. There was a great fire burning a hundred and fifty yards down hill. There were figures about it. There was yapping talk coming from the fireside.

"My guess," said Steve, growling, "is that somebody's trying to talk them into making a rush and they haven't much stomach for it. We did plenty of damage in those woods!"

"I saw you were safe," said Frances uneasily. "But I've been trying to help the women, and some of the men are wounded. I was so afraid the people you were trying to help would kill you."

"I was pulling they wouldn't," said Steve drily. "And there was a shaving-kit in those suitcases, remember. I was shaved. To our friends that meant I was civilized. The guerillas don't bother."

Frances peered out the window toward the leaping flames. At least, she seemed to.

Actually, it was an excuse for being com-fortingly close to Steve for a moment.

"Do you think they'll try to storm the house?"

"Probably," said Steve reflectively. "It's a long arrow-shot to the fire. But maybe the crossbow could reach it. Get that chap with the crossbow, Frances. Tell him to come up here. And whoever has the strongest bow."

"But—Steve! You told Lucky and me that you warned some people once that the guerillas were coming, and they beat off the guerillas, and—bombs fell and wiped them out."

"Yes," said Steve curtly. "Guerillas and looters are wiping out the last traces of civilization, and so long as they're winning, the people with planes and bombs don't interfere. But if anybody is strong enough to stand off looters, somebody among the looters talks into a pocket radio and a plane takes care of the situation. Economical! How to destroy a civilization: give bandits a free hand and use bombs only where decency is able to defend itself! Go get that cross-bowman and somebody with a strong bow, won't you?"

She hesitated, and he kissed her, there in the darkness by the open window.

"We're chaperoned, now," he said drily. "Go on!"

She went away, feeling her way down the unlighted steps to the great living room with its feeble flickering ruddy light. When she came back, two of the fugitives came with her.

"The guerillas are holding a council of war, down by the fire there," Steve told them. "They're working out plans for storming the house. Can you drop an arrow or two or a bolt or two among them?"

"I ain't a expert," the bowman said wearily. "I made a bow and arrows because there wasn't anything else to shoot with."

"And as for me, I thought this crossbow would be good," the crossbowman admitted. "And I did get a couple of guerillas. But I'm no sharpshooter."

"Try it just the same," Steve urged. "Just let the thing fly high and fall near the fire. I guarantee results."

Frances caught her breath. He could. An arrow shot into the air, however inexpertly aimed to fall among the men about the camp-fire, would have one chance in a thousand or two of striking one of the figures. And if one had a crater-stone which controlled chance,

that one-in-a-thousand chance was the only one which could happen.

The Bowman loosed an arrow, aimed high and pulled all the way back. There was a long, long wait. Then a sudden startled hubbub about the fire.

"It hit," said Steve. "Now you two, take turns and let off as many as you can as fast as you can. I think you'll be lucky."

The crossbowman loosed a bolt. The Bowman, another arrow. The crossbowman again. The archer. Yells and screams and howls of fury came from the fire circle.

There was no suspicion that the missiles came from the house. The fire was too accurate and too deadly. The guerillas thought they were being ambushed from the woods and undergrowth. They dived away from the fire and sought their attackers. They found—sometimes—each other.

**A** HALF hour later there was a lurid red glow over a hilltop, and Steve raged impotently.

"They've fired the generator-shack!" he told Frances bitterly. "And I'd figured we'd start using electricity in a day or two. Maybe they'll wreck the dam."

He stood irresolute a moment, and then fury got the best of him.

"I'm going out," he said savagely. "I'm safe enough; we've got a date for five years from now, with Lucky."

"We'll—be together in five years," said Frances shakily, "but we won't necessarily be alive, Steve! If anything happens to you—"

"Use the crater-stone," he told her. "I'm going out!"

He went downstairs, still raging. He summoned two of the newcomers and had them stand guard by a repaired, battered door—with no faintest light behind it—while he opened it silently and slipped out into the darkness.

Despite his fury, he was cautious. He lay close behind the wall for a long time. He heard no sounds which were not obviously natural. No one massed for an attack, certainly. After a long time he moved away from the building. He found nothing, save one groaning figure which he avoided.

An hour after his first emergence, he heard a low muttering sound. He trailed it, moving with infinite caution. He knew the ground about the house now, and he was able to progress with Indianlike silence.

He found a man. One man, alone. That one man muttered quietly, and stopped as if listening for a reply, and muttered again. He was not speaking English. Steve could not hear the syllables clearly enough to tell what the language was, but he knew that it was not English.

There was a surge of frenzied hatred which swept over him. Then he lay still. Very still. He waited until the conversation was ended. There was a tiny clicking sound, and then a stirring where the talk had been. A man moved away. One man only.

Steve let him get well on ahead, and then trailed. A mile on, he grew deliberately careless. He limped. He crashed through bushes. He made whimpering noises to himself. He heard the sounds of the other man's progress stop. He blundered on, moaning a little, and limping more markedly than before.

Then he heard a thrashing. He snarled in a high-pitched, scared tone:

"Who's that?"

"Me," said a voice in the darkness, somehow amused. "You hurt?"

"Yeah!" snarled Steve.

He seemed to stumble and pitch headlong. The other man came to him as he rolled and grumbled. Steve got his legs under him. He was crouched when the other figure loomed over him. He rose, and the little foil struck aside a branch and slid into flesh with the curious sliding resistance Steve had learned to know.

Three minutes later he had found a small instrument which could be concealed under a man's armpit. He reflected with some grimness that the discovery justified his unwarned attack, which would have been assassination under other circumstances. But atomic war allowed of no ethics at all.

This man had been with the guerilla band. He'd lingered after his fellows fled. They thought they were attacked by deadly figures from the wood. They could not imagine, of course, that arrows and crossbow bolts could be shot with such absolute accuracy from the house. The chances against every missile finding its target would have been too great to believe in, and they knew of no solution to the paradox of the indeterminate. So the guerillas had fled into the darkness, seeing enemies behind every tree-trunk, and frequently finding them.

Only this man had remained until all was



quiet, and then he'd fired the dynamo-shed as a minor blow, and later still he'd used this pocket microwave transmitter. He was a spy for the people with planes and bombs, guiding guerillas to loot and burn and kill, so that any trace of human life above the savage stage would be eradicated.

The burning question was, would he have reported a defense by people civilized enough to need bombing, or on a strictly barbaric level? Would he have reported the attackers from the dark as another band of guerillas who would undoubtedly carry out the mission the defeated looters had in mind?

**B**ACK at the house, Steve consulted with Frances. He showed her the little transmitter and no less than two automatic pistols and a precious store of cartridges he'd found on the spy's body.

"They were routed with arrows," he told her, frowning. "They also thought they were finding enemies all over the woods, though they were actually fighting each other. The logical thing for him to report would be that his gang ran into another, which chased his gang off to do the murdering and raping his mob planned, themselves. But I think

[Turn page]

we'd better move away eight or ten miles for a week or so, just in case this house is bombed."

Frances shook her head.

"We can't do it, Steve. One of the babies is sick. Desperately sick. And two of the men couldn't walk ten miles. All of them are completely worn out. They just can't go any farther! They've been fighting a rear-guard action for four days already. They're exhausted. So—I used my crater-stone. I pulled for it that the baby'd get well and be playing in the sun in front of the house day after tomorrow. And the crater-stone warmed."

Steve considered.

"Then it will happen. Crazy, isn't it? If the baby can play in front of the house day after tomorrow, there can't be a bombing. Evidently it's on the dice that we can escape for awhile, and the possibilities which would prevent it are blocked off now. But I wish you wouldn't use those things, Frances! They must be radioactive when they warm up. So I've got to figure out a way to do what they do, without them."

"I wish you could, Steve. If I could understand, it wouldn't seem so much like magic."

He ran his hand through his hair, in exasperation.

"But it's not magic. It's physics! It's no more magic than radar. If you'd read all the way through my copybooks you'd understand it perfectly. It's simply forced resonance. We picture something in our minds and the crater-stone amplifies it, and the happening we imagine—if it exists in a possible future—gets charged up with that extra energy, and the equilibrium of things in general can only be restored by that thing happening. That's all. It's perfectly simple."

He looked longingly at the tiny microwave set.

"I'd like to look this thing over, but I need good light and it's hours until dawn. Go get some sleep."

Himself, he went out again and to the still-glowing embers of the generator-house by the dam. The dynamo was ruined. The reek of scorched insulation mingled with the stinging smell of smouldering wood. Steve was too disheartened to try to quench the embers with water from the pond.

"We're savages," he told himself savagely. "We fight with bows and arrows. We've no lamps—not even candles—and our only light is an open fire. Those crater-stones are

simply freaks. Maybe Frances and I can keep going with them, but we can't build up a civilization with a few hunks of accidental mineral. Now we've a pack of refugees on our hands and we can't feed them, and the electricity I figured I could tinker with has gone to the devil!"

He heard his own voice, complaining and querulous. He stopped.

"Maybe I'd better go out and cut my throat," he said wryly. "I'll cart some fish back to the house and poke into that radio set as soon as it's light."

He did. There was no point in trying to capture individual fish. He hauled the whole trap out of the water and slung it over his shoulder. One of the younger fugitives had been sent scouting. He helped Steve bear the load. Steve had noticed the boy—a gangling youngster of sixteen or thereabouts.

"Bob," said Steve. "Do you know anything about electricity?"

"I had a television set," the boy told him awkwardly. "I put it together myself, and it worked."

"M-mmm," Steve began. "There's a generator up by the dam at the end of the pond. It did make electricity to light and heat the house. Those fellows last night burned down its shed. It looks like it's ruined, but maybe some of the inner layers of wire can be salvaged and we can rewind it by hand. Want to take a look at it?"

"Yes, sir!" The boy's face lighted up.

"Go to it, then," said Steve.

**W**HEN he reached the house, dawn-light was beginning, to the east. He turned over the fish to a competent-looking young farmer, on sentry duty near the house. And Frances had not gone to sleep. She was watching for him. She slipped her hand into his.

"You seemed so uneasy, Steve, when you went out. Do you feel better now?"

"Outside of various problems," he said drily, "such as how to find food for all these people, and how to make a ruined generator generate electricity, and how—without information or equipment—to make something that will do what the crater-stones do so we can understand 'em and make the most of them, and how to keep guerillas away without being suspected of holding on to the de-cencies of life."

He almost ran out of breath.

"In short, outside of feeling that there's not much use in trying, I'm all right."

She bent close and whispered in his ear.

"Thanks," he said moodily. "The feeling is mutual. But I insist that until I'm something more than a witch doctor doing mumbo-jumbo with magic stones, until I'm a civilized man again— Oh, blast it!" Then he said abruptly, "The light's good enough. I'm going to look at that pocket radio."

She ran indoors and brought it to him. He regarded it sourly.

"Only a spy should ever see this. So just possibly, in case a spy was killed by accident, they might have tricked it up. I'll be a little bit cagey."

He moved a hundred feet away. He worked busily, while she watched him. Presently there was a sharp popping sound and she gasped. But he waved his hand reassuringly. After a few moments he came back.

"Thorough, systematic people, our friends with planes and bombs! If you open this thing the obvious way, it explodes. I cut it open from the back, so it didn't. That popping you heard was the detonator-cap, after I'd taken out the explosive."

He spread out the opened small contrivance. There were tiny, almost microscopic radio-tubes. There were infinitesimal conductors and inductances. A minute battery. And there were two dials beside the midget microphone and miniature speaker.

He regarded it for a long time.

"Nice," he said at last, ironically. "Wonderfully nice. It's a microwave set. If a plane's high enough in the stratosphere, this can contact it even several hundred miles away. They beam the microwaves by using the foil speaker-cone as a reflector. Look! This dial is set to a fixed frequency. It points to the source of a signal of that frequency only. The odds are that it's to enable spies to get into touch with each other on the ground and cooperate in their deviltry. Pretty, eh?"

"This dial points toward any other electrical disturbance. If we had that dynamo running, any spy could get a line on it. Or any internal-combustion engine could be spotted or anything at all that made a spark now and then. A good way to locate any small oasis of civilization, eh?"

"If we had electric lights or current or even used a flashlight, sooner or later some spy would be led to us with absolute certainty, either to bring guerillas to wipe us out, or to arrange for bombs."

He stopped and laughed without mirth.

"You see how that changes the picture, don't you? If we use electricity in any form we'll be spotted. If we're spotted we'll be destroyed. If we defend ourselves against looters, we'll be bombed. If we don't, we'll be killed.

"If we hang on without trying to keep anything of civilization, we'll forget it all. If we even try to be decent, we'll be hunted down by all the scum of the earth, aided by every technical device that ingenuity can contrive! Isn't it a picture, now? What price crater-stones against that set-up, Frances? Want to go out with me now and let's cut our throats?"

## CHAPTER X

### *Stalemated*

**I**N ALL there had been twenty-two men originally, and eighteen women, and almost as many children ranging from babies in arms to Bob, the television enthusiast who had helped Steve carry the fish. The day before there had been fifteen men left. Today there were eleven. And of the eighteen women only twelve remained.

In their hearts burned hatred so terrible that it was a corrosive hurt. The hatred was for guerillas, of course, but also it was directed against those unknown, unseen, unidentifiable people who had aeroplanes and atomic bombs.

The refugees knew that there was a link between the guerillas and the bombs. Wherever honest folk fought to hold to everything that separated men from animals, looters turned up to destroy them. If the looters failed, bombs came screaming down from seemingly empty sky.

Perhaps not all the guerillas knew of the link. Perhaps only chosen, talented leaders had this cooperation. There was no need to encourage most looters. There are always some people who seize upon any catastrophe to behave as beasts, and in the atomic war it was an advantage to be a beast. Honest men tended to group together for mutual aid and protection.

But under the conditions of atomic war, such assemblages only made more vulnerable targets for bombs, or objectives for guerilla raids. And surely there was de-

tailed information given somehow to make murder and rapine the easier. Leaders had sprung up with intuitive knowledge of spots where food and victims for amusing brutality could be found. Steve now had evidence that their intuition came in small instruments, in microwave communication sets.

The people now tacitly accepting his leadership had come to the same conclusion without his definite evidence. They had been a group of farmers and their families, closely knit by blood-ties, who had not followed the common urge of normal folk.

They had been fiercely independent and their small holdings were remote from the rich lands the looters preyed on at first. They were watchful. They were prudent. They closed ranks when the world collapsed about them, and tried to go on sturdily as before. Their houses were close together, but did not form a village. For a long time they escaped notice. But they used ploughs, and ploughed land shows up clearly in air-photographs.

A single ragged wanderer appeared, begging food. They gave it to him, and now bitterly regretted that they did not kill him with torture, instead. Because he went away, vowing gratitude, and two weeks later looters converged upon their community from three directions.

Watchfulness prevented surprise. The farmers grimly conceded to themselves that they could not fight all three bands. They attacked one, furiously, and almost wiped it out. They acquired fresh arms and attacked the second looting band with even greater success. The third retreated precipitately, and then bombs fell from the sky and their farms were wiped out.

Their families should have been wiped out too, but the men had moved their women and children to hiding, in case they failed in battle. But now they put two and two together. The bombs and the looting bands were too closely connected to be accidental. In any case they had nothing left but themselves and a few head of livestock.

They'd started a desperate migration for some other isolated place where—they vowed—no hungry stranger would ever fail to be killed immediately. But their animals left a broad trail. They were sniped at because the animals were food. They were ambushed because they had women with them. Word seemed to pass in every direction ahead of them. Their progress became a running,

hopeless fight.

Their last animal had been lost four days before. When Steve sighted their advance-guard—only three men and only one gun among them—they were at the limit of their endurance.

When Steve held a council of war with them, the signs of their ordeal were plain.

"We can write ourselves off as dead and sit down and die," he told the men cynically. "Quite likely that will be the end of it, anyhow. But there's a chance for us to do some damage first. And there's been through all history an odd series of events that may be more promising than it sounds. Everything that's ever turned up to harm humanity has ultimately been tamed and put to use.

"Men were probably as afraid of fire, a million years ago, as wild animals are now. But they tamed it. Men were deadly afraid of gunpowder. It killed enough people! But they tamed it and used it for blasting coal and metal ores, and made roads and tunnels, and they converted cannon into internal combustion engines, and in the long run explosives did more good than the harm they'd caused.

"Even lightning was terrible, once, until it was tamed and made electric lights and television and so on. Everything that ever killed men has sooner or later been tamed. But atom bombs have seemed different."

**T**HERE was a growling noise. For three hundred miles they'd fought their way through human beasts the atom bombs had made best able to survive. They hated the beasts, and they hated atom bombs and those who used them.

"There's just one chance, and it's a slim one," Steve said, more cynically than before. "Lucky Connors found something that atom bombs make, which may mean their taming if we can work it out."

He explained, as simply as he could, what the crater-stones were and what they did. He met blank incomprehension. He tried again, and ran against the same inability to understand.

"They make accidents happen the way we want them to," he said helplessly. "Look here! All of you take pencils, or get some charcoal from the fireplace. Each of you write down a number, without consulting anybody else. Any number. Up in the millions if you like. I'll use a crater-stone to make you happen, by accident, all to write

the same number."

There was skepticism and impatience. But one man wrote, and another, and another. Then one man showed his number to another. It was 397546872. The second man displayed his. It was the same. A third man. A fourth. A fifth.

But it seemed like a conjuring trick, of no importance.

"Then we'll go outside," said Steve, when he saw their impatience, tinged with unease. "Somebody bring a bow and arrow."

He made a mark a good hundred yards away. Behind a tree. He had the bowman shoot over the tree. It hit the mark. Again and again and again.

"Call it a lucky stone if you like," said Steve angrily, when cold eyes turned toward him. "Go look around the fire where those looters were last night. Every bolt and arrow fired from the house hit one of them! There'll be dead men down there, and you'll be glad they're dead. And there are other dead men in the brush, here and there."

Three of the men stayed, watching Steve dubiously while the others went down to see. There were shouts. The men downhill beckoned to those about the house. All went to look. One heavily bearded man stood clenching and unclenching his hands above a body.

When Steve drew near, he turned and spoke in a choked voice.

"This man killed my son in the fightin' a week ago," the farmer said. "I saw't. I don't know how you got him killed, whether by witchin' or what, but I don't care if the devil done it so it's done! And after all, we're alive because of you. We'll listen again and try to understand, even if it's witchin'."

There were eight bodies beside the burned-out fire. Three of them had guns. Two had pistols. There was other booty.

"Better go back to the house," said Steve to Frances in a low tone. She hesitated, then walked to a discreet distance, where she waited.

The slain were stripped. Clothes were precious.

"They fought each other in the dark, too," Steve observed coldly. "There should be some more bodies. We may pick up more guns. We'd better look."

They did look. They went back to the ruins of the generator plant and searched, and found nothing except a dagger which Steve picked up. Every additional weapon

was valuable. One farmer stayed close to Steve, as he threaded his way through the rubble. Frances followed and stood near a shattered fountain while the hunt was going on. She gave a sigh of relief when the explorations were finished.

Steve returned to the house with the men. They felt doggedly satisfied. Some were asking questions. Clumsy, groping questions. What Steve had to say in the way of explanation went counter to everything that had been their normal way of thought—as it had, in a sense, been unusual to him.

But at least Steve's methods, however inexplicable, passed the pragmatic test. They worked. There were nine new firearms in their possession. They credited the gain to Steve. And there were two men, in particular, who pressed him with desperate queries such as men only ask when prepared to believe anything if belief will allow them to hope. As they went into the house, Frances heard him say doubtfully:

"We'll try it and see."

They ate, mostly of fish. Afterward, Steve and the two men went off alone. Then the two men came back, borrowed extra cartridges, and plunged into the woodland back along the line of their flight. And Steve stood frowning in a harassed way after them.

"What is it, Steve?" Frances asked.

"Two women and a couple of children whom everybody believes dead or worse," he answered. "They must be hiding out somewhere back yonder. These men wanted to know if I could work a miracle. I said no. They asked if I could help get anybody who might be alive but separated from them, found and brought back here. I said maybe."

**F**RANCES was puzzled. She looked at Steve.

"What did you do?" she asked.

"I just tried to find out what's in the pattern of possible futures," Steve explained. "I pulled that the two men should find the missing members of their party. The crater-stone warmed. It was possible, and it was sure. I pulled that they'd find them the first day. That wasn't on the dice. The second day. It was. Then I tried this and that, trying to fumble out how they could find them, by whether the crater-stone warmed up or not. Actually, I was playing hot-and-cold, the kid's game. They've gone off. And they'll find two women and at least two kids and bring them back, and then they'll think I'm a

spiritualist medium or something! Maybe they'll want to build a church around me! And doggone it, I don't like the idea of pulling off miracles and finding lost people and junk like that. It's—phony!"

"Then why not make an understandable contrivance that will do what the stones do, and explain how it works?"

"If I use electricity, a spy will pick up the radiation," said Steve bitterly. "If a spy doesn't, a plane up in the stratosphere will! Electricity means civilization, and civilization means bombs. I'm going out of my head, Frances! Up to now, people have excluded chance from all scientific work. They had to! If your results could have come by accident, they were no good, because you couldn't repeat them. But now we've only to ensure that chance *can* produce a given result to get it every time. I've got to experiment with this stuff, Frances. I've got to! But if I try anything at all I'll bring a bomb."

The sixteen-year-old Bob came to him, bashfully but with his eyes alight.

"I can fix the dynamo in two days, sir," he said triumphantly. "Only two or three layers of wire were ruined. Shall I start?"

"No, Bob," said Steve gloomily. "I'm licked. We daren't use the dynamo. It's luck we never tried. But—look here! I feel sort of humble. I'm a trained physicist and my mind runs in a groove. I got out of it once, but apparently I'm back. You aren't old enough to think in ruts, yet. Let me tell you my troubles. I'll see if you can suggest something."

Frances went away and left him talking to Bob, who was sixteen years old and had once made a television set which worked. Steve had diagnosed his difficulty quite clearly. He had been trained to think in a specific fashion, and the crater-stones called for a different sort of thinking altogether.

All the experiments of physical research had always been designed to exclude, rigidly, the element of chance. Accident was anathema in a well-conducted physics laboratory. Even Steve's painstaking inquiry into the paradox of the indeterminate had come about because physics, as an exact science, had reached a stage of delicate measurement in which indeterminacy—chance—turned up in spite of all efforts.

Steve's treatise had been begun, in fact, in the vague hope of finding some way to eliminate chance in the behavior of even

small numbers of electrons or other particles.

But the crater-stones did not eliminate chance. They controlled it. And Steve could not reserve his entire professional habit of thought overnight to take full advantage.

So he talked to the boy, Bob, quite humbly, because the boy would understand more than most adults and might be able to do a mental about-face more quickly than Steve himself.

Two hours later. Steve walked into the house where Frances helped a mother with a sick baby. He picked Frances up, lifted her off her feet, and kissed her exuberantly.

"We've got it!" he told her explosively.

While men and women stared at him blankly, he kissed Frances soundly again, and marched triumphantly out of the house once more. His voice rose out-of-doors, calling for the sixteen-year-old Bob.

## CHAPTER XI

### *New Science*

**L**ESS than two days later, Steve turned on the electric lights in the house. An hour afterward, he had turned on the electric heating-units in ducts behind the walls, so that the house became warm and dry, and the slight mustiness of the air—as a result of the building having been so long untenanted and unaired—began to lessen.

Before the day was over, he had drawn up plans for beds of humus in the attic upstairs. He would put lights and heating-elements in the attic and use it as a hot-house in which to grow food all winter.

There would be roofed-over sheds in the nearby woods, built under cover of the green leaves, which by the time of bare branches would be indistinguishable from the ground around them. They also would be warmed and lighted and would grow food. There would be an underground passage from the house to the wood—dug as a ditch, at night, and roofed over as it was dug before dawn of every day so its construction could not be seen from aloft—which would prevent a trail from being made about the building.

The boy Bob worked with absorption and intense authority, supervising all electrical work. The dynamo would not be used as a generator. An easier method had been found.

Steve, himself, vanished from view. He had taken a small room for his own work, despite the crowding of the building by all the newcomers. In it he labored extravagantly with utterly improbable materials—stray nails from the burned-out dynamo-shed, and salvaged wire from the damaged dynamo, and even bottles from what had been the garbage-disposal area of the house's former occupants.

Time passed and his labors grew with them. He became bright-eyed and feverish. Sometimes he stopped and held his head in his hands.

Frances heard him talking to Bob when—days later—she went to insist that he eat something.

"Faraday founded a science in three days of experiment," said Steve, "and Fleming remade a science when he stopped to notice what bread-mould had done before he heaved a tray of agar-agar into the trash-can. You and I, Bob, are trying to found an entire new civilization in a couple of weeks, and it's just crazy enough to make my head ache from time to time. I could do with about a month's sleep right now."

Frances produced a tray of food and insisted that he eat.

"If food will keep me awake, I'll eat anything," said Steve dizzily. "By the way, how is the food situation?"

"We'll do," said Frances evasively.

He shook his head, as if to clear it, and looked at her sharply.

"My dear, I think you're lying. When did you eat last, and what was it?"

He stormed when he found out that she had tried to give him all the food she would normally have, herself, in a day. It was inevitable, of course, that nearly thirty people encamped in the house made food supplies short. There were fish in the pond, to be sure. There were some rabbits and small game in the woods. And the women—after due scouting by the men—did gather occasional mushrooms and hickory-nuts and other edible wild things.

But there were not animals enough for the party to support itself by hunting, even if they'd had ammunition to spare, and there were no crops to be gleaned. Nothing had been planted anywhere this year, save in isolated communities like the one these folk had come from.

"The answer is that I am an ass," said Steve. "I've been doing research when I

should have been applying what I found out day before yesterday. I've been working out schemes instead of keeping the pantry filled. If Bob, here, will put together a few wires. . . ."

He had worked too hard. As long as he kept going, he was all right, but once he stopped and tried to turn to something else, exhaustion overcame him. He tried to sketch what he had in mind, but he yawned uncontrollably in the middle. But the boy Bob leaned over his shoulder.

"I think I get it, sir," he said anxiously. "Let me try making it?"

"Go ahead, Bob. A-a-ugh! Put it together and I'll charge the generator-wires with the crater-stone and we'll have something to eat. . . ."

**T**HE last of his words slurred. His eyes closed. He was asleep. In his absorption in the experimental work in hand, he'd gone far beyond the stage of being worn out. He slept like a log, and Frances watched jealously over him, even when the boy came anxiously and would have waked him for additional needed directions.

He slept for eighteen hours straight while Frances guarded his rest. But she had dozed off, herself, when he waked. She felt his eyes upon her, and started up. She smiled at him.

"You want something, Steve?"

He did not seem inclined to stir.

"N-no," he said slowly. "I'm rested now. I've been awake for some time. I've been watching you. You've had a rotten deal, Frances."

"I'm doing all right. Everything's all right. You remember the baby that was sick? It played outdoors yesterday."

He shook his head.

"I think I'm a nut. I drag you about the country until I find a place for you to stay in relative safety. Then I drag in thirty assorted people to increase your danger, and you go on short rations while I spend all my time puttering and seem to forget you.

"Next you try to make me eat the food you should have yourself, and I raise Cain and go off to sleep in the middle of everything, still without seeing that you've enough to eat. And then you sit up by me in case I want something. You have had a rotten deal from me."

"I'd have been dead, and very horribly, but for you, Steve," she said quietly. "I was

half-starved when I met you, and it's only been the past couple of days that we've been on rations. And I'd been hiding from looters in sheds and under leaves and—everywhere, and now I live in a house which has electric lights and books, and there are people around me that I'm not afraid of. And sometimes you actually notice me, Steve." She smiled at him, her eyes crinkled. "Actually, you sometimes notice me! I'll do."

He sat up and grabbed at her arm.

"Notice you? What the devil do you think I'm working for? Why do you think I want to have safety and civilization and decency back in the world again?"

"I couldn't guess," she said with an air of breathless interest. "Do tell me, Steve! Why?"

He seized her in exasperation, and she smiled at him again, and he kissed her. And they sat on the floor together, with his arm about her shoulders, and she looked perfectly contented. Even when, some ten minutes later, he was saying absordedly:

"The kid pointed out that extremely short waves won't go around sharp corners and can't travel through water. So we fixed our switches so they give off nothing but extremely short stuff when they are opened and closed, and surrounded them with water. Not too tricky, you notice. I can't help thinking as I was trained to. The children in this gang will run rings around me as scientists when they're a bit older, with the new stuff that's bound to come."

Frances listened, but she looked most often at Steve's hand, tightly holding her own. He went on zestfully:

"With the trick of exploring the pattern of possible futures, and finding out what's possible and what isn't, it actually took me only two hours to work out a gadget to do everything the crater-stones will do.

"I can put any amount of power into it. But I needed electricity to try it, and the dynamo was a wreck. So the kid came up with an idea. One of the most annoying effects of indeterminacy is the shot effect, the thermal noises you get in high-gain electronic equipment."

Frances didn't understand but she didn't let Steve know it.

"How can the difficulty be overcome?" she asked.

"Free electrons, roaming around in a wire, by pure accident sometimes pile up at

one end," Steve went on. "When they do, that's an electric current. The kid said those currents are accidents and could I make them when I wanted to. And that was all I needed. Of course I could! I took a bit of wire and used the crater-stone. All the electrons in it could only move toward one end, as if Clerk Maxwell's demons were on the job. Of course, that cooled off the wire. And of course it gave a current!"

**H**E LOOKED at her triumphantly.

"Then I wondered if that accidental condition could be made permanent, and it could. After I've treated a bit of wire, the electrons can only travel in one direction in it, and so they do. They pile up, new free electrons form where they came from, and we have power, the wire gets cold and absorbs more heat to produce more electricity, and it's a D.C. generator with no moving parts, that needs no fuel, and that will keep on working till the cows come home. We'll never worry about fuel any more. We can run machines and automobiles and ships and airplanes on heat we take out of the air. Sunpower, when you think of it. That's a good first step toward a new civilization."

Frances smiled warmly at him. He freed her hand to gesticulate.

"I was working then with electrons. I tried it next with molecules. They have random motions because of heat. It's more pronounced in gases and liquids, but it's always there. When I was able to make all the molecules in a glass of water try to move in the same direction at the same time, I knew I had the next big thing lined up. I was trying to fix some iron the same way when you came in to try to make me eat."

Then Steve stopped short and looked at her. His expression became one of intense self-disgust.

"Lord! Frances! Here I'm talking rot instead of going after grub for you! Why do you stay here and listen, anyway?"

"I thought," said Frances ingenuously, "that maybe when you got through you might kiss me again."

They went out of the laboratory some ten minutes later, with Frances smiling contentedly and patting her hair back into place.

"And we're both hungry," Steve said to her, marveling. "It must be love!"

They were laughing when they went in search of Bob, the boy. He had labored magnificently, but his creation looked like



nothing that had ever been before on earth, or in the heavens above or the waters under the earth. It was an incredibly intricate arrangement of bits of second-hand wire and salvaged bottles from the former trash-dump. Some of the bottles were filled with liquid and had wires inserted in them, but others seemed completely empty save for wires which had no apparent purpose.

"These are our jewels, I think," said Steve. "I'll check it over and get some of our whiskered allies to work it. Since Bob, here, made it, they may not think I'm a witch if it works. But they'll keep him busy for the next month or so explaining it to them."

He verified the meanderings of wires which were definitely not in any circuit which could be classed as electronic. It was something completely new, and it looked insane.

"A good job, Bob. Let's show it to the others."

The boy gulped, and ran. In minutes the others came to see. The boy stood back, trembling with excitement.

Steve smiled at the men who still regarded him with a mixture of faith and dark suspicion.

"This is a machine to cause accidental happenings," he said. "Our young friend Bob made it. He'll explain to you how it works. There are all sorts of accidents. Some are good ones and some are bad. This is supposed to cause good ones." He pointed to the bearded man who had been first to say that even if Steve had defeated the late looters with the devil's aid he was glad of it. "You, there! If you'll take hold of those two handles and think of what we need to have happen, I believe you'll get your wish."

The bearded man stepped forward. His

face contorted with sudden terrific emotion. He held the handles.

Nothing happened.

Steve touched his shoulder and he stepped back.

"I wished," said the bearded man fiercely, "that every murderer and looter in the world should drop dead, and every man who had anything to do with the bombs!"

"I'm afraid our gadget isn't up to anything on so large a scale," said Steve drily. "We'll have to be a bit more modest. That couldn't happen by accident. It couldn't happen by chance."

The boy whispered to Steve.

"But it works, sir! I tried it. I—pulled for it that some day I'll know as much as you do, and the wires glowed!"

STEVE looked at him, and could make no comment. He turned to the other men.

"Somebody pull for something that's simply improbable," he suggested curtly. "I want you people to realize that this is simply machinery but that it does produce a definite result."

A younger man took the two handles. One of the bottles with wires and liquid suddenly bubbled. The wire seemed to grow incandescent under the liquid. It stayed that way. Another wire, exposed to air, glistened wetly. The wetness clouded. The wire covered with frost. Then, gradually, the incandescence died away. The young man, a little bit frightened, let go of the handles.

"We're all on short rations," he explained apologetically. "I wished the snares we've got in the woods will get filled up so we'll all have a good supper."

"That is what science is for!" said Steve approvingly. "Right now, anyhow. Let's

[Turn page]

see what we see."

An hour later the men began to come back from their round of the snares. They had more than twenty rabbits, two ruffed grouse, and a partridge. Steve nodded in satisfaction.

"I guess we can keep game coming in to feed us," he told Frances. "But we've got to be careful, at that. If there's a migration of game this way, there'll be people following it. We'll have to go in for wild-fowl, instead of ground-game. Say, a dozen or so ducks or geese or whatnot to land on the pond each day.

"Somehow too, we've got to get vegetables, and some iron and stuff to work with." He sighed. "I'm not going to feel comfortable, though, until we've got some kind of a defense against atomic bombs and attacks by the guerillas who might be sent to hunt us down."

"I wish you had more time to be with me, Steve," Frances said wistfully.

"I wish that those two men who went off to hunt for the women would come back," said Steve. "And Lucky would be handy to have around. I can cook up gadgets, Frances, but I guess I'm not practical. Everybody's been hungry because I wasn't. And we've got to be practical.

"The people with planes and bombs do know that something odd happened around here. Their man had reported it before I killed him. And it's a fact that, if we're let alone, sooner or later we'll be dangerous. But right now they could crush us as we step upon ants."

There were thirty people in the house, of whom Steve and a sixteen-year-old boy alone could make a device which controlled chance, and therefore constituted the whole body of useful science left upon earth.

The rest of the continent of North America was a waste, roamed by ever-more-desperate looting bands who inevitably tore down any traces of civilization they came upon, guided by the spies of people who were resolved that America should become unpeopled save by savages.

But the two men who had set out days before, came back that afternoon. They had two women and three small children with them. The women and the children were nearly half-starved. One of the women had been a prisoner of a small band of looters, a fragment of the bands which had hunted the refugees across country. Her

captors were now dead. The two men were filled with bitterest rage. The shorter of the men had four fresh scalps dangling on his belt.

That was disturbing. Civilization could not be based on scalps. But as Steve was thinking it over in his mind, later on, there was a hail from the new-fallen night.

Lucky Connors had come back.

## CHAPTER XII

### *Ominous News*

**U**TTERING a cry of delight Frances hugged Lucky and Steve found himself unexpectedly jealous. But Lucky put out his hand and grinned.

"You've been goin' places, fella," Lucky said. "You really got things done. Whew, electric lights! You got a whole tribe around you. You got plenty of grub?"

"We'll do," said Steve. "I've been needing you, Lucky. I seem to be the absent-minded professor type. But there's a kid here who used to play with television."

"Migosh!" said Lucky. "Stop him, fast! Those guys with planes and bombs can track down anything like that. Look!"

He unslung a pack from his back and tumbled out a half dozen small flat objects.

"These here are some kinda short-wave sets," he said earnestly. "Spies in the guys with planes carry 'em. They can spot anything that runs by electricity with 'em. They can talk with planes with 'em. And they can find each other and know each other with 'em. If there's somebody playin' with television around here he'd better quit right off!"

Steve nodded.

"We're safe as far as that goes. I got one of these same things from a spy I killed. If you open them the wrong way they blow up, though."

Lucky grinned again. They were in the big room of the house with electric lights, but as there was a serious shortage of bulbs, a great fire was burning in the fireplace. The farmers, who now gave Steve great respect, had gathered to listen. Lucky seemed to be in fine fettle.

"I got me a spy, early," he said contentedly. "Remember I told you I was gonna hunt down one of the fellas who report to

the guys doin' the bombin's? And I said I was gonna make him talk? When I left here, I pulled hard to meet one of those fellas. First day after I left, I struck on south. Then west. I went on three days and never saw a livin' soul. I didn't feel agreeable, and maybe it was just as well.

"On the fourth day I found a dead man, new-killed. He looked like he'd been eatin' regular, so I hunted for a trail an' went on after the folks who'd killed 'im. 'Bout nightfall I caught up with 'em, settin' around a fire. I went in to the fire an' says, 'I'm Lucky Connors and I'm a gamblin' fool. I got a rifle I'll gamble against grub or what have you, with y'own dice.' That kinda broke the ice."

Steve grimaced. With a crater-stone, controlling chance, Lucky Connors could not lose shooting crap unless he wanted to, no matter what dice he rolled.

"Them that woulda killed me for the rifle, figured it'd be more fun to roll me for it," said Lucky. "But I cleaned up the camp, usin' their own dice, and some of them was the crookedest dice I ever did see! Then I ate hearty and said, 'I'm Lucky Connors, fellas, and I can't carry all this stuff I won. You fellas take it back and let me in on the party, whatever it is.' And I set back and waited for 'em to call the play. But I was in."

Lucky paused and grinned.

"They coulda killed me, but every one of 'em wanted to find out how I made their own dice misbehave," he went on. "So we set around cordial and they told me what they were aimin' for. They'd heard there was a farm that hadn't been raided and there was a coupla women and plenty of grub there, so they were goin' over to see. So I joined 'em for the raid, and I pulled for the folks we were goin' after to light out before we got there."

He pulled forth a pipe and tobacco. He filled and lighted his pipe. The watching men stirred hungrily.

"Smoke up on me," Lucky said hospitably. "I got some more."

He tossed a bulging bag to the nearest man. It went from hand to hand. Some of the men had not smelled tobacco for weeks.

"They'd cleared out, all right, but we looted the place of grub," he added. "We burned the house, too, and set fire to the crops in the field. It was the boss of the gang who done that. That fella kinda—uh—

int'rested me. How'd he know about a farm that hadn't been raided, and why'd he want to burn crops that coulda been come back for after they was ripe?"

**T**HE atmosphere was not cordial. These men were farmers, too, and half their number had been killed by looters exactly like those Lucky said he'd joined.

"I kinda figured things out," said Lucky. "If I was right, he'd have some kinda report to make, that night. So I didn't go off to sleep like the others. I hid out an' watched. And when everybody else was snorin', the boss of the gang he walked off beyond the fire, and he listened awhile, and he went on a ways farther, and then he started mutterin' like he was mutterin' to himself.

"I let him talk himself out, and when he quit and started back to the fire I jumped 'im. Knocked him cold. I tied him up an' heaved him on my back and carried him till I was tired. Then I made sure he was tied tight and went to sleep."

Steve felt a light touch against his shoulder. It was Frances, sitting on the floor beside him to listen to Lucky. She leaned comfortably, unconsciously, against Steve. Any trace of jealousy he might have felt evaporated on the instant.

"Come mornin' I woke up with a shot-gun in my middle. There was a man and two women there, and the man was ready to blow me to here-and-gone. He was the farmer that we'd burned his house and crops. He'd watched us loot and burn his place. He'd have shot me whilst I was asleep, only he recognized the man I was carryin' all tied up as the guy who'd fired his wheatfield. So he was curious to know what it was all about, and he meant to ask me before he killed me. I told him."

Lucky grinned and puffed on his pipe. He enjoyed an audience, did Lucky. A little while before, most of his present hearers had been favorably impressed by his present of tobacco, and then turned to instinctive hatred by his narration of a share in a guerilla raid. Now they wavered. They did not know what to think. And Lucky enjoyed their indecision.

"That guerilla boss, he sure got eloquent. I never heard any man beg for his life so hard. So the farmer, he took my word for what I was after—the evidence was pretty good—and we staked that guerilla boss out and we built a fire and begun to ask him

questions. When he started lyin' we stripped him—that was when I found the first one of the dinguses, Steve—and got some brands ready, and then he told the truth."

The eyes of the refugees burned, now. They no longer hated Lucky. They waited hungrily to hear of torture.

"What nationality was he, Lucky," Steve said suddenly. "What language did he speak into that transmitter?"

"Huh!" said Lucky scornfully. "He was nothin' but a lowdown looter! He talked American same as you and me. He'd been bossin' a kinda small gang, lootin' and burnin' and killin', and fellas would turn up and join and drop out again, and he wasn't makin' out so good. But a fella turned up and offered confidential to give him guns and whisky to build his gang up with if he'd take tips by short-wave radio and report what he seen and done."

Lucky turned and gave Steve a quick glance.

"You and me, Steve, woulda shot that guy for a spy, but this boss guerilla took him up. And the fella gave him a short-wave set and told him how to use it—but he warned him not to open it—and sure enough, next night the short-wave set told him where to find a cache of whisky and a few guns, and he began to prosper. He had thirty—forty men under him when I joined up. Mostly they were raidin' farms that the short-wave told him about, burnin' 'em and gettin' the grub and killin' the people just for the devilry of it."

He paused.

"It took us a right long time to get all the details outa him," he added drily. "Once we had to start a little bit of fire on his middle. But he told us everything he knew, and I treated him fair." His tone was virtuous. "I done just like I promised I would, if he told me everything he knew without holdin' back none."

A bearded man leaned forward, his eyes burning.

"You didn't let him go, man!"

"Shucks, no!" said Lucky in surprise. "But I kept to my promise. The farmer wanted to do it, so I let him, but that fella got just what I promised him—killed quick, with one shot. It took a lotta argument to get him to be satisfied with that, but I—uh—persuaded him." Lucky's eyes glowed with a satisfaction that comes when a long pent-up hatred is released by brutal revenge.

FRANCES' hand, in Steve's, tightened convulsively. Steve made no move. There could be no ethics in a war such as was now being fought.

"And after that, Lucky?" Steve said evenly. "That's only one transmitter. Here are a half dozen."

"Oh, we found out how to get 'em from him. There's other fellas like him that got transmitters, and there's fellas that pass 'em out. The ones who pass 'em out are from the folks with planes and bombs. One of those dials is for locatin' another fella who's got one. It's so they can join up and know each other and not waste time fightin' each other. He explained all about it. So the farmer and me, we used that one. We set it to make a kinda call, like he told us how, and we set and waited. Two-three days later some fellas come by and one of 'em told the others to go on ahead while he set down. When his fellas were outa sight, he came straight toward our sendin' set. I killed him."

Lucky's air was tranquil; his tone conversational.

"That fella had two pistols and more ammunition than you'd think one man could carry! And he had another set just like the one I had. I give it to the farmer and he said he was gonna go in the business of sendin' out calls for fellas with those sets. They'd always arrange to meet him quiet—naturally. And it'd be profitable work, when you think of it. Anybody hidin' out would give a lotta grub for a gun or pistol and some shells, and him and the two women, all havin' guns, could take care of themselves easy.

"Him and the women went off to where he said he knew there was another fella hidin' out. He said he guessed he'd set his friend up in the business too, if it turned out good. In fact, he might set up several fellas, killin' off men with sendin' sets that talk with the folks that have planes an' bombs.

"So I arranged a recognition-signal that everybody in that business would use to know everybody else, and we parted. A right nice fella, that farmer. He said he hoped I'd come to see him some time if things ever got better and he got his house built back up again."

Lucky seemed to consider his story ended. He puffed on his pipe and grinned at his audience.

"That still accounts for only two sets," said Steve. "And you've got a half dozen."

"Yeah," said Lucky. "It was a kinda interestin' business. And it's surprisin' how many decent folks there are around, even yet. Hidin' out, all of 'em, and half-starved, most of 'em.

"But I set three-four of 'em up in business, and they're kinda gettin' a little confidence. They're even darin' to get in touch with each other. I told 'em it was ploughed fields that tip off the planes, and the planes tip off the guerillas, so they oughta make out better.

"They'll plant stuff in little patches. No furrows. No neat fields. That'll help a lot, all by itself. And they'll pass on the word. It's bound to spread, when all the sendin' sets in this locality get wiped out and the fellas that are huntin' 'em have to go travelin' to stay in business."

There was a deeply satisfied silence all around the room. The men who had suffered so horribly from guerillas had, at last, the satisfaction of knowing that guerillas were being killed. That spies were being hunted. That at least a small dent had been made in the disaster that had befallen civilization.

There was still no safety for them, however. There was still no real reason to hope. Their food depended upon the operation of a device to control chance, which they did not understand and which instinct forbade them fully to believe in. And they were definitely, terribly vulnerable.

This meant not only against guerillas and bandit gangs, armed and directed from the planes which could drop bombs. They could be blasted at any instant of any day or night if the folk who had destroyed civilization heard so much as a whisper of a suspicion that they clung to anything—those folk who had been doomed to die.

And there was worse, which they did not know. When the house was filled with the minor turmoil of people finding their resting-places for the night in so crowded a menage, Lucky Connors plucked at Steve's sleeve and beckoned with his head. Steve followed him out of doors.

"Frances looks okay, fella," said Lucky.

"I think she is," said Steve. "I hope so, anyhow."

"Yeah." Lucky was silent for a moment. "She—uh—understood why I went off?"

"Yes," said Steve uncomfortably.

There was a pause. Then Lucky shrugged. He said in a different tone:

"Things are comin' to a head, fella. On

my way back here I picked off one last fella with a sendin' set. He and his gang seemed to be headed this way. It worried me. I—uh—made him talk. I guess he figured I was somebody doublecrossin' the fellas with planes and bombs. Anyhow, he'd been told to hunt up this house and find out what was goin' on here.

Steve frowned. "Here, eh? That's bad. What were his instructions, Lucky?"

"If it was guerillas like his outfit, okay—he'd get paid off in whisky and grub for findin' it out," Lucky answered. "If it wasn't, he was to report that, after wipin' everybody out if he could. He ain't goin' to report anything. I don't know if his gang will come on here or not. But when he don't report, somethin's goin' to happen! The folks who smashed up this whole country are interested in us. They know that somethin's wrong somewheres, with all their spies vanishin' like they been doin'. They're goin' to tighten up all around. They're pickin' on this place to start. What are we gonna do about it?"

Steve took a deep breath.

"I guess we'll have to fight," he said somberly. "There's nothing else to do. You know, it would be interesting to know who they are or where they are or what the devil we can do about them. I feel like a gnat trying to start a fight with a locomotive."

## CHAPTER XIII

### *Enemy Bombs*

**K**NOWING the extent of the danger which threatened, Steve made no pretense of going to sleep that night. Followed by Lucky Connors, he repaired to the room he'd set aside as a laboratory, and resumed his labors. But this time he had very specific objectives. Lucky Connors couldn't be of much help; he merely sat on a bench and watched Steve. And Steve's system of work seemed lunacy, at that.

Steve took one of the six child's copy-books and wrote in it. Then he took the handles of Bob's elaborate apparatus of wires and stray objects, and stood frowning for an instant. Nothing happened. He crossed out what he had written and wrote something else. He held the two handles again. The process went on and on. After

nearly an hour, two wires in a bottle of clear liquid glowed incandescent, and a bare wire turned white with frost.

"That helps," said Steve. He surveyed what he had written and did not cross it out. "I'm playing hot-and-cold, Lucky. This thing does the same things the crater-stones do, and I'm trying to find a way to survive, in the possible futures that lie ahead. The crater-stones get hot when they work. This thing makes those two wires glow. It gets its energy from the wire that turns white, changing its contained heat into electricity and dropping away down in temperature in the process."

"Whatcha tryin' to do, Steve?" asked Lucky, who obviously was puzzled.

"Right now I'm pulling for a way to make a record of a thought-pattern, so it can keep on pulling for something even when my mind gets tired," Steve answered. "Nobody can hold a thought more than a second or two without some change. In the old days we had gadgets that did everything but think. I've got to make one that will wish!"

Lucky shook his head.

"Too deep for me," he admitted. "Way over my head."

"I'm playing hot-and-cold," explained Steve. "You remember how I found out this house was still standing before I saw it? I'm doing the same thing now. I pulled for it, just now, that I'd find a way to make a thought-record on iron. The gadget didn't light up. So it wasn't in a possible future that I could make a thought-record on iron. I went on, pulling for every possible material at hand. It just lighted up on protein.

"It is possible, in the future, to make a thought-record on some sort of protein. Now I've got to find out what kind and how. When I get close to what I want, I'm hot and this gadget works. When I'm not, I'm cold and nothing happens. It's a wacky way to do research, but it's fast. I wish I were cleverer, though. I might be able to make it a game of ten questions and get my answers in a real hurry!"

He wrote in the copybook and held the handles, frowning. Nothing happened. He crossed out the writing and wrote something else. Nothing happened. He crossed out and wrote, and crossed out and wrote. Lucky watched for a long, long time. Presently he yawned. Ultimately he dozed off.

He woke, cramped, and Steve was still busy with the same absurd routine. It

seemed to have no relationship at all to the situation facing him and all the rest of the world. It seemed a dreary and useless rigmorole, while the situation was desperate and apparently irremediable. The whole earth had exploded in a welter of destruction, in which cities vanished in the blue-white glare of atomic explosions.

Nobody knew who had started the destruction. No nation knew what other waged war against it.

In one sense it was not war at all, but a series of international assassinations in which all destruction was done anonymously and every nation cried fiercely that it was attacked and no nation admitted attacking. Now the whole earth was pock-marked with glass-lined craters where cities had been, and if any victorious nation actually survived, it was only after such destruction as no vanquished nation had ever before endured.

But some nation did survive more nearly than the rest. There were some folk who still had planes and bombs. They had arms they could give to guerillas to complete the ruin of a shattered America.

They had microwave communication sets with which to guide those bandit allies in the reduction of America to sheer savagery. They had monster aircraft which flew in the upper stratosphere. And unquestionably they had bases in which the arms and bombs were stored and the aircraft serviced, and from which the organized production of chaos was controlled. They had spies, who must number in the thousands.

Their bombing and fighter forces must be huge. Their technical facilities and resources must be on a relatively gigantic scale, compared to one small group of people, some thirty in number and with exactly one weary physicist among them, who could marshal only a dozen or so firearms and a single contrivance of salvaged copper wire and reclaimed bottles and clumsily straightened nails. No self-respecting junk-yard would have given room to the equipment in Steve's laboratory. But it was all he had, and he worked it grimly. With it he fumbled incalculable possible futures for a path to safety. Now and again two wires glowed in a bottle. They were the markers on the path.

When red dawn came he still worked, and in the same way. Scribble in a book. Hold two handles and think—cross out the scribble and scribble again. Hold two

handles.

The strain was monstrous. Such mental effort was much worse than any physical labor could have been. But he went on like an automaton until the sun was clear of the horizon and climbing higher yet. Then, suddenly, the wires in the glass bottle glowed yet again. When they did, he dropped his hands in a gesture of wornout completion.

But he could not rest, even yet. He had to make sketches of the new circuits, with the materials specified and all connections indicated. And then he had to set to work to make them.

When the sound of stirrings began in the house, he stopped and hunted up the sixteen-year-old Bob. He handed over the sketches for two devices and dully explained such details as the sketches did not show.

The boy scanned them eagerly and set to work at once. And Steve went back to the making of the third gadget—and fell into the numbed sleep of mental exhaustion before it was quite finished.

**T**IME passed. Off somewhere a dozen miles away, a band of guerillas woke in quarrelsome mood. Their leader had vanished. Because of his absence they'd drunk up the whisky he occasionally produced as if by magic, and had fought each other blindly.

This morning there were three dead men in camp, and still no leader.

They argued in a sultry fashion while they ate what food remained. They had no plans. They only knew that their leader had intended to examine a house a dozen miles away, a house which might be the headquarters of a rival band, or which might be the hideout of folk who could be robbed.

In either case it was a destination. Rival guerillas could be joined, most likely. Refugees could be killed, quite certainly, and refugees usually had some women with them.

As the morning wore on they quarrelsome agreed to carry on. At about noon they began a shambling march toward the house, bunched and careless and pettish. They did not take care to stay among trees. Where they came to weed-grown fields they crossed them instead of skirting the edges.

At the house, the boy worked feverishly, and two intricate, lunatic agglomerations of metal scraps and oddments grew to completion under his hands. He went to hunt up Steve. He found Steve just desperately awak-

ing and going on desperately with his part of the task.

Outside, Lucky fretted because there was no sign of Steve. Frances fiercely tried to stop him from going into the laboratory.

"If he fell asleep, let him!" she protested. "He works all the time, Lucky. He never rests."

"But there's a lot that's due to happen today," Lucky said uneasily. "There's a gang comin' this way and all."

"You're here," said Frances. "You've got a crater-stone. You'll do something about it."

"Shucks!" said Lucky. "You think I'm a friend of yours, don't you? Well then, let me be a friend of yours! There's big doin's on the way. I don't know how to handle 'em. Your friend Steve does—or he seemed to think so, anyway. I'm goin' to call him. Things need doin'."

He knocked vigorously on the door of the laboratory.

"Rise and shine, fella!" he called. "What do we do?"

Steve came out of the laboratory, carrying the most improbable of freakish creations under his arm, while the boy Bob went on anxiously ahead to where he had assembled two more.

"Come along," said Steve. "We've got to mount this stuff outdoors."

He led the way up the hillside behind the house, where the boy was at work bracing an absurdity upright. One of the two things he had made was merely meaningless tangles of wire and bottles on a bit of charred board. The one he braced so carefully had been built around a section of three-inch sapling, which rested in a forked stick on two scorched, approximately straightened nails. It could be aimed like a gun.

"These are finished, sir, like I told you," the boy told Steve worshipfully. "I don't get what they'll do, though."

**S**TEVE put his own device down. He began to check the ones the boy had made.

"They'll all hook together," he said. "The one I just finished is a thought-record dinkus. It'll hold a wish or a thought or a condition to be hooked into the others. It has to work, because I pulled that it would and it was in the pattern of possible events. That one—" he pointed to the section of sapling in the forked stick. "That's a hypothetical probe. It's like radar, in a way, but it can handle

the output of the other, which is a generator-maker. You know how we make our electricity, Lucky?"

Lucky shook his head.

"We enhance thermal noises," said Steve, still checking the Goldbergian assemblages of odd parts. "Shot effects, you know. They're natural, spasmodic currents in all bits of metal. They're accidental. So since we can control accidents, we can make them happen constantly and much stronger than in nature.

"We make all the free electrons travel one way and that cools off the metal and produces current, and the cooling absorbs more heat to make more current. We can make that action permanent, and it gives up all the power we need. This gadget will make it happen at a distance, but the effect will be only temporary."

"You said this was a hypo—hypo—" Bob said unhappily.

Steve untwisted one connection the boy had made, and twisted it in another place.

"You did good work, Bob. A hypothetical probe ought to be a variation on the way we've been finding out things. Up to now we've been pulling for something to happen, and if the crater-stone or the thing you made for me worked, we'd know it would happen. But this is a probe. It doesn't say, 'I wish this to happen when I do so-and-so.' It says, 'If I did so and so, would this happen?'"

"Here! It looks all right. I'll try it. I hook in the thought-record—so, to ask the question, 'If I went along the line the probe points, would I see a plane?' We can't go straight up, you know, so it has to be hypothetical.

"With a crater-stone, Lucky, we'd get no answer. Finding a plane by going straight up wouldn't be in the pattern of possible events because we can't go straight up. But it's in the pattern of ascertainable facts, so this thing ought to work."

He swung the block of wood skyward. Wires glowed suddenly. He stopped moving the device.

"There's a plane up there," he said quietly. "The thing works like radar. Yes, there's a plane up there!"

Lucky heard a distant screaming sound. Far away, black smoke mushroomed upward in a swift-moving, billowing mass. There was a second distant eruption. A third and fourth and fifth. Then the concussion-wave and the sound of the first

explosion arrived simultaneously.

Leaves overhead jerked spasmodically.

The sound of the first explosion was a crushing roar. The second sound came, and the third and fourth and fifth. Each was louder than the one before. Each was nearer.

"Hey!" said Lucky in a queer voice. "They're comin' closer!"

Steve's hands moved swiftly, with incredible speed. He was making connections with his fingers. Bits of wire tore the flesh and blood spurted, but he paid no heed.

"We're going to be bombed," he said with savage brevity.

Smoke spurted from twin explosions two miles away, then from three more, a mile and a half off. A bombing pattern was being established. Everything within an area, four miles long and two miles wide would be obliterated. But it had been extended a little because a band of moving figures had been sighted from above.

They were, of course, the quarrelling, leaderless guerillas whose leader had vanished the day before. They moved toward a spot where mysterious events had been reported. The guerillas made no reply to microwave signals sent down to them. Therefore they seemed a part of the mystery, perhaps the occupants of the house, and they were bombed.

Then the pattern of bombs moved toward the house, faster than any human being could flee. A bomb went off a mile away, and then two others flanking it. The concussion-wave staggered Steve. But he said harshly:

"Got it!"

He twitched the last two wires together. Other wires, bare wires, frosted suddenly as their internal heat became a surge of electricity and they drew more heat from the air around them. Two little wires in a bottle glowed brightly.

Then the sky cracked open. Wide!

## CHAPTER XIV

### *War by Science*

**C**ONCEALING leaves were blown from the trees by the violence of the explosion. A bare half-dozen panes of glass, left in the house, splintered into fragments. Men reeled from the shock of the blast over-



head. The world was filled with thunderous bellowing tumult which was the sound-wave of detonations overhead.

Its echoes and reechoes rolled and reverberated among the hills.

The noise died away, grumbling in the distance. Birds—at first paralyzed by fright—flapped and squeaked among the branches, and then took to wing in panic-stricken flight.

Almost directly above the house, some four thousand feet up, there was a monstrous, globular mass of black smoke. It writhed within itself. But a wind shifted it away, leaving streamers of sooty vapor behind.

And then, very high indeed, there could be seen another globe of black the size of a football. That was probably fifteen thousand feet up. Beyond it there was another at a likely twenty-five thousand feet, the size of a pea, and possibly others higher still. They were bombs which had detonated as they fell.

There was silence for a brief time only. Women began to call shrilly to their children, as if a mother's arms could protect the children from bombs. One woman sobbed throatily. Lucky Connors stared up, his face gone white and drawn. The boy Bob also gazed upward with awe-struck, shining eyes. And Frances looked at Steve with the luminous expression of infinite pride a woman displays when her man has done something remarkable.

Steve set his lips.

"I guess that's that. They'll send over an atomic bomb next. Here! Where's some extra wire? We've got to put a wide-angle extension on that probe! It's got to work like a fish-eye lens!"

He snatched up scraps of extra wire. He began to form a reflector—radar-fashion—for the end of the apparatus made in the sapling-trunk.

"I can do that, sir," the boy said quickly. "Like a one-eighty beam reflector, two ways?"

Steve nodded. He turned feverishly to the other maze-like masses of wiring.

"Got to cancel that thought-record and make another," he muttered. "There's not much time."

His fingers bled. He shook them impatiently. He worked—he nodded to the boy. He fitted the newly-formed shape of wire to the end of the thing he had called a probe.

He fastened it in place and aimed the sapling trunk skyward.

"Now we'll see what turns up. They should guess what's happened."

It was broad daylight, just past noon. But at that instant there was a flare of light at the very horizon which was brighter than the sun itself. It was monstrous in size. It was as if, for the fraction of a second, the sun had been brought terribly close to earth and had poured out a monstrous, radiant heat. Then the light winked out. The heat ceased. There was nothing where the light had been.

Steve's tensed body went lax with relief.

"That did it, all right!" he said shakily. "That was an atom bomb going off beyond the atmosphere. They must have learned what happened to their bombers and started a rocket for us as soon as they could aim it."

Then something made a shrill whistling noise overhead, and it rose in pitch and rose in pitch, and hit heavily into a hillside two miles off. It did not explode. Nothing at all happened.

"That would be a bombing plane, I guess," said Steve as shakily as before. "It took all that time to fall."

Other shrill whistlings came to the ears, two and three at the same instant. They sounded from every side, but every one of them ended in dull impacts. Some were far, far away. There must have been a dozen in all.

Frances' eyes were frightened.

"There was a fleet of planes overhead—to bomb us! And—and—" She stared at Steve.

"And they ain't there any more," said Lucky. He swallowed. "I never been so scared since I got my luck. That was a atom bomb, fella?"

**A**NOTHER lurid monstrous flare blossomed on the horizon. Lucky flinched.

"Yeah," Lucky continued, answering his own question. "And there was another one. And another!"

A third instantaneous, weirdly silent flare came as bright as the sun itself and many times larger. Three atom bombs had exploded in empty space as they rose curving from below the horizon to fall upon people who dared to resist chaos.

Steve sat down suddenly and put his head in his hands.

But Bob, the sixteen-year-old, spoke raptly.

"I got it!" he cried. "Golly, I got it! He hooked on a generator-maker circuit, so the probe threw a beam that made generators outa every piece of metal it hit. Every one! The bombs that were fallin' were turned into generators. The different pieces arched where they were close together. They heated up thin places in the fuse. They burned into the detonator and they set it off. And they exploded, every one!

"Next, the planes—they got to be thousands of generators all hooked together, every piece spittin' blue-white fire. Every wire to every instrument and every control became charged and started pourin' juice into everything all at once! Every control burned out! Every motor jammed!

"Where the ends of every bit of metal wasn't spittin' electric arcs, it was gettin' cold as liquid air, and brittle, with no strength to it. It'd break, then— Oh-h-h! I got it! I got it!"

Steve looked up. Frances gazed at him, wide-eyed. He lifted himself rather heavily to his feet. He put his arm around her. He opened his mouth, and closed it.

"Let's get something to eat," he said at last. "We're safe now for a while, but we can't stop with being safe! We've got to fix these people so they can't do any more damage, and then I guess we can start getting civilized once more."

He kissed her almost absent-mindedly as he walked toward the house with his arm around her waist.

The refugees were shaken and scared, but also they were savagely triumphant. Food for Steve was handed to Frances to serve him, but most of the people who now relied on him were too much in awe to ask questions. They clustered around the boy, who was one of their number. He made voluble explanations, his eyes shining. There was the probe, which was simply a variation on the apparatus which acted as an artificial crater-stone.

To get information from that apparatus or from the crater-stone, one used it to explore possible futures, automatically causing a change in the probability of future events. But the probe explored the factual present, with no effect upon probability in itself. It worked like an infinitely superior radar. It could be adjusted to hunt for anything. Anything at all. The generator-maker was actually a more effective weapon than the atomic bomb, for defense.

If every separate bit of metal in a complex bit of apparatus—such as a bomb-fuse or a bombing plane—became separately charged with high-voltage electricity with plenty of amperage behind it, that apparatus would be destroyed.

The generator-making field created just such a condition when it was in action. It was rather as if a beam of magnetism could be projected, to make temporary tiny magnets of every sheet and rivet and wire in an aircraft, with all the north and south poles emitting electric arcs. And where the poles were far apart, the middle dropping to the temperature of liquid helium, when no metal has either strength or elasticity.

The third piece of apparatus simply controlled the other two, but no atom bomb could penetrate such a defense, nor could an atom bomb provide a defense against it.

And the three devices were startlingly simple, when the functions of which they were capable were considered. A civilization based upon controlled chance would not merely be one in which good luck was universal. It would be one in which there could never be danger from atomic bombs.

Steve called a council of war that afternoon. The deliberations were interrupted, once, by a drum-fire of distant detonations. A sentry, outside, gave the clue. When the first boomings sounded, he'd whirled to look. And he saw smoke-puffs just over the edge of far-distant hills. As he stared, infinitely tiny specks darted over those same hills and instantly exploded.

"Ground-level planes," said Lucky, wisely. "Tryin' to sneak up at treetop level. In the last war, the early radars wouldn't work except on high-level stuff. But these fellas can come up behind hills, and when they come over 'em, the dinkuses mess 'em up."

**A** THOUGHT had occurred to Steve. His eyes narrowed.

"They might try ground troops, too, but I can change the thought-record to take care of that, too," he said. "The thing is that they're going to keep on trying to get us. Yet I doubt that they'll anticipate an attack from us very soon. They couldn't possibly detect the stuff we're using, so they probably think we've got radar and power-beams with a couple of hundred thousand horsepower in them. That sort of stuff wouldn't be portable. They'll expect us to

stay on the defensive and try to build up what they think we've got. So we'll attack them before they have a chance to figure things out."

Frances looked anxious.

"What do you mean to do?" she asked.

"We'll duplicate these gadgets," Steve said. "We'll carry the extra ones with us. We might make an extra set, for safety, here, too. I think—hm—four or five of us should be enough to make the attack with. But I'll have to use the probe and locate their nearest base."

"It's a coupla hundred miles south," said Lucky. "I found that out. There's some territory there that folks go into and never come back. A place about fifty miles across."

"Then that's it. Who'll come with Lucky and me?"

There was almost an uproar. Eleven men among the refugees now considered Steve their chief. They had regarded him at first with suspicion and then with unease. But after witnessing what had happened today they trusted him implicitly, and they looked forward to slaughter of the folk who used planes and bombs to wreck a world. Their eyes burning, to a man they demanded to go.

But Steve chose only three. Then he hesitated.

"Lucky, how about you staying back here to run things? You know how to pull for what's needed and have it happen."

In his mind was the thought of Frances. But Lucky rejected the suggestion.

"No dice, fella," he said. "I ain't talked much, but I've seen plenty. If there's any killin' of those fellas to be done, I'm goin' to be in on it!"

There was another distant drum-fire of explosions. They listened, and that was all. It was merely more planes trying to come and bomb them, the only thing they had feared most for weeks. But Lucky fidgeted.

"I want to go out and watch 'em blow up," he said. "We start hikin' about daybreak, Steve? Okay! All set!"

The council of war broke up. Bob, the boy, began the duplication of the devices that had been made that morning. Steve explained to him gravely that it was more important to have many such devices available than to perform any other service. It was important, too, to train other men to make them.

And the men were desperately anxious to

learn. Clumsy farmers' fingers copied, painstakingly, every incomprehensible detail of the models the boy set up for them. There were four sets complete within three hours. Steve, checking them, rearranged one to an even greater compactness. It still worked.

By nightfall the model had been refined still farther, into a rifle-like projector with a blunderbus-like coil where the barrel should have been. And five men sat up all night to make extra ones for the expedition to carry in the morning.

But before that—much before that—Steve and Frances went out-of-doors alone. There was a moon again. They talked quietly beneath a spreading tree. Insects made romantic noises. Night-birds called mournfully in the darkness.

"We'll make out," Steve said awkwardly, when Frances had protested vehemently that she wanted to go too. "But it's going to be a tough hike. We could construct some sort of traveling device, but they'd be looking out for that. They'd never think, though, that people who could blast their planes out of the sky would be content to travel on foot. So that's the way we'll go and we're going to travel fast. Meanwhile you're going to stay here."

He kissed her, and her protests were stifled. Then there was an isolated explosion, far away. Frances started.

"Just another try by a sneak-plane," he told her. "They'll keep that up indefinitely." His expression grew pensive. "Er, I'm going to bring something back. I used the old crater-stone, for sure, and pulled for something. And it warmed up. So I know I'll come back with what I want."

There was no reason whatever for secrecy, but he whispered. And she put her arms about his neck.

Then, suddenly, over at the horizon to the south, there was a lurid flare of light as brilliant as the sun and vastly larger. For the fraction of an instant the world was illuminated more brightly than by day. It was another atom bomb. Then came the blessed dark again.

And Bob, aged sixteen, who had come out to ask Steve a professional question about a proposed change in a circuit, blinked in the re-fallen darkness.

"Gosh!" he said.

He went back into the house without disturbing them.

## CHAPTER XV.

*Invasion*

**B**Y EASY stages, it took them only four days to make the two hundred miles, because early on the second day they came to a broad river. They made a raft and floated down it day and night, with only one needing to stay awake on watch.

They used the probe to check their progress, and disembarked on the fourth afternoon. Then they went on.

At nightfall there was absolutely no sign that this part of the world—all weed-grown fields and desolation—was any different from any of the rest. But they knew.

Lucky had become fascinated by the probes. There was a switch which, when thrown, allowed the object sought for to be varied.

Lucky grinned cheerfully.

"This is about where the first line of watch-dinkuses will be," he said.

He'd used the probe on a thought-record which made it seek out devices which would betray their presence to enemy watchers in the center of the foe's dead area. He knew that there were three lines of photo-cells and induction balances which, without alarming anyone who ventured in, made their capture or killing a certainty at the option of the inhabitants.

Lucky swung the probe right and left, and chuckled.

"Pullin' for a place we can go through without settin' anything off."

They went through. They went on. An hour later they reached the second line. They went through that. The third. Lucky used the probe continually.

"Hold it!" he said presently. "Somethin' funny up ahead."

He was quiet for a long time.

"I don't get it," he murmured to Steve finally. "I've found something to stay away from. Not a trap. Not a warner. Not a big bunch of those folks. Not bombs. You try, Steve."

Steve put the switch of his own probe to brain-control and tried. After a little, he smiled grimly.

"Prison-camp," he said. "A lot of people in it. Our kind. *Hmmmm.*"

"There'll be guards, but they'll be watchin'

in, not out," one of the other three said hungrily. "We could kill 'em and—test our stuff."

"Why not?" said Steve. "I guess we owe them quite a bit."

They advanced. They came upon a long line of electric lights—more of civilization than was believed to exist anywhere—and a stockade, with hovels inside it. They saw a guard pacing up and down, a rifle carried negligently over his arm. Lucky squirmed away. The others waited. A long time later Lucky's voice came faintly:

"Hey, fella!"

The guard whirled, grasping his gun with both hands at the ready. Then, in the dim light of the electric bulbs, those in the darkness saw what happened. The barrel of his gun turned white with frost. Sparks—arcs—played about his fingers. He could not let go. He toppled. He moved spasmodically. He rolled over and over. He was still. Then his dead body flexed horribly and relaxed again.

Lucky came back, humming snatches of a little song to himself.

"They'd be right curious what killed him, if they'd have a chance to look," he said amiably. "Electrocution is handy. It's permanent and it's quiet, and any fella with a gun carries his own generator providin' he touches his gun in two places and we turn a beam on him."

The men who had been refugees moved forward eagerly.

Presently the five reached the place where the guards' barracks stood. The guards on duty were dead. Killed as their comrade had been killed. By electrocution.

Steve turned his riflelike instrument on the barracks. Instantly the lines of electric lights flared white-hot and blew out. The dynamo for power was in the barracks. He had multiplied its voltage enormously, so that at the same time, every other bit of metal in the building spat charring electric sparks. Most of the guards seized weapons at the first alarm. They died. The rest snatched up weapons when Steve fired a shot in the air. They died, too.

Steve went through the gate beside the contorted figure of a man in uniform. The rifle which had killed him was still clutched fast in his charred fingers. Steve entered one of the hovels and spoke briefly and urgently to the unseen people within. He came out.

**B**EFORE the five were out of sight in the darkness, a stream of running figures had poured from the prison-camp gate and dispersed in the wilderness outside.

"*Hm—slave-labor,*" said Steve, thoughtfully. "That means there'll be more such camps. They must've had some way to produce food. It may turn out handy!"

Before dawn came, the five occupied a neat, small lookout-building atop a hill. Its former occupants were no longer concerned with the affairs of this world, and a telephone instrument buzzed angrily.

"I'll take the call," said Steve.

He picked up the phone.

"Hello!" he said pleasantly. "I want to speak to the officer in command of this base . . . I'm the American in command of the forces which is going to wipe you all out if I don't get what I want . . . I don't speak your language . . . Speak English, please! . . . We have your base under the threat of weapons you can't possibly resist . . . No, I'm not crazy! Listen!"

He nodded to Lucky, who coddled his weapon. It was aimed where its probe-function had told him the heavy bombers were based. A pair of wires in a baking-powder bottle along its "barrel" glowed incandescent. There was a sudden spout of fire four miles away and then a series of racking explosions following each other with incredible rapidity.

"You probably heard that," said Steve into the telephone as the echoes rolled. "You'd better connect me with your commanding officer. I suggest you have him waked up, if it's necessary. I'll hold the wire."

He grinned at Lucky. Lucky was holding his weapon vaguely toward the horizon but above it.

"I got a hunch," said Lucky happily. "I got a hunch there's a plane comin' in. Right on the line where they keep their atom bombs."

"They'd be fools to keep them assembled," said Steve. "Take a chance. There'll not be more than one or two in firing condition, anyhow."

Lucky aimed, chanting softly. "Will that plane crash the atom-bomb stores, if I knock it down now—now—now—now?"

The wires glowed.

"*Mmmh!*" he said.

There was a long wait. Then, utterly without warning, there was a flash of such

awful radiancy and such ghastly, overwhelming heat, that the five momentarily were blinded. There was the smell of hot paint in the little lookout-building. There was a sound which was beyond sound. The building rocked on its foundation.

Steve's voice came out of a deathly stillness.

"Really," he said into the telephone in a chiding tone. "We're getting impatient! Will you connect your commanding officer or do you want more atom bombs?"

Chattering, disjointed buzzings came from the telephone instrument.

"You chaps look hungry for something to do," Steve said to the three bearded men of his following. "Set fire to part of the town. Only part of it, though, mind you!"

If wires and nails and even kitchen utensils poured out arcs of electric fire, flames would follow. The three small hand-instruments did not have to furnish the energy for the arcs. That was already present in the metal objects which would emit them. The three men grimly used their weapons.

"Hello!" said Steve into the telephone. "You're in command? Good! I suppose you're a general? . . . Then, General, you will immediately order all your troops under arms, march them to the nearest prison-camps, have them stack arms and deposit all cartridge-belts with their small-arms, and release the prisoners and take their places.

"I am sure the prisoners will arm themselves. They may mount guard over your men. I wouldn't know about that. But certainly if you haven't started the carrying out of those orders in five minutes you'll regret it."

He looked inquiringly at Lucky, who spoke softly.

"The arsenal, where they stock their ammunition."

"And just to urge you on," said Steve gently. "Listen!"

Little wires glowed where four riflelike instruments pointed along the line Lucky indicated. Heavy detonating tumult began off in the night.

"Your high-explosive bombs will go next," added Steve. "Or we can set the rest of the town ablaze, as part of it is burning now."

Screaming, squealing sounds came out of the telephone.

"Very well," said Steve pleasantly. "All your men in the prison camps, and all the

prisoners out, or I'll get quite provoked. I'm going to hang up now, General, and there'll be no more arguments. Obey your orders or we will begin wiping you out."

He hung up. His features were pinched and very tired, but he was smiling. There was a dim red light in the sky to the east.

"It's queer that I don't feel like a murderer," he said softly. "We must have killed a lot of them in the last few minutes. But it doesn't bother me at all. After all, we haven't killed one in a hundred—no, not one in a thousand—of the murders they've done. We really ought to wipe them out. Only we can't do that sort of thing."

"Maybe you can't," said a bearded man grimly. "We can!"

"You'll probably have to kill a few," Steve told him. "But it will pall on you when they can't fight back. That's an odd thing about us Americans. We're about finished here, I suspect. We'll have to tip off the released prisoners what it's all about, and let them organize themselves. I imagine they've been used to cultivating ground as well as for work in factories. They'll put their former bosses at those jobs instead. Then we'll go back home.

"No," he now added reflectively. "We'll have to leave one of our number here to knock off any plane from other bases that may turn up, and we'll have to figure on taking over all the other bases there are. By plane, I guess, in time."

Then he said, with an unconscious gesture of brushing off his fingers:

"Let's go out and look at the sunrise."

**I**T WAS three days before they started back. Five of them had started, and five men rode back, but one of the five was a stranger. They rode on splendidly-groomed horses from the general's stables, and each of the five had, besides, a led horse trailing behind him with food for the journey and other items that would be welcome. Wire, for example, and seemingly more other parts for more duplications of the probe and thought-recorder and the generator-making combination that each of them carried, save one. But there was cloth, and some toys, and sugar, and pepper, and such items as conquering heroes may lawfully loot and take home to their womenfolk.

They made the trip back in five days. And when the horses emerged from the woods near the house and pushed on across weedy

fields toward it, yells greeted them. Yells of purest triumph. And Frances ran and ran and ran to meet Steve, so that when he swung her up before him she could only pant and hold him close while she put up her face to be kissed.

"We did it," he told her. "One base was smashed and taken over by the slave-labor they had there. Decent people, the captives were, most of them. The other kind were more useful outside, as guerillas. The released victims are planning an organized sweep to wipe out the other bases all over America, and then they'll start on the rest of the world."

She held fast to him and he could feel the beating of her heart.

"Where's Lucky?" she said suddenly.

"He stayed," Steve told her. "Somebody had to, and he stayed with a gadget to protect the place until we can send back some more stuff. He's rather wonderful with the probe, Frances. He can find anything with it. So just before we left, he told me to tell you he's using it for himself. He's trying to find a girl he can like as much as he likes you. He says the probe says there's one among the released prisoners.

"The probe says so. But he hasn't caught up with her yet. She keeps moving around. He's sticking to the job of finding her, though. And then, too, he wants to go on and help wipe out the other bases."

Frances looked up at him in alarm.

"But you won't go, Steve! You'll stay here, won't you? If it—if it wasn't so crowded, this house would be wonderful to live in!"

Steve smiled.

"It won't stay crowded, I suspect. And anyhow I'll remain right here and do some experimenting. We've started a new kind of science and I want to dig into it. That business of molecular motion, now—" Then he stopped. "I brought back what I told you I would. Found him among the released prisoners. He didn't mind coming for the job on hand."

Frances stared. She peered around Steve's shoulder at the patient-faced man—thin as from long hunger—who had taken Lucky Connor's place on the return journey.

She suddenly flushed crimson.

Steve reined his horse aside and beckoned to the thin man.

"Reverend, here's the lady," he said contentedly. "If it's all right with you, we'll have the wedding this afternoon."