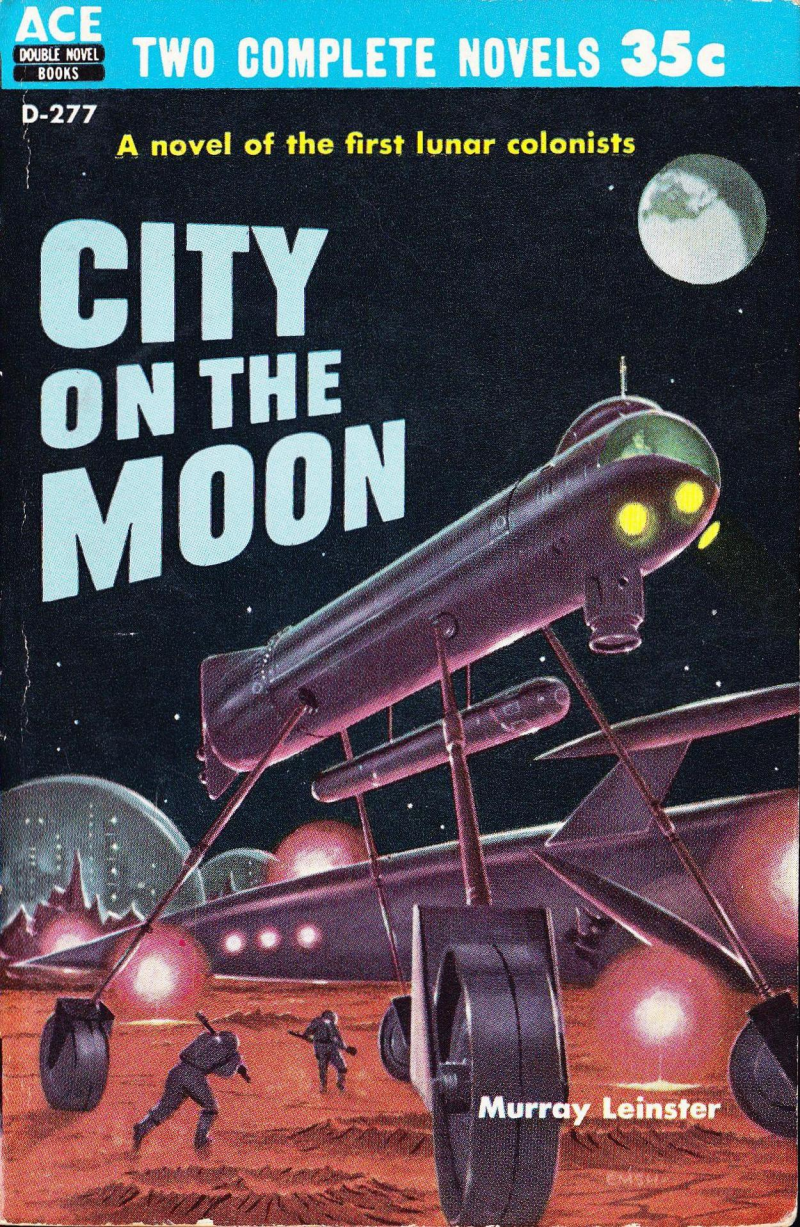
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CITY ON THE MOON
Murray Leinster

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The Author:

Will F. Jenkins, better known to readers under his popular pen-name of *Murray Leinster,* has been entertaining the public with his exciting fiction for several decades. Called the dean of modern science-fiction, he was writing these amazing super-science adventures back in the early twenties before there ever was such a thing as an all-fantasy magazine. His short stories, novelettes, and serial novels have appeared in most of the major American magazines, both slick and pulp, and many have been reprinted all over the world. He has made a distinguished name for himself (or rather two names!) in the fields of adventure, historical, western, sea and suspense stories.

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CITY ON THE MOON

by

MURRAY LEINSTER

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CITY ON THE MOON

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MEN ON THE MOON

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CHAPTER I. THE TRAP

THERE were clankings and motor noises inside the sealed body of the moon-jeep, but these were the only sounds anywhere. The huge metal wheels rolled over stone, and inside the jeep the din was audible, while outside there was utter silence. The great vehicle, with its dangling load, moved with the noiselessness of a phantom so far as the landscape was concerned. There could be no noise whatsoever outside the airtight tube which was the jeep's cabin. This was the moon, a world without air.

The vehicle moved among mountains, crawling on twenty-foot, spidery wheels over the fantastic terrain. The time was night, and the full Earth hung overhead, embedded in a sky of numberless, untwinkling stars. Earthlight poured down, casting shadows, and the moon-jeep glittered faintly as it moved among pinnacles and potholes in a nightmare of violence made real. This was the lunar surface, the scene of an ancient bombardment when meteors and mountains fell from the sky and ravaged the face of a world that was already dead. The moonscape was pure confusion; it was chaos; it was sheer desolation.

But in the jeep's cabin, there was comfort in the sighing sound of the motors. The clankings and clatterings transmitted through the wheels brought a sense of reassurance. There was no feeling of normality, of course. For one thing, weight was only one-sixth of weight on Earth. Joe Kenmore, driving the jeep, would have weighed only thirty pounds on a spring scale here, instead of one hundred and eighty.

He said over his shoulder, "It's strange that one feels at peace here—safer than in the City. But this is restful!

People should get away from crowded places once in a while."

The last was irony. Civilian City was three dust-heaps, lying some forty-odd tortuous miles away through the mountains. Moon-dust, piled untidily over inflated half-balloons, held those giant air bubbles safely confined—by its weight. The same moon-dust insulated the domes from the unbelievable cold of the two-week-long lunar night, as well as from the furnace heat produced by the succeeding fourteen days of glaring sun, untempered by air or clouds.

A hundred and fifty men lived and worked and squabbled in the City. In addition, there were spotter stations where radar marked the fall of the drone-rockets that brought supplies for the City from Earth. Then there were the military missile bases, which were the first footholds of mankind on any natural celestial body that was not man-made. Their positions were top secret. And beyond farside of the moon, remote in emptiness, was the Space Laboratory. This was the reason for Civilian City, the moon-jeep, the presence and Kenmore and Moreau in it, and for the assorted frantic happenings in the City and outside of it.

Moreau said abruptly, "But *I* do not feel safe. I have another sort of feeling, and I do not like it. There is no reason behind it, but I find myself thinking of my sins. That is a bad sign!"

Kenmore frowned. Sometimes Moreau was right. He was a member of the French group in the City—which had to be international if it was to exist at all. The American military missile bases on the moon were sources of hysterical distrust among the non-American nations. These bases could direct guided missiles anywhere on Earth, and no one could have the slightest hope of intercepting them. American bases kept peace on Earth, but

they hardly produced good will among men. Happenings in Civilian City proved that internationalization of the Space Laboratory project hadn't ended tension.

"I am thinking," Moreau said wryly, "that there have been four jeeps—on missions like ours—which never got back to the City. One of them, certainly, had been sabotaged by some one of our fellow citizens in the City. The breakdown of the second was at least suspicious. And the trails of the other two led into rockslides—somewhat improbable, because those routes had been shaken into stability by explosives. I do not think that any of those things were accidents, and I am uneasy. But I do not know why I am uneasy right now."

Joe Kenmore grunted and drove on. The operation of a moon-jeep really required four or five hands, extrasensory perception, the gift of prophecy, and three-way vision in the driver. Moon-jeeps were extremely exotic vehicles, developed from the straddle trucks of Earth for use in airless frigidity. Each of their four wheels revolved at the bottom of a stalk; each could be separately steered, and separately lifted over obstacles. The tubelike cabin was raised some thirty feet off the surface; it contained an insulated cargo compartment and a vast assortment of apparatus. Crawling among senselessly unflung masses of stone, among craters and debris and the craters-within-craters of the moon, this jeep looked rather like a silvery stick-insect on wheels. Its present load was an unmanned cargo-rocket from Earth, one which had fallen beyond these mountains and which it carried to Civilian City slug underneath its cabin, between its wheels.

"We ought to be all right," said Kenmore. "We're retracing our own trail."

The curious splashed track of jeep wheels in dust was plain to be seen in the headlight-glare. There was, of

course, moon-dust everywhere. The violent alternations of high temperature and low, between day and night, had cracked and splintered the surface stone everywhere, and then had fragmented the shards until almost every level place bore a thick, deep layer of dust that was as fine as talcum. Below some of the slopes there were even lakes of dust—and a dust-lake was a trap for men and all their machines. A jeep would sink into it as in quicksand, without hope of getting out. Any trail should last forever; there was no wind to disturb the least impression.

The moon-jeep trundled on, under a monster jagged monolith and around a pothole that extended down indefinitely. The outward trail was perfectly plain. It had been chosen on the basis of photographs taken from space, and since the jeep had traversed this trail once in safety, it should be perfectly safe for return.

"I am very kind to everyone in the City," added Moreau ruefully. "But still I fear that somebody might kill me as a matter of politics. Do you not feel something of the sort?"

Kenmore grunted again. There was a needle-shaped mass of stone—toppled as long as a hundred million years ago but still unweathered—in the path of the jeep. He worked the vehicle carefully up to the fallen giant. It would have to be stepped over—one wheel at a time must be lifted and carefully put down on the other side.

The jeep stopped, facing the barrier at an angle of some forty-five degress. Directly beyond the obstacle there was a monstrous wall of stone a good half-mile high, gleaming in the earthlight. Partly gleaming; there were shadows of absolute blackness where the outward-leaning portions screened it. The former trail of the jeep approached the cliff and swung off to the right, paralleling it. Kenmore, frowning in concentration, began the

lifting of the jeep's right-hand front wheel. It would be raised, the jeep moved forward, the wheel put down, and then the rear swung around to permit a lifting-over of the right rear wheel. Then, sidling for the purpose, the left front and left rear wheels would follow—and the jeep would go on.

There was an intolerable flash of blinding, perfectly white light—brighter than earthshine, brighter than Earth itself overhead, and brighter than the multiple headlights of the jeep. For an instant all the moonscape, all the jagged, tumbled, incredibly harsh and malignant area about the jeep was lighted as brightly as if in daylight. Then night fell again.

There was no sound, but the moon-jeep quivered from an impact transmitted through its wheels. Kenmore snapped levers home, and the jeep's three solidly touching wheels spun at the suddenness with which power reached them. The vehicle itself reeled as it plunged backward; then the partly raised wheel touched surface and the jeep fairly leaped to the rear. Almost instantly it spun about, on a point of pivot underneath itself, and darted away from the fallen monolith.

"You were right," said Kenmore.

The jeep plunged on. Its wheels clanged and bounced on the dust-covered stone beneath them; its headlights glared ahead. But the sensation of the ride was essentially that of a dream. In one-sixth gravity, no object falls fast. Upward bumps were abrupt, but landings were gentle; on the moon, an object falls less than three feet during its first second of free descent. This flight was like a nightmare.

"What . . ."

"Look behind!" Kenmore snapped.

Moreau flung himself to a port, stared, and his breath left him: The half-mile-high, light-streaked precipice

was crumbling before his eyes. It bulged; it leaned outward. Swiftly spreading cracks ran everywhere; gigantic masses of stone stirred in movement which was the more horrible because there should not ever be any such motion on the moon—movement which was not the motion of men or their machines.

It seemed that the cliff did not so much crumble downward as outward. It loomed above the fleeing jeep and shut out the stars; then it came down like the paw of some utterly monstrous creature.

But there was enormous deliberation in all save the frenzied flight of the jeep; the stony masses descended in slow motion. Objects on the moon fall approximately two and a half feet in the first second of fall, and roughly five in the next, and a little more than ten in the third. The flying fragments of the cliff seemed almost to float above the racing vehicle; but they descended, too, and their mass was monstrous. Kenmore somehow spared a hand to flip the controls that would close steel shutters over all the ports save those before him. They were meant for use in daylight against the baking heat, but they might protect the plastic ports.

Something hit a wheel; something incredible brushed the rearmost part of the cabin. Stones, rocks, boulders flew on before it, and settled almost deliberately to the ground—and the violence of their impact was proved by their splintering even as they bounced.

The jeep veered to one side to avoid a mass as big as a house, which landed a hundred yards ahead. It was too big to bounce, brittle with the more-than-liquid-air frigidity. The mass disintegrated as it touched, and instants later the jeep jolted crazily as its wheels ran over the spreading fragments.

Then the spotty earthlight itself—filtering through hurtling debris—was blotted out. Kenmore swore as

something taller than the jeep hurtled down before the driving-ports, and rolled onward, shedding parts of itself as it rolled. It seemed to waddle and carom between stony walls on either side. The clamor of stones falling on the jeep's steel body rose to an uproar in which one could not hear himself think.

Kenmore braked, his face twisted in a grimace; then he followed the monster closely. And suddenly the drumming of rock-splinters diminished. It almost ended —then there was an outrageous crash as some unseen missile struck. Afterward, there were merely sharp patterings of particles ranging from the size of one's fist to sand grains; then silence. In the sudden quiet a wheel thumped violently; the last impact had been upon it. Kenmore tensed, noting how bad the thump sounded. In any case, repair was impossible. Presently he stopped.

CHAPTER II. EMERGENCY LANDING

MOREAU crawled from where he had been flung by the gyrations of the jeep and stared at the dimly glowing instrument board, where Kenmore's eyes, also, were fixed. In the back of the jeep something clicked; there was a sighing as the air apparatus worked briefly. But the air pressure indicator did not stir; incredibly, the jeep was not losing its air to the vacuum outside. The plastic-glass-wool layers between inner and outer hulls had sealed off any cracks that may have come in the outside plating.

"That blast was fired too soon," said Joe Kenmore. "If we'd had one wheel all the way over the rock we stopped at, we'd be buried now."

Moreau swallowed. "A wheel—is bent," he said thinly. "Do you think we can return to the City on it?"

"No use even looking," Kenmore told him. "We'll run on it until it collapses—if it does. If the wheel falls off, that's that."

Moreau swallowed again. "That flash could have been a meteor. A meteor could have struck the top of the cliff . . ."

"Only it didn't," said Kenmore, savagely. "Vaporized iron wouldn't give a pure white light. That was magnesium marking-powder in liquid oxygen; we could make blasts like that!"

He had named the explosive which was at once the safest to ship by rocket—it is utterly harmless unless the ingredients are mixed—and the one whose constituents were normal supplies for Civilian City. Oxygen, of course, was for breathing; magnesium powder for a stalled jeep to spread over square miles of moon-dust by airjet, to mark its position so that it could be seen from space. No jet had thus been helped yet—before its crew was dead—but there was still hope.

"Then it was . . ." Moreau lapsed into infuriated syllables in his own language. If somebody had blasted down a cliff to destroy this jeep and murder its crew, some profanity was justified.

"That was meant to kill us, yes," said Kenmore. "It'll be interesting to find out who, besides us, was roaming around outside in a jeep. They'll be our would-be assassins."

He opened a drawer and took out the large-scale, space-photographs which were at once the maps and the surveys of this general area of the moon's surface.

After a time, Moreau said slowly, "Of course it could be that there are enemies of Civilian City who do not live in the City itself."

Kenmore said nothing. He clipped a photo to the map rack, where he could see it clearly, and began to edge

the jeep out of its still-unpleasant situation. The gigantic stone directly before them was surrounded by debris; boulders of all possible dimensions encircled it. The jeep could ride, lurching violently, over the smallest of these; it could get around some, and a few could be crossed by straddling. The rest had to be avoided altogether, if possible.

"Our would-be murderers," said Moreau unhappily, "could be fellow citizens of the City who disapprove of the entire project of which they are a part. Or they could be from Earth, secretly landed and operating from a base somehow established without the radars having detected them. But there are still some who say that the United States does not enjoy having people of other nations on the moon. They say that your—ah—military men may contrive accidents to be discouraging."

"You don't believe that!" snapped Kenmore.

"No," admitted Moreau, "I do not. Nor do I believe in a secret base established by our enemies. But some will say that the United States works covertly to sabotage the project to which it admitted other countries. The proposition is foolish, but it is believed."

Kenmore grunted. There was a crisis on Earth, which it was hoped the moon project would conquer. There had been twenty-odd known civilizations on Earth in the past, he recalled, and every one had reached a point of crisis and collapsed. China and Babylonia, Greece and Rome rose and fell—and they were at least as much civilizations as nations. Current, Western civilization was built on mechanical power rather than on human muscles; it had risen higher than any others. With power enough, men could make Earth a garden, and colonize the stars. *Man not only can do this,* Kenmore thought; *man must do it, or this civilization will decay. Civilization must climb, or die!*

But there was the question of power—its foundation. Coal and oil were limited; only atomic energy promised to let progress continue. Only atomic power involved radioactivity, and radioactivity meant danger. Already the background-count of splitting atoms in the atmosphere had multiplied eight times from the relatively trivial power-reactors in use. No matter how careful the screening, or how painstaking the disposal of atomic wastes, a steady trickle of atomic poison seeped into the air. There was a limit to the power that could be produced without destroying all life on Earth, and that limit had nearly been reached—without releasing enough power so that human civilization could continue to rise.

That was the reason for the Space Laboratory—to try to work out a new principle of releasing atomic energy. For the men in it, this was the most hazardous enterprise ever undertaken. The best brains of the human race worked feverishly amid atomic explosives more terrible than fusion bombs; every breath was peril; every heartbeat was likely to be their last. They did research too dangerous to attempt on Earth, or even on the moon; it had to be done forty thousand miles out in space, with the moon as a shield for Earth against what might happen in the Laboratory. Civilian City itself existed as a supply base for the Laboratory, as a place where men from the Lab might relax from time to time.

If the Laboratory succeeds, Kenmore thought, *Earth will become a garden and the stars may be ours.* It was the most splendid dream men had ever tried to realize. *But because of the nature of human beings, the hope itself has enemies.*

There are social systems which only work when men are half-starved and ignorant. There were nations where such systems still prevailed. Their ruling castes would be overthrown if prosperity reached the people; their

teachings could not survive enlightenment; their governments would be destroyed by progress. And to such nations, the purpose of the City and the Space Laboratory was a real and present danger. So there were spies and saboteurs who could earn fabulous rewards by any action which hampered or overthrew the moon project.

The jeep went thumping away from the place where it should have been overwhelmed. The wheel would last—or it would not. It would be absurd for Kenmore and Moreau to try to confront those who had set off the blast in such tangled territory as this. The culprits couldn't be found; moreover, the jeep was not equipped for fighting. No jeep was. Strangely, no weapons were permitted on the moon, outside the hidden military bases. *So the most ruthless of conflicts,* Kenmore thought, *for the highest stake ever fought for, has to be fought barehanded.* Jeeps could not fight save by ramming each other, and men could not offer battle but only practice assassination.

Cliffs drew aside on either hand. The limping, pounding, vehicle arrived at a vast open plain which was a lunar crater—its farther wall invisible below the nearby horizon. The tracks of its former journey, to pick up a freight drone-rocket and bring it back, were vividly clear in the earthlight. Kenmore swung in close to the cliffs from which he had emerged.

"They'll expect us to make a wide sweep to dodge another ambush," he said curtly, "so we'll disappoint them —I hope. We'll head back direct, before they can set up another deadfall. I wish we could use radio. With a dented wheel . . ."

The wheel thumped and pounded horribly, but radio was impossible. The lack of atmosphere on the moon meant that there was no inonosphere to refract radio

waves around the horizon. Radio worked, but for line-of-distances only. To communicate with Earth required microwaves to penetrate Earth's atmosphere, and a forty-foot reflector to direct them in a tight beam across two hundred thirty-six thousand miles of emptiness. Civilian City was barely forty miles away, but it was out of radio range on the moon.

Yet Kenmore threw on the communicator switch. A tinny voice spoke, and he stiffened. Then he heard the words:

"Calling Civilian City! Calling Civilian City! We have no beam! Come in, Civilian City!"

Moreau's mouth dropped open.

"I thought," said Kenmore, "that our friends back yonder might fake a distress call, hoping that we would be fools enough to answer. Then they could get a directional beam on us and guess how we'd try to get back."

The speaker hummed and hummed. The tinny voice cried:

"Calling Civilian City! Calling Civilian City! We're coming in! We have to! Give us a beam, Civilian City! This is emergency! We've got to have a beam! Come in! Come in!"

It could be nothing but the Earth-rocket—the passenger-carrying ship which made two trips each Earth-month. The rocket brought personnel and supplies, and carried back voluminous reports of scientific observations that were actually by-products of the real space project. The really essential work went on out at the Space Laboratory beyond farside. The Earth-rocket had left Earth six days before, and blasted up to the Space Platform—the artificial satellite circling Earth, which was mankind's first toe hold upon emptiness—and there had refueled for a second blast-out. For something over four days it had been in free fall toward the moon, its rockets silent. But

now the rockets flamed, and the ship needed a directional beam to land by—because nearly all the human activities on the moon took place in darkness.

Kenmore touched a button, and the jeep's port-shutters rolled back. He and Moreau could look straight up through the observation-blister above the cabin. There were the stars overhead, and the Earth a brilliant, frightening object in the sky. It was of a tawny-greenish shade, with distorted continents visible upon it, and there was a polar icecap to be seen. Round about it shone the stars, and everywhere that a glimmer of light could be, it was. The stars were of all the colors that light could be.

But close by the edge of Earth's dazzling face, there was a moving, blue-white flame—rocket fumes, illuminated by the hellfire that produced them. The rocket was already deep in the moon's shadow overhead. It might be five hundred miles up, or two hundred, or one; it looked like a bright and nearby nebula moving among the stars.

Kenmore stared up at it. The misty, corona-like brightness drifted slowly sidewise. It would be decelerating at an angle to the line between Earth and moon. Its pilot was matching lateral velocity with the moon's surface by tilting his ship. Lunar gravity was drawing the ship down; presently, giant braking rockets must be fired to check its fall completely, and land it very, very gently somewhere within a mile of the conical dust-heaps which were Civilian City. The inhabitants of the City should have heard these calls from space; they should be rejoicing. Some of them should have donned vacuum suits to go out into the frigid, airless night to watch the rocket come to the surface. They might do grotesque dances of welcome in the small gravity and the earthshine.

The tinny voice cracked suddenly, as if whoever spoke was nerve-racked past endurance:

"Calling Civilian City! Calling Civilian City! Listen, down there! This is the Earth rocket! We're coming in! We can't help it! We've got three passengers and two of them are women! Give us a beam to land by! Answer us! Answer!"

Moreau said uneasily, "Could there be sabotage of the beam? And why do they bring women to the moon? Nothing could be more insane!"

The voice from the speaker was abruptly hysterical: *"You fools!"* it cried frantically. *"Give us a beam! We've got to land! Come in, Civilian City! We've got Cecile Ducros on board, and a girl named Arlene Gray—"*

Joe Kenmore uttered a sound like a roar. He shook clenched fists at the sky. There was a girl he was going to marry, if he ever got back to Earth. Her name was Arlene Gray, and her father was associated with the Space Laboratory Project.

He jammed on the power and sent the moon-jeep leaping crazily across the crater's nearly level floor. It was useless, of course; Civilian City was forty miles away. On such tumbled surface as he had to cover, ten miles an hour was high speed. He might double it by sufficiently reckless driving, if the damaged wheel held up; but even so, he could not reach Civilian City in less than two hours. The rocket would have to come down in twenty minutes at most; perhaps ten. Possibly it must touch down somewhere even sooner . . .

The moon-jeep bumped crazily toward another route that would lead to the City. It threw up waves of powdery, slow-falling dust from the sides of its gigantic wheels, one of which was no longer round.

They heard the voice from the sky three times more, frantically calling for a landing-beam to guide it. The third time, the voice was very faint; the rocket was passing beyond the horizon.

The jeep sped on like a mad thing. Inside there were clankings and thumpings and the soft sighing sound of its engines. But outside, there was no sound at all.

CHAPTER III. DESERTED CITY

THE moon is a small world, its mountains tall. Therefore, when the moon-jeep came hurtling out of the last obstacle to sight, and the City was in line-of-sight below, the jeep was very high up indeed. The Apennines about it reached clutching, rocky fingers toward the stars, a full twenty thousand feet above the frozen lava sea that was the Mare Imbrium. In the pass, the jeep was three miles higher than the City. The vast, gently undulating *mare* reached out to a horizon which was no more than the place where stars began to shine. It was a seemingly limitless gray nothing—gray in the earthlight close below, but fading to utter blackness in the distance.

But there was no light where the City should be. Far, far out, Kenmore and Moreau could see a tiny winking splinter of brightness, but it was not the City.

"Call the City," panted Joe Kenmore. "Find out if the Earth-rocket got down safely!"

Moreau called; there was no answer. Their radio should reach the City; he called again, and again. There was no reply at all. The winking light far out on the *mare* could have answered, perhaps; but it disappeared as the jeep went hurtling down the tread-marked trail.

Sweat stood out on Kenmore's face as the radio remained obstinately silent. He could not see the City itself, of course. It was only three great dust-heaps, invisible a mile away. But there should be a light atop it; there should be glaring lights about the surfaced Earth-rocket as its cargo was unloaded and taken into the

City's air-locks. There should be jeeps carrying burdens, and the chest lights of vacuum-suited figures moving about. But there wasn't.

"Stop calling!" snapped Kenmore, when they were two-thirds of the way down the pass. "Something's happened!"

Moreau clicked off the transmitter. The jeep plunged down the carefully surveyed way, marked by the wheels of other jeeps on other journeys through these mountains. There were places where sheer drops of thousands of feet awaited the incautious. There was a long, crazily sloping hillside which ended abruptly; one could survive the descent only if he passed between two jagged monoliths on which the top-surfacing of moon-dust had the ironic look of snow.

They reached the level, frozen sea of stone, where jeep trails in the dust showed the way. The twenty-foot wheels of the vehicle rolled erratically—one of them thumped violently—as Kenmore drove downward through the night.

They reached the great dust-heaps which were the City, and still there were no lights—no light atop the dome, none at the air-lock. No jeeps even stood outside the City. There was nothing at all to indicate normal occupancy.

And there was no Earth-rocket.

Kenmore braked a hundred yards from the tunnel-like entrance to the main dome's air-lock. With Arlene Gray on his mind, he sweated, raged, and was numb with horror all at once. But Moreau said encouragingly, "If there had been true disaster, the domes would have collapsed. They have not."

True—the domes were intact, their conical shapes undisturbed. Moon-dust has a very small angle of repose, and if the inner bubble had collapsed, the cone itself

would show the fact. Even filled with uneasiness for Arlene, Kenmore realized that nothing so drastic as complete destruction had come upon Civilian City.

He struggled into his vacuum suit, but Moreau was ready first. He crowded into the jeep's small air-lock, and there was the clanking of the inner door and the thudding of the pump. Then the sound which was the opening of the outer door. Kenmore saw the jeep-lights' glare upon the dusty sea-surface, and on the square metal opening of the City's lock, and on upward-sloping flanks of impalpable gray dust. Moreau's shadow appeared, multiplied by the number of the lights. It was a group of shadows fanning out from his feet, all moving in jerky but precise imitation of each other.

Kenmore crawled into the lock. The pump began to thud, but he couldn't wait; he released the outer door, and it opened explosively. The air inside burst out, to be whipped away to nothingness. Kenmore swung down the rope ladder.

Moreau's voice—calm as usual—came in the helmet phone. "The lock-door is open. There are many footprints, all going out."

Kenmore moved to see. The immense loneliness a man feels in a vacuum suit on the moon was justified in a new fashion, now. To Joe, it was mingled with terror because of Arlene. Civilian City rose from the plain of the Mare Imbrium, some three miles from the foot of the Apennine range. And the lunar Apennines are spectacular. Now, in the curious reflected light from Earth, they looked like giant fingers reaching imploringly toward the sky. They were a jagged, tumultuous wall against the senselessly cheerful sky of stars. Earth shone brightly, impartially, upon them and upon the frozen sea. The Mare Imbrium was ever-so-gently less than perfectly flat; it had a bloom, a coating, which was a thin layer of

moon-dust. The earthlight served to emphasize a man's loneliness on a world where men did not belong.

Kenmore reached the air-lock, and Moreau pointed to more footprints. The powdered surface showed them clearly. There were many; too many. All moved outward.

The two went in and Moreau switched on the chest lights of his armor. He pressed the stud that should have closed the outer door; nothing happened.

Without a word, they hauled it shut by hand. Again Moreau struck the knob that should have opened the inner door; again nothing happened. Kenmore worked the manual handle—raging—and presently it yielded; there was a puffing of air. They entered the inner of the dome's double locks and closed the outer door. They opened the inner—and found themselves in absolute blackness. They were in the central air-space of the main dome of Civilian City, and no light glowed anywhere, save for those on the two vacuum suits; it was unthinkable.

The bubble under the dust-cone was very large. The floor was flat, of course. The air-space was a half-globe, three hundred feet across and a hundred and fifty high. It was circular, and around its rim were the ceilingless cubicles which provided office space and laboratory space and game areas, as well as merely furnishing arrangements for privacy, which was as needful as anything else. In the center were the Earth plants, which kept the air from smelling flat and stale, regulated humidity, and had some share in removing CO_2

But the room was dark. The plants had closed their blossoms, as if at night; their leaves drooped.

Kenmore swung around to look at a pressure gauge. There were a dozen about, each with its gong to give alarm if the pressure dropped a single ounce. The needles were far, far over into the red area, which meant

that vacuum suits must be worn within the dome. The pressure was five pounds, when normal was fourteen point seven. Kenmore tapped one instrument and the needle fell to indicate four point eight pounds. The temperature was forty-eight degrees. The City had not cooled unduly. He swallowed.

"Don't open your helmet," he warned Moreau by helmet phone. "The air hasn't gone, but it's going." Then he added, "See if anybody's dead."

But a glance at the rack for vacuum suits answered him. There had been a suit for everyone in the City, plus spares for normal outside activities. The usefulness of a vacuum suit which contained enough air for only two hours, could be doubted in a case like this. If there was a complete loss of air from the City, death would be inevitable. But such suits were handy for lesser emergencies, and they had been used. Everybody in the City had donned them and gone out.

Kenmore went quickly to the communications office, to the regular beam communicator to Earth. It was turned on, but no tubes glowed; no dial registered any output. It was dead.

"We'll try the other buildings," he said. "We want to know about the Earth-ship, too! It was coming in. What happened to it?"

Arlene Gray was on that ship. She shouldn't have been, Joe thought; no girl should come to the moon with the City's present state of technical equipment, or in the state of affairs among its inhabitants.

The lessened weight was nerve-racking; the constant confinement was frightening. But to go out into the outside emptiness was terror-inspiring. Neuroses would flourish on the moon in any case, but currently things were worse than merely neurotic. Rumors of the turmoil had gotten back to Earth, undoubtedly. So—the intent

was perfectly obvious—Cecile Ducros had come on the lavishly publicized Earth-ship. She was the most popular television personality on at least three continents. Her coming was a public-relations stunt to glamorize the entire project of a colony on the moon. Yet . . .

What had happened to the Earth-ship? At least two hours ago, it had expected to surface immediately. The rocket must be down by now—but where? It couldn't have stayed aloft; it didn't have enough fuel. It couldn't have gone back to Earth; it depended on extra rockets brought up by freight missiles. But the ship would have had no help in getting down anywhere. It didn't have a radar beam to guide it to a small, nearby area from which Civilian City could be reached on foot in vacuum suits.

And if it hadn't landed properly, then the ship had crashed in the Apennines. That mountain range is said to have the most spectacular scenery of any place on Earth or moon. But to try to find a crashed spacecraft among its thousands of peaks and multiple thousands of square miles . . .

Kenmore trembled, but he went hurriedly through the locks that led to the power dome, which was a second mound of moon-dust with a similar balloon inside. Here was the power equipment, the machine shops, and the primary generators. There were growing plants here, too, to help condition the air. But he found no light. This was as large as the main dome, and its machines glittered eerily in the inadequate light from the chest lamps of the two vacuum suits.

The air pressure here was three point two pounds, the temperature was thirty-eight. This dome had lost air faster than the main dome. The generator switches were off; somebody had carefully shut down everything before the City was abandoned. The huge tanks of reserve fuel

were intact. Normally, of course, the City's power came from mercury boilers outside. During the day, sunlight provided power without limit.

Moreau said mildly, "If someone does not run the generators, the boilers will pop off and the mercury will be lost when the sun rises."

But sunrise was an Earth-week off. Kenmore did not even think about it; he made incoherent noises of rage and anguish. He led the way frantically to the locks to the air-plant dome. Any part of the City could be shut off from any other. Naturally!

There was seven pounds pressure in the air dome, the temperature sixty degrees. The jungle-like masses of vegetation in the hydroponic tanks glittered in the lights from the two men's suits. There were towering racks of tanks, from which leaves extruded themselves extravagantly. The face-plates of their helmets tended to mist from the humidity here, thin as the air was. But one could survive in this dome without a vacuum suit. It would be like a very high mountain, but the low gravity would help. The demand of one's body for oxygen would be less; one could even be comfortable.

"I shall open my helmet," said Moreau's voice in the helmet phones. "Watch me, Joe."

He opened his face-plate; then his expression became one of pure astonishment. "One lives here! I hear snoring!"

He went scurrying through the passages between the low-level hydroponic troughs. Kenmore followed quickly.

There was a single, not-bright light. Against the side wall, an emergency lamp glowed in the vast darkness of the air dome. A huge, whiskered man snored loudly on a bunk by the lamp. Kenmore snapped open his own face-plate as Moreau kicked the bunk. "Wake up!" he snapped. "What's happened? Where are the people?"

Kenmore panted, "The Earth-ship! It was coming in! What happened to it?"

The whiskered man's eyes opened in the middle of a snore. He regarded them blankly; then he beamed. "You come, eh? *Kahk vasha zdarovya!* I waited for you. Pitkin fears nothing—not even Americans!" He stood up. "All the rest were frightened when the air began to go. The Director went gray with terror. He opened the secret instructions and left in the first jeep. But I knew the Americans would come before the City was destroyed. So I waited. Pitkin fears nothing!"

"What happened to the City?" demanded Moreau.

"The Earth-ship! The rocket!" panted Kenmore.

Pitkin waved a large hand. "The City leaked. That is all. Pressure began to drop two days ago. In all three domes at once. The Director was frightened. He tried to call Earth for orders, but there was no radio. He cried that there was sabotage—he was clever, eh?" Pitkin winked elaborately. "He knew the Americans were driving everybody out, so he led them all, in jeeps, to a missile base for safety. He had written instructions, and he was terrified, but he went. And all the others followed. All but Pitkin!"

"But the rocket!" cried Kenmore. "The rocket from Earth! Where did it land?"

Pitkin shrugged until his shoulders almost touched his ears. He looked at a clock and said placidly, "I have slept twelve hours. I know nothing of the rocket. But I know the Americans, eh? I knew you would come!"

Kenmore said fiercely to Moreau, "I'm going to hunt for it! It was coming down, and surely it had distance radar. Surely the skipper wouldn't be an idiot who couldn't tell the difference between the Apennines and the Mare Imbrium! I'll circle . . ."

He made for the air-lock. Moreau said thoughtfully,

"You found the leaks in this dome, Pitkin? You must have, to risk sleeping. What sort of leaks?"

"Razor slashes," said Pitkin blandly, "in the plastic wall behind a water tank, and elsewhere. The air went out. There were those who said that cosmic rays had rotted the plastic. But I—I am Pitkin! I guessed!" He winked again, wisely. "Americans do not wish any but Americans on the moon, eh? They drive them out of the City, eh? But I—I, Pitkin, become an American!"

Moreau said shortly, " Pitkin, you are a fool! We go to hunt for the rocket. If you can bring up the air pressure in this dome, it would be well to do it. We—ah—we will probably be back."

He ran after Kenmore—not Earth-fashion, but in the only way that one can travel fast in low gravity. He seemed to glide across the floor, almost as if he were on skates.

He went through the lock, into the main dome, and caught up with Kenmore in time to share the main lock with him.

In the lock, Moreau said wryly into his helmet phone, "Truly, Joe, the inhabitants of Luna are lunatics! Somebody sabotaged the City! It is madness!"

Kenmore did not answer; he acted as if he did not hear. He moved across the powdery-coated sea to the jeep, and swung up the ladder.

He opened the outer lock-door and paused. "I remember something," he said with an air of great calm and reasonableness. "As we came down the pass I saw a light out on the *mare*. It was winking. It could have been a jeep coming to the City, but a jeep should have gotten here by now. I'm going to see if it could possibly be the rocket."

"Excellent," said Moreau gravely. "It is most promising!"

CHAPTER IV. ARELENE GRAY

KENMORE crowded into the small air-lock. Moreau followed to its outer door and grasped the outer catch. But when Kenmore closed the inner seal so that the outer could open again, Moreau was taken unaware. The lock-door swung open; he lost balance, and it slammed shut again. Its cycle would be automatic; it was locked until the inner door was opened and closed again.

The jeep started off instantly, and Moreau was left dangling on the ladder. He swore violently in his own language and banged on the lock as the speed of the jeep increased. There would be other bangings audible to Joe Kenmore, inside. The dented wheel made a rhythmic bumping at each revolution. The speed increased yet more, and Moreau swore still more violently. He banged in a pattern: three deliberate bangs, three quick ones, and three deliberate ones. *SOS*. He repeated it.

The jeep hit its maximum speed of forty miles an hour over the undulating, dust-covered sea-surface. The earthshine made it look like a snowfield, save that the jeep's wheels splashed up the whitish stuff like a liquid. With no air to scatter its particles, the stuff settled down again, slowly, also like a liquid. The jeep left twin, non-spreading wakes behind its wheels; they looked like double furrows, slowly subsiding behind.

Moreau achieved unsuspected eloquence in his profanity as he was flung about. To fall, now, might mean to be thrown beneath those giant wheels. In any event, to walk back to the City was hardly practical, and might be impossible. With no lights to guide him, and only the ramparts of the Apennines for markers, he could pass

the City by without seeing it. And he had not topped his air tanks lately.

Moreau hung by one hand and both feet to the whipping rope ladder. He fumbled behind his shoulder and brought out a signal rocket. He tapped off its guard cap against the solid, wildly swaying cabin overhead, and squeezed the rocket's tail when he thought he had it aimed just right. It erupted lurid, red sparks and leaped out of his hand. It struck the ground, bounced up, and bounced again. It flew ahead of the jeep; Kenmore could not possibly fail to see it and be reminded of Moreau's existence.

The jeep slowed to a stop, and its inner lock-door clanked. Moreau heard it when his helmet pressed against the outer one. He opened the outer door, crawled inside, and thankfully shut the outer door behind him.

The jeep was already in motion again when he wormed himself up into the cabin. Then emotion overcame him. He took off his helmet and expressed himself at furious length—but unintelligibly to Joe Kenmore.

"I'm sorry," said Kenmore tonelessly, when he was out of breath. "I heard the lock and thought you were inside. Then I stopped thinking about you. I'm trying to think straight, and it's not easy. Arlene is down somewhere on the moon. With luck, she may be out here. But if the ship came down in the Apennines . . ."

His voice cut off with a click. He drove, staring out where the rays of the jeep's lights brightened the surface. But he could not see far; the surface of the Mare Imbrium here was almost perfectly level, the horizon two miles away. Moreover, earthlight on the moon—like moonlight on the Earth—is vastly deceptive. If the Earthship was down on the Mare Imbrium, it would show up by daylight, true—but daylight was a hundred and fifty hours away. The ship had to be found now!

So Kenmore drove straight ahead, staring desperately to either side, until he was sure he'd gone past where he'd seen the light. Then he drove out . . .

He made circles. He made loops. He tried frantically to organize his efforts; yet when it came time to make a turn, he felt desperately certain that if he only kept on a little farther . . .

And over and above his own and Arlene's disaster, there was a greater one in prospect—even for them. Because Civilian City and the Space Laboratory were, after all, the ultimate strivings of civilization to make itself secure and strong, and to establish a new dynamism in the overall activity of humankind. War would end all civilization, but war was impossible only because of the missile bases on the moon. So long as they stood, the world and humankind was safe from its own folly, because they were in hands which recognized war as a form of suicide and would not permit it.

But there had been one man in the City who knew the position of the nearest missile base. Directions for reaching it had been entrusted to him—directions tightly sealed, for use only in the direst of emergencies. That man had panicked and opened the sealed memorandum; now he led the City's population to a missile base which could not possibly shelter all the refugees. Presently, there would be citizens of the City in each of the missile bases.

Some of the refugees could know and remember their locations—which would thereupon no longer be secret. Then it would be possible for someone to send up pods of bombing rockets, radar-masked, to blast the defenders of the world's peace and all its hopes. Once that happened, the Space Laboratory would hold no more promise, and Earth would soon be racked with war.

But Kenmore put these facts and speculations aside. Arlene was somewhere on the moon.

After a long time, Moreau heard him trying to swallow. His throat made sounds, but his swallowing apparatus did not work. "It—couldn't have been more than twenty miles out," he said. "We saw it, only I didn't notice the bearing. It's good astrogation to land on the dark side of the moon, within twenty miles of one's target, when there's no ground-radar to help. It's too good to expect, but it's not too much to hope for . . ."

Moreau said detachedly, "You feel frustrated, Joe—the way I did when I could not make you notice my bangings on the air-lock. Ha! I used a signal rocket to catch your attention!"

Kenmore was tense and strained past endurance. He said violently, "We fire signal rockets! Now!"

He plucked at the cover of the firing buttons for the signal rockets mounted in the jeep-cabin roof. Moreau said, "Wait until I climb to where I can look out of the observation-blister!"

He went behind the driver's seat, up the cleats on the wall. Moreau stared out of the ceiling port, which was shaped like a goldfish bowl and presented direct vision to the sides and the rear, as well as above and ahead. Kenmore brought the jeep to a halt.

His hand shook as he stabbed a firing button. There was a growling, and then silence. In Kenmore's eyes the powdery surface of the lava sea took on a reddish tint. Signal rockets for moon use leave a long-lasting trail of red fire, because a line of light is always artificial, and really vivid red is the rarest color among stars. It shows best against the lunar sky.

The signal rocket went away and up and up. It rose much faster than one shot from Earth, and many times

higher; but it would not reach to the top of the Apennines against the horizon.

The jeep was still; Kenmore heard his own harsh breathing. The signal rocket dwindled and dwindled . . . It went out.

Five minutes later a thread of red light rose from below the horizon to the north.

"Take bearings!" said Moreau urgently. "Joe, take bearings!"

Kenmore took a bearing; his hands shook. He fired two more signal rockets, branching away from each other, in conventional acknowledgment that the previous signal had been seen. Then the jeep swung into its highest speed, bumping over the Mare Imbrium.

It was a long way, and to Kenmore it seemed a longer time. Once again a signal rocket rose. It seemed to be a call for haste, and Kenmore's heart was pumping; he could not seem to go fast enough. He said jerkily, "I've half a mind to dump the load we're carrying!"

"We bounce sufficiently as it is. The load at least keeps us from taking off like a rocket ourselves."

And so the jeep went racketing and clanking and bumping over a surface that looked like solidified pitch with a light powdering of grayish snow. The dust spurted up like liquid and settled like a plowed furrow, and there was not a whisper of sound outside, but a thunderous bumping of the dented wheel within.

A third signal rocket rose in the night; they saw it rise. Kenmore wheeled the jeep—he had been about to race past—and trundled toward the spot. He trembled a little as he swept the search beam back and forth.

He saw the Earth-rocket. It had not made a good surfacing. It lay on its side, which was something of a catastrophe in itself. Much more ominous, there were figures in vacuum suits already outside it.

When the jeep stopped, within yards, Moreau was ready to swing down the ladder to help. Kenmore said hoarsely into the talkie-microphone, "Arlene?"

Her voice came happily from the speaker: "I knew you'd find us, Joe!"

A new, indignant male voice cut in. "What happened to the beam? We could get no response from the City! This is the devil of a way to run the moon!"

Then Moreau spoke suavely, and his voice came from the speaker too. "There is some slight confusion in Civilian City, Captain. Usually we live in chaos. Now there is merely confusion, so we do not know how to act under such conditions."

From the speaker came the chattering of teeth. Moreau went on briskly:

"The two ladies first. Up the rope ladder, *ma'mselles,* and into that thing which looks like a milk can dangling under the body of a jeep. You will enter it and close the door by which you enter. Above you will find a handle. It will not turn until the lower door is shut. Turn it, and you will be welcomed into our jeep."

The air-lock clanked. A moment later, a helmeted head came up from the jeep's floor behind Kenmore. Then, through chattering teeth, came the most coldly furious voice he had ever heard: "Someone weel pay for theesl"

It was dark, and he could not see her. He said urgently, "Move back, please. Away from me. And close the lock-door."

He did it himself, with his hands still gloved against vacuum. Blessedly, he heard the lock clank again. An instant later, another helmeted figure stood up. The face-plate opened, and Kenmore made an inarticulate sound of relief. But Arlene said quickly, "We've been outside for hours, Joe. Don't touch me! I'm—rather chilly!"

He remembered to turn on the inner lights of the ship, and looked hungrily at her. Her suit was cold enough. An hour outside, with the surface at two hundred fifty-odd below zero, meant that the exterior of even a heated suit was cold! Frost condensed upon the corrugated armor; fog formed like a gown and flowed down to the floor.

Arlene smiled at him shakily.

"The rocket toppled over when it landed, and a vision port cracked. We've been hooked in direct to the ship's reserve tanks for hours—in our suits. I'm—rather glad you came!"

The furious voice said again—and again icily, "Someone is going to pay for this!"

There was a pounding outside. Kenmore closed the lock, as Arlene stepped away. A man came up and took a deep breath of the jeep's air; another man. Yet another. When Moreau came inside, last of all, the jeep was almost unbearably crowded.

Kenmore threw in the power and headed back for the empty Civilian City. The rocket skipper managed to edge past the others to protest bitterly, "There was no radar beacon! Why? Why was there no light for us in landing? Was it intended that we crash?"

Kenmore replied with equal bitterness. "It's rather likely. The radio and radar communications of the City were sabotaged, together with the City itself."

"Sabotaged? Why?"

"It is an example," Kenmore told him furiously, "of the working of that form of international co-operation for a splendid objective, which consists of everybody cutting everybody else's throat—without regard to his own!"

"I do not consider that," objected the skipper hotly, "an answer to my protest!"

"Make it again to higher authority!"

Kenmore drove with both hands and both feet, and still had some need of extra members. He watched the surface in the glare-lamp glow. Presently he saw a jeep trail—rather, the trail of many jeeps all traveling in the same line. He swung to follow it toward the Apennines and the City. The people of the City had left in jeeps, naturally. It was not less than four hundred miles to the nearest armed-forces missile base, if one knew the way. The City's inhabitants could all crowd into the normal number of jeeps at the City, though the air would go bad on a long journey. This would be their trail. Kenmore backtracked it.

In half an hour, the dust-heaps which were the City loomed up again. Kenmore stopped the jeep very close, and Moreau briskly took charge of the exit. The City's entrance-lock was only yards away, and the jeep's lamps shone brightly on it. Moreau had the rescued ones turn on their chest lamps even before they got into the lock. He herded them in a line as they reached the ground; he took them to the lock. They crowded in. The door closed, and they were on their way into that abysmally dark, artificial cavern in two of whose three parts there was not enough air to keep them alive.

Kenmore had made no move to don his helmet. Without words, Arlene had remained behind, too; they were alone.

"If I'd known you even dreamed of coming up here," said Kenmore wretchedly, "I'd have warned you. It's bad, Arlene! It's a madhouse, and there are times when it looks like a suicide club!"

"*You're* here." After a moment, she added, "You didn't ask how I managed it. Cecile Ducros was hired by the Moon Corporation to come up and do some telecasts. There've been rumors of unpleasant things happening. The United Nations has heard there's been discrimina-

tion against non-Americans. Since we reached the moon first, and set up bases here, there's profound suspicion of us, Joe. There've been open insults. There was a movement in Congress, too, to call the whole thing off. But all the other nations yelled murder, so something had to be done."

Kenmore couldn't say anything. He slumped in his seat.

"So," said Arlene, "it's to be glamorized. Cecile Ducros can glamorize anything. She makes a business of it—beginning with herself. I don't know what she charged for this job, but it must have been plenty! She's been scared every second of the time. And she had to have somebody along who'd be able to go places and gather material for her. Somebody who'd have a faint idea of what it was all about, to tell her the woman's angle. That person turned out to be me. Aren't you pleased?"

"I'm rather—fond of you," said Kenmore. He grimaced. "You know how I feel about you, Arlene. And therefore I'd give everything I've got to have you safe back on Earth again. You see, it isn't only lunacy that's been happening here!"

"What else?"

"Everything! The real reason for coming to the moon, aside from the military one, is what we call the Laboratory, floating in space beyond farside. There are some theories about atomic energy that are too dangerous to try out on Earth. Even on the moon they might not be safe to try. It's nuclear stuff from a brand-new angle. I don't understand it, but it's needed! If it's worked out, it'll either be so dangerous that it can't even be used as a weapon, or so safe that even politicians can't use it for any harm."

Arlene raised her eyebrows. "Is there such a thing?"

"There is," said Kenmore. "Space-travel aside, there's

power—unlimited power for everybody on Earth. Power to grow posies in Antarctica, if anybody wants to. Power to freshen salt water and irrigate the Sahara. Power to turn the Gobi into a garden. For the immediate future that's what the whole moon project is for—to furnish and supply a laboratory where the most dangerous experiments men ever imagined can be done safely, though not safely for the men who do them. But you know all this!"

"Most of it," Arlene admitted.

They were close together in the moon-jeep, but they wore the clumsy vacuum suits needed for movement outside. Arlene loosened the neck-clamps of her helmet and slipped it off. She shook her head as if in relief at the free movement of her hair. She smiled at Joe.

"It should have been rather good to work up here," said Kenmore, tiredly. "But it hasn't been. There was trouble on Earth with spies and saboteurs. It seemed they'd be left behind. But if we didn't bring some with us, we developed some after we got here. It's international co-operation—which means throat-cutting, here. There's suspicion. There are factions. Nobody can accomplish anything, because everybody wants a monopoly on accomplishment. Everybody fights to keep everybody else from getting ahead of him, with the result that everybody goes backwards."

Arlene smiled again at him in the jeep cabin on the Mare Imbrium on the moon, with the earthshine like silvery twilight outside.

"I could give you details, only they don't make sense," said Kenmore. "But the third-raters and the crackpots play ball with each other to prevent anybody else from doing anything the third-raters can't do. There's been every form of insane behavior that humans ever contrived, plus a few we made up for ourselves."

"Including," said Arlene cheerfully, "hauling a tele-

vision personality and me up here to do broadcasts, pretending everything is peaches and whipped cream."

Kenmore laughed without being amused. "Which she won't do. I've heard this Cecile person speak just twice, up here. Both times she said, 'Somebody is going to pay for this!'"

Arlene laughed softly. "Somebody will! The woman likes money, Joe. She adores it. She will even risk her remarkably well-formed neck for it. She has! And she *will* collect! She has a broadcast due in something like two and a half hours."

"The communicator to Earth is sabotaged," said Kenmore.

"She has her own electronics man with her. He can make electrons jump through hoops. If he gets her just fifteen minutes' conversation with Earth before her broadcast . . ."

"What?"

"She'll make Civilian City sound like an unearthly paradise," Arlene assured him. "We'll almost believe it ourselves, listening to her and watching her! Want to bet?"

Kenmore grunted and flicked off the inside lights. "We'll go into the City and see what's turned up. The air dome seems to be holding pressure, though the others are going empty. The others must be sieves! Come along. But . . ."

They were very close together. There was silence for a moment. Vacuum suits are clumsy things to wear, but Arlene had taken off her helmet and Kenmore was not wearing his. After an interval, Arlene sighed contentedly. "You do have nice ideas, Joe!"

"Put on your helmet," he commanded. "Don't get any of your hair between the gaskets. It'll make a leak."

Arlene obeyed. Then she said, "Considering that I'm

one of the first two girls ever to get to the moon, and all . . . don't you think it likely I'm the first girl ever to be kissed here?" Then she added hopefully, "Anyhow in a moon-jeep?"

"It's very likely," agreed Kenmore drily. "And if you are very good indeed, maybe you'll be the first girl ever to be kissed in Civilian City, too! But I'd give a lot if you were safely back on Earth!"

He went first out of the air-lock. He was waiting for her as she came down the swaying rope ladder. They moved toward the triple dust-heap which was the abandoned habitation of human beings on the moon.

CHAPTER V. CECILE DUCROS

THE manners of human beings are peculiar; the customs of human beings are strange—but the reactions of human beings in situations of emergency and danger approach insanity. The conduct of the few remaining human beings in Civilian City was a perfect example of the fact.

Pitkin had the air pressure up to eight pounds in the air-dome. He'd added a soupçon of extra oxygen and zestfully started the dome's separate generator, kept ready for emergency and now definitely required. Cecile Ducros removed her vacuum-suit helmet and exposed the most icily-furious face that Joe Kenmore had ever seen. She gave orders; she was a very beautiful woman, but her voice crackled. As she instructed Lezd, her private electronics technician, she slipped into her native language and it sounded as if she were uttering whipcracks instead of words. But she did not waste energy in tears.

Lezd buttoned his face-plate and, with Pitkin to guide him, went into the power dome. There they labored.

Presently the lights all over the City came on dimly and brightened; then the three artificial caverns were as brilliantly illuminated as ever. Everything looked very cozy, but in two of the three domes there was still not enough air to keep a human being alive.

Lezd looked over the complex Earth-beam apparatus in the main dome. Kenmore worked over a matter he considered important. Moreau, beaming, sat beside Cecile Ducros, with Arlene listening imperturbably, and answered questions the television star shot at him.

Cecile Ducros was not using the charm at just this moment; she hadn't turned it on. She was using an excellent brain for a highly specific purpose, which under the circumstances was as unlikely as could be imagined. With Civilian City abandoned and leaking; with a story of sabotage to curl the hair; with a tale of personal danger to make all her television audience gasp for breath, and an exposé of indifference to her safety that would rouse a storm of protest among her fans—with all this, Cecile Ducros was getting the material for a broadcast on the charming aspects of lunar civilization.

One hour before broadcast time, her technician had the beam in operation back to Earth. He plugged in a connection to her in the air dome, and she talked in infuriated French, with a cold-blooded fury that was daunting—even if one did not understand a word she said.

Kenmore came back into the air dome to make sure that Arlene was all right. She smiled at him, indicating Cecile and Moreau.

"She'll make the broadcast," Arlene said in a low tone. "She's told Earth what happened. She swore she'd broadcast the whole story—unless! And if they keep her off the air for this broadcast, she'll tell it next time, or next, or next. They've got to pay her for all her suffering, or she

tells the world about it! But they will pay her, so she's going to broadcast on the charm of lunar living."

"But why," demanded Kenmore, "why didn't Earth notify the missile base, and arrange a guide-beam for the rocket? Or at least have a jeep come over to talk it down? What *did* happen?"

Arlene said in the same low tone, "The Earth transmitter was out. Sabotage, too. Timed together for maximum effect. You see the point?"

"I can guess it. Each transmitter thought the other was taking care of the rocket. So the rocket came on out —it could hardly stop, anyhow—and it should have crashed on landing. Everybody should have been killed, and right on top of it the world should learn that the armed forces of the missile bases had evacuated all civilian personnel from Civilian City and were shipping them back to Earth. All Europe would believe that we scoundrelly Americans had faked the disaster and let the rocket crash for an excuse to get everybody but Americans off the moon!" Then he said coldly, "You'd have been killed too."

She nodded. "I would."

Kenmore ground his teeth. "Eventually, I'm going to kill somebody for this! But I've worked. I've located some of the leaks in the main dome. I've been stopping them. Would you like to help?"

They went into the main dome. Kenmore had a small air cylinder, with a hose which ran into a bucket filled with foaming material much more enduring than soapsuds. In the dome's low pressure, a very little air made a lot of foam. Joe swept the white stuff against the side walls. Visible areas of plastic could be disregarded; no saboteur would cut slashes in the plastic where it could be seen. But if one painted the foam around the edges of an object against the wall—why, any leak behind it made

the foam disappear. It was the automobilist's old trick of dipping a leaky tube in water and watching for bubbles to appear. Only Kenmore, of course, was working the trick in exact reverse.

The two figures in vacuum suits looked very small as they labored in the huge and brightly lighted dome. They looked absurd. The building was out of all proportion to their size. But on the moon, a building has to be larger than one on Earth, to shelter a corresponding number of people. Moon buildings have not only to contain the people, but all the out-of-doors that on Earth serves to grow food and purify the air they breathe.

Very shortly, a pattern began to appear in the manner of the sabotage. Each leak Kenmore found was a neat slash in the plastic, cutting through to the dust outside. The dust was so finely divided that it would flow like a liquid. Air could go out, but no dust appeared inside. There was still some air pressure within, and it became apparent that the sabotage had been done with such deliberation that it had become routine. Where a partition of one of the privacy cubicles touched the side wall of the dome, a razor blade had been thrust behind the corner and a slash made. There was one slash at the bottom, a few inches from the floor; there was another at the top, just a couple of inches higher than it was quite convenient for Kenmore to reach.

Presently he stopped using the foam; he knew where to look. He said evenly, "One man did all this. He got systematic about it."

Arlene watched, after that. Kenmore worked on, until he had gone completely around the vast enclosure. He said angrily, "It ought to be tight now! I don't like the idea of a man doing a job like this, as if he had all the time there was!"

His earphones almost bellowed at him.

"We go on the air," snarled the voice of Cecile Ducros, "in just five minutes! Where are you, Kenmore! Come at once!"

Arlene heard the summons, too. She grimaced and went with Kenmore through the lock into the dome of the hydroponic gardens. There was a camera set up, and a beautifully lighted set—lurid with flowers from the troughs—and Cecile Ducros was pacing up and down, deliberately getting the feel of the light gravity, with a cold intentness and absorption.

She looked up and snapped, "You remain in your vacuum suit. Arlene, you also! You come on after seven minutes. You will be on for four." She looked balefully at Moreau. "The specimens! The ingots! Get them!" She snapped at Pitkin: "One sound from you during the broadcast and I'll strangle you personally!"

It was remarkable, and it was insane to be preparing the equivalent of a normal studio broadcast in the evacuated, leaking buildings of Civilian City, with a history of past cold-blooded sabotage, with recriminations and controversy to come. But Cecile Ducros did it.

Lezd, the electronics man, worked the television camera himself. He performed the feat with nonchalance and matter-of-fact skill. The lights were perfect. A sweep-second hand went around and around. Cecile Ducros watched it, with the camera trained on her. And suddenly she was smiling a sleepy, heavy-lidded, mysterious sort of smile at the camera lens and speaking with a very delicate intensification of accent.

"How do you do? Thees is your leetle Cecile Ducros, and I speak to you tonight from the moon. We grounded her-re—or should I say we mooned?—some hours ago, and I have been charmed, I have been fasceenated, I have been ravished by what I see! Look! These blossoms!

They gr-row here, and they purify the air. Look-look-look-look!"

She swept her arms to guide her audience's eyes. Then she smiled upon Moreau, and at the cue he ambled fatuously into the camera's range. "Here is someone who leeves here—a man een the moon! Eet would be charming to walk in the earthlight with heem!" She sighed. "Ah, I am so susceptible!"

Kenmore and Arlene, standing just off the set, could see the whole of it—the beautifully calculated tricks by which Cecile appeared so charming, the perfect timing with which she shifted moods, the seeming spontaneity with which she appeared to think of calling onstage Captain Osgood, who had skippered the Earthship up to the moon, and the deftness with which she admired the wonderful navigation—or was eet astrogation, Capitaine? What was the word for steering a sheep in space? —the wonderful skeel with wheech the sheep had been brought to rest so perfectly . . .

She dismissed him, then called on Kenmore and Arlene, and explained that they had been out-of-doors, walking in the earthlight. Then she shifted position—with the camera following her—and there were specimens of lunar rock-formations, and a great boulder of quartz rock with wire-gold in it. Her eyes grew wide as she told of the mines where such things were found. And these, she explained excitedly, were ingots of gold! So many! They were worth thousands of thousands of dollars back on Earth!

But the charmeeng thing was also the lightness with wheech one walked on the moon!

Then there was another background, and Cecile Ducros showed how anyone—anyone at all—could toe-dance upon the moon, and she lifted her skirts to show the justly famous gams and did no less than twenty-two

entrechats in one graceful leap. She reminded them that Nijinsky himself had done no more than ten on Earth, but weeth science to come to the aid of woman, she had visibly surpassed him. . . .

It was an amazing performance. It seemed that she called at random upon members of a well-populated city to grace her production, yet there were exactly eight people in the whole settlement besides herself and Arlene. She beautifully canceled out all rumors and made ridiculous any that might be started in the future, about an operation to force the abandonment of the City, as a ruthless act of Americans to force non-Americans off the moon. It was a strictly professional job.

When she smiled that same sleepy smile at her audience back on Earth, and looked wistful because she was leaving them, and then called Moreau back into camera range and looked up at him and sighed, "Ah, I am so susceptible!" and then signed off—why, up to that moment she had been convincing enough to carry even Kenmore and the others along with her.

But when the camera clicked off, she said viciously, "Now, who was it that tried to kill me? What villains . . ."

And having completed her broadcast, she allowed herself the luxury of a full-scale tantrum.

Kenmore grimly took over the communicator in the main dome. He heard only part of the very fine example of artistic temperament which a thoroughly scared woman allowed herself, when she could afford it—and not before. He got Earth. Then he got Major Gray at Bootstrap, which was the Earth terminal for all space activities—the space platform and the moon. Major Gray happened to be Arlene's father, and the fact had probably determined Arlene's choice as a companion for the television star. She would have been indoctrinated on mat-

ters of security; she would see that Cecile Ducros was discreet.

There was a scrambler on the audio beam, of course. Even the sound portion of the visicast had been scrambled on the moon and unscrambled back on Earth before being passed on to the television networks. It was possible to talk confidentially. Kenmore savagely told Gray just what had happened.

Major Gray uttered one explosive word and then said coldly, "She's safe now?" He meant Arlene.

"Now, yes," said Kenmore shortly. "But she should come back to Earth right away!"

There was an interval of something over three seconds between the end of a comment to Earth, and the beginning of Gray's reply. It took half that time for the radio waves to reach Earth, and half again for the beginning of the reply to get to the moon.

"This place is a madhouse!" snapped Kenmore. "It needn't have been abandoned! Apparently nobody thought of trying to do anything without orders! It should be a pioneer town, but it's filled up with government clerks from a dozen different nations! Good men in their way, but they think that what isn't ordered is forbidden!"

A three-second pause. Major Gray's voice: *"Do you want me to pass that comment on?"*

"I wish you would. This City's been run according to ironclad instructions from Earth. That should mean efficiency, but it works out to lunacy! Nobody can do anything without authority for it, so anybody who has the capacity to get something done has to use all his brains getting orders issued! It's bound to end up in somebody cracking up from pure futility!"

Again a long pause. Gray: *"Go on."*

"I'm sounding off," said Kenmore coldly, "because I'll

undoubtedly be in great disfavor here for what I've done. When I got here, the only man in the City was Pitkin. He was sleeping happily. I've taken command because I'm the only one who seems to have any idea that anything *can* be done! I assume that help will be coming from the nearest missile base; meanwhile, I've patched the main dome so it holds air, and I'm setting Moreau to repair the power dome. Then I'm going out to see if the Earth-ship can be repaired to get Arlene and Cecile Ducros back to Earth."

A long pause. Major Gray: *"Then what?"*

"Then," said Kenmore, "I'm going to kill somebody."

He clicked off. When he turned, Lezd—the electronics technician who had accompanied Cecile Ducros to handle the technical end of the broadcasts—was regarding him.

Lezd said with detachment, "This is the way one talks to his superiors?"

"When necessary," Kenmore told him. "What about it?'

"I like it," said Lezd. He nodded and turned away.

Kenmore growled. He had been a minor figure, here on the moon. He had been among the first to land, and his experience was outstanding. But authority could not be distributed—not in an international, co-operative enterprise—on the basis of experience or ability.

When there was relative safety for everybody, political considerations dictated highly unrealistic divisions of position and command. But now there was disaster and a man who knew what to do had to take command, because nobody else could.

Kenmore got Moreau back into a vacuum suit and took him into the power dome. He walked purposefully to a place where the fuel tanks that held 80% hydrogen peroxide—which must not be frozen—stood against the wall.

"There'll be a slash in the plastic here," he said, pointing, "and another one there. Somebody went comfortably about to make the City uninhabitable. Look!"

Moreau looked, and stared. "How did you know?"

"Pattern of action," said Kenmore. "Find and fix them."

CHAPTER VI. THE SHUTTLE

HE WENT back to the air dome, where Pitkin beamed amiably at the still-storming Cecile. Arlene's eyes turned to him.

"I'm going out to look around," he told her. "And I've got to check on the jeep. You'd better get some rest."

She shook her head. "I couldn't! I'm not used to being on the moon, Joe. I don't want to sleep yet! Besides, there was nothing to do in the ship coming up. We coasted for days! I'm rested!"

"Top your suit tank, then," he told her curtly.

He showed her how to check the contents of her vacuum-suit's air tanks. He checked and topped his own. They went out.

There was a truly deadly tranquillity in the night outside. In a sense it was not really night; the vast round disk of Earth with its seas and icecaps filled a vast amount of the sky, and its light was bright. Since it was midnight on the moon, the Earth was necessarily full, and its reflected light on the peaks and sea was at least equal to twilight at home. There was utter stillness everywhere. Nothing moved; nothing made a sound. In a vacuum suit, of course, one could hear one's own breathing, and the earphones brought the breathing of anybody else whose talkie was turned on. One heard one's crunching footfalls on the moon-dust. But the silence and the stillness beyond that was appalling.

Kenmore pointed. "The generators are working again," he told Arlene, "so there's a light at the top of the City. Not full brightness yet, though. There'll be other lights presently, there and at the lock. You mustn't ever go out of sight of the City under any circumstances! Stay close to me."

She did not need to answer; she moved closer. The loneliness of the landscape made separation a frightening idea. At midnight on the moon, the ground had been radiating its heat to empty space for all of a hundred and fifty hours. And empty space is cold! The stone underfoot was actually colder than liquid air. Earthshine seemed bright, but it yielded no appreciable heat. And yet it was much more practical to move about on the moon in such frigidity than to try to perform any action out of shelter in the day. A suit could be kept heated at the temperature about them now, but it wasn't practical to try to cool a vacuum suit in lunar sunshine.

Joe Kenmore walked toward the moon-jeep with its battered, misshapen wheel. The vehicle's body glittered mirror-bright in the light from Earth. Without air, there could be no rust; even aluminum, polished in the outside emptiness, stayed bright as a silver mirror. And when men in vacuum suits turned solar mirrors on ore veins in the hillsides, and smelted out metal from its place, the white-hot stuff ran down and into waiting molds without a trace of dross. Even iron was a glittering white metal, when vacuum-cast.

But now, Kenmore restlessly inspected the jeep. The drone freight-rocket it had brought in still hung beneath it. The drone was a forty-foot cylinder which had been flung up from Earth and captured at the Space Platform, refitted there with rockets, and aimed and fired toward the moon. There were radar spotter-posts to watch it and mark its fall. It was much more efficient to

let drone-rockets fall where they would, and then bring them into the City, than to try to guide the drones to a target space. This rocket might hold food, or fuel, or machinery for mankind's outpost in space, but it could not carry a passenger. The frenzied acceleration which lifted it from Earth saved costly fuel, but would destroy anything alive.

The jeep's great wire-spoked wheel, seemingly so fragile and so spidery, was actually a sturdy structure. But far back in a narrow ravine, now hours since, a house-sized mass of stone had fallen against it. Mass is not changed by gravity; the wheel was badly bent. Kenmore played the chest light of his vacuum suit upon it. It had crawled forty miles through the mountains after its injury, and then had hunted the Earth ship for an indefinite distance. The tread of the wheel was crumpled; there was a great crack in it, and that crack was serious. It was a miracle that the jeep still stood erect.

"No good without repair," Kenmore decided. "And the people of the City took every other jeep away when they ran off."

He needed a jeep for a journey. The Earth-ship lay out on the stony sea, and had to be made ready to take Arlene back to Earth, when that desirable event could be managed. But there were enough dangers in traveling on the moon, anyhow, without multiplying them by using a defective jeep.

Arlene Gray looked up at the firmament. Kenmore heard her saying, absurdly, "Star bright, star bright—Joe, how many stars are there?"

"Plenty,' said Kenmore. "Enough to keep us busy for millions of years, just hunting among them for planets to move to."

The heavens were an unbelievable sight, to Arlene. On Earth, the number of visible stars is relatively small;

there are rarely as many as three thousand to be seen by the naked eye. But here the stars were revealed as numerous as the sands of the sea, of all colors and all possible variations of brightness.

"I need this jeep," Kenmore commented acidly, "if only to have something to let everybody here run away in, in case of need! After all, the people who sabotaged the City might not like it that we're here and alive in it. They might come back!" He scowled. "This is a nasty mess! I'd like to start building up air pressure in the domes again, but I'm not sure . . ."

"There's plenty of air?"

"Some hundreds of tons of it," he assured her. "It's kept frozen, as now. We rechill it every night and insulate the tanks again before morning."

Arlene said curiously, "You don't seem too worried about what's happened to the City. You're taking it pretty calmly."

"I'm far from calm. But I'm thinking beyond the City and even our lives. I'm thinking of what the City's here for and what its smashing could mean."

Arlene sounded wistful. "You were talking about the Laboratory trying to find a way to get unlimited power for Earth. But to you it's power for rockets. Isn't that really what's in your mind?"

"You can't get far with chemical fuels," he said. "Right here is about as far as they'll take a ship. But if we had atomic rockets, then Mars would be easy, and the asteroids, and Saturn—or at least its moons, and Jupiter's moons . . . Even Pluto, in time."

"Why?"

"They're there," said Joe defensively.

"Rockets are just beginnings, Arlene, just as dugout canoes were the beginnings of ships. We need something better than rockets. There may be an energy-field to

change the constants of space—including the limit on the speed of light. There's even a chance that the mass that builds up with velocity—it shows up at a thousand miles a second—may be a property of space instead of matter, the way that the wind resistance at the speed of sound isn't in an airplane, but in the air. If we can ever change space with an energy-field, we'll be able to reach the stars!"

"And then?"

"We'll—we'll go there and settle there . . ."

Arlene grimaced. "I'll bet a cave girl asked a young savage, thousands of years ago, why he had to go exploring a place where the cave tigers were, when they had a nice place to live, right where they were. I'll bet he answered her just about the way you just did, Joe."

Kenmore looked at her, frowning.

"And I'll bet," she added wryly, "that when all the stars are visited, and all the planets settled on—I'll bet some girl out in the Milky Way will be asking somebody like you why he wants to go on to another island of stars —another galaxy—when the planet they were both born on is so nice a place to live."

"Maybe," admitted Kenmore. "Maybe that's right."

"And," said Arlene, "she'll like it if he agrees with her, but she'll be proud if he doesn't."

There was silence for a while. Kenmore fidgeted. "You make it sound senseless," he protested. "If at the end it's all the same."

"No," she said, rather forlornly, "a girl would rather be proud than pleased—for a while."

There was a peculiar, almost imperceptible change in the light about them. Kenmore looked up sharply.

A rocket flame burned among the stars. It was not descending; it floated toward them across the heavens, and by the fact that it had shape, Joe knew that it was

not far distant. They could see the flame itself in its nimbus of illuminated rocket fumes. The flame was lanceolate, with the wider part in the direction toward which it moved. Its motion slowed, so it was a rocket decelerating to land—but it would land among or beyond the mountains.

"Look!" snapped Kenmore. "That's the Shuttle to the Laboratory! Mike Scandia's the jockey—you know him. He's too high! It must be the radar beam's still off."

He reached behind him and wrenched out a signal rocket. He tore off the cap, aimed it skyward, and squeezed the tail. It leaped up from his hands, leaving a lurid trail of crimson sparks. It went up and up and up . . .

The rocket flame seemed abruply to double in brilliance. The slowing of the moving flare became more pronounced. Kenmore found himself wincing at the sight.

"That'll be tough!" he said uneasily. "Mike has to decelerate at two Earth gravities, but he'll be using four, now! That's hard to take when you've been on the moon a long time . . ."

The scene was very strange indeed. There were the sloping dust-heaps of the City, with feeble lights atop; the jagged mountains with their shining dust and dark shadows in the earthshine, the round, greenish platter of Earth hanging in the sky; and the fierce white flattened flame aloft, responding to the skyward-streaking trail of red sparks . . .

Before the first signal rocket burned out, Kenmore sent up another. He fumbled, and Arlene was competently handing him another from the belt loops of her own suit. He took it for granted that she understood; she did. Mike Scandia—Arlene knew him because he was Kenmore's friend. And Mike was in that furiously speeding rocket overhead.

The flame among the stars was almost intolerably bright, now. It thickened yet again. That would mean a deceleration of six gravities! Kenmore sent up another rocket, and still another, to insist that the rocket's landing place was here. Which it was.

The flame overhead slowed and slowed, and then it seemed not to move; a part of it darted away, and streaked with infinite swiftness toward nothingness. The remaining flame grew brighter and brighter, and abruptly halved itself, and the again-remaining part of the flame burned with a white-hot fury but nevertheless descended.

Then it went out. Something up aloft was falling, now, with its movement across the heavens stopped.

Kenmore sent up rocket after rocket. But things fall slowly in the gravity-field of the moon. Presently there was a vague spot of incandescence above them. Arlene said anxiously, "Will he crash, Joe? Will he crash?"

"Not Mike. The radar beacon from the City must still be off—I should have made sure of it!—and Mike couldn't know. Everything was cut off when the City was deserted. But he came in on course from away beyond farside, and there was nothing to guide by. He'd have landed in the mountains, most likely . . ."

A mere few hundred feet up, something flamed so savagely that Arlene turned away her head. The lava sea, the City, and even the mountain flanks glowed fiercely.

And the downward-plunging flame slowed, and slowed, and touched the surface of the lava *mare* a quarter-mile away. The source of the flame became visible—a tiny rocket-ship much smaller than the Earth-ship. The flame splashed out in a pancake of unbearable whiteness.

Then it shot up at incredible speed. It rose and rose far higher than the mountain peaks. It went on toward the stars, and winked to extinction.

The little rocket-ship from the Laboratory, the Shuttle ship, remained standing upright on its landing fins. Something moved. A brittle, cracked voice said furiously in Kenmore's headphones, "Somebody's going to get hurt for this! Why the devil wasn't that landing-beam on?"

Something climbed down the ship's side to the lava sea. It was a very small figure, a tiny figure, in an incongruously bulky vacuum suit. Kenmore heard the sputterings of impending profanity.

"Steady, Mike!" he growled. "Arlene Gray's listening. She just got here. The City's been abandoned. There's a mess all around."

"Mess?" raged Mike's cracked voice. "You ought to see the guys in the Lab . . ." Then it changed. "Arlene? Arlene Gray? You, Arlene, you belong back home! Who let you come up here?"

The tiny figure in the bulky vacuum suit came soaring in a long, preposterous moon-jump to land with some precision beside Kenmore and Arlene. He gripped Arlene's hands with the clumsy gloves of his own suit, and the two figures made as grotesque a contrast as anything else in view. Because Mike Scandia was a midget; he stood forty-two inches high. He and Arlene, greeting each other warmly, made a picture in keeping with the grotesquerie of the scenery around them.

At the moment, the near escape of the Shuttle from destruction seemed enough to worry about. There were other disturbing items, of course. The City could be attacked again—from outside, this time. At least one jeep had been damaged, and was probably unsafe to use, in an attempt to murder its occupants. The City's population had fled, and its safety was doubtful. The mere continued existence of human lives on the moon was in

jeopardy. Arlene, Kenmore, and everybody else—even the missile bases—were in deadly danger.

There was too much to worry about, so Kenmore allowed himself to feel relief over the safety of the Shuttle, and did not concern himself too much about Mike's acid comment on the state of mind of the occupants of the Space Laboratory.

CHAPTER VII. SABOTAGE

Mike had reports to be sent to Earth by facsimile transmission. They came from the Space Laboratory for the scientists, the administrators, the organizers of the project which included City and Laboratory, and the arrangements for their supply. He headed for the dome to put them on the transmitter which, though they were coded, would still scramble and rescramble them before sending them through space. On the way, he said succinctly to Joe Kenmore, "The Lab's a madhouse. The guys are looping." He vanished.

Kenmore pointed out to Arlene the remarkably simple navigation arrangements of the little Shuttle ship. It used solid-fuel rockets—as the Earth-ship did on its return voyages—because solid fuel was practical to transport up by drone-rocket, and liquid fuel wasn't. Separate tubes, like jatos, fitted into racks outside the hull. Mike would fire one marked *twelve-three*—meaning three gravities acceleration for twelve seconds—or a *ten-two*, or a *five-two*, or a *six-three*. He made change for the time of burning and acceleration effect desired. Smaller change could be made by releasing a burning rocket before its flame went out. The frantically flaming object then flew away at fantastic speed, either vanishing in emptiness or

smashing on the barren mountains of the moon. Mike had landed in just that fashion.

Inside the City, Scandia transmitted his message, then ate hugely. He was presented to Cecile Ducros; he bristled a little.

Later—hours later—Lezd hunted up Kenmore. "Earth is calling," he said interestedly. "Are you in charge here?"

"In emergencies," Kenmore observed, "the angriest man usually does take over. There is an emergency, and I am angrier than anyone else. So I suppose I am the boss."

Lezd nodded.

"I know my business," he observed. "I also know men who know theirs. If I can help you, tell me. Earth asks to speak to you."

"Thanks," said Kenmore.

He went into the City and to the communicator. He said impatiently, "Kenmore, on the moon. What is it?"

The three-second pause. Then a voice from Earth: *"Record this, please. At the conclusion of this message there will be a coded message to be received on facsimile and delivered to the Space Laboratory with all possible speed. The immediate delivery of this message takes precedence over all other actions, even emergency requirements of any nature. Give orders for the Shuttle-rocket to be refueled and to prepare to return to the Space Laboratory immediately."*

Kenmore raised his eyebrows. He bellowed, and Mike came fretfully through a doorway. "Another trip," Kenmore told him. "Back to the Laboratory. Right away. Top, crash, emergency!"

Mike sputtered. Then he went off.

Kenmore said, "The order's given. What next?"

"The missile bases," said the voice, after the usual three-second pause, *"report that no refugees from Civil-*

ian City have arrived. From your report, they are long overdue. They may have lost their way. Jeeps from the bases are setting out to search for them."

Kenmore went sick. A hundred and fifty human beings had started out in panic twenty—forty—perhaps sixty hours ago. They could have been ambushed and overwhelmed by a blasted-down cliff in the manner from which he and Moreau had so narrow escaped. They could have lost their way hopelessly—or the jeeps could have been sabotaged. If the first possibility were fact, then they had been murdered. If the second were the case, then there could be little hope. If the last—why, every person who had fled might now be going mad in their stalled vehicles, waiting for their air to give out, or for the sun to rise. If they were marooned like that, and did not suffocate before sunrise, the monstrous heat of the lunar day would bake them in their steel shells.

The voice went on:

"Until proper authorities return to Civilian City you will make all possible repairs—subject to the first need to send the following coded order to the Laboratory. Nothing must be put before that! Nothing! The message follows."

The face of the clerk on Earth disappeared. The tricky, preliminary dots of facsimile transmission began. Kenmore turned the communicator to facsimile printing. Arlene Gray appeared, looking for him.

He told her icily of the non-arrival of the fifteen jeeps in which the folk of Civilian City had fled.

"Of course," he said, "if there is a guerrilla fighting force somehow landed on the moon, they might be on the way here now. Or they might be waiting to backtrack a missile base jeep, and locate the bases. But I think it's simpler than that. I think it's traitors in the City. Mike

has to make a special trip back to the Lab. Top-urgency coded message."

Arlene hesitated. "I ought to go with him," she said uneasily. "I'm supposed to gather material for Cecile's broadcasts. It would be safe enough for me to go, wouldn't it?"

"Right here," Kenmore told her, "you are in the second least-safe place in the solar system. If there's a first, it's the Laboratory, but I'd say there's not much choice."

"Then I'll top my tanks and be ready," said Arlene. "You watch me and see if I don't do it properly."

He watched, and she did. But a suit only carries two hours' air supply; to withstand twenty-five-hundred pounds' pressure a tank has to be heavy even on the moon. Nobody can carry much more.

They went out together, to the vast stillness beyond the City. There seemed to be no change. One day on the moon is equal to fourteen on Earth, and a night is equally long. It had been near midnight when a cliff began to fall on Kenmore's jeep, and still near midnight when he searched for the fallen Earth-ship on the lava sea. Even now, it was only slightly past the middle of the two-week-long darkness of lunar nighttime. The stars did not seem to have stirred in their places; the shadows of earthlight upon the mountains had not altered.

Only by looking up at the great bright shining Earth could any change be seen; some stars had moved a little, with relation to it. But the continents were no longer where they had been, for the Earth rotates.

Mike's voice came in the helmet headphones, from near the small Shuttle-ship. "Not like that! Easy! I know you haven't got the brains of a gnat, but—"

Pitkin rumbled. He heaved a long tube up for Mike to fasten it in the proper rocket clamp. Naturally a rocket pilot fastened his own rockets in place. Mike fumed

and fussed as he made the highly critical adjustments and securing of his drive-elements.

"Arlene's going with you, Mike," said Kenmore through his helmet phone. "She'll gather atmosphere, so that Cecile Ducros can pretend she saw the things herself."

Mike Scandia stopped dead, halfway up the slender rocket-ship's hull. "Like hell she does!" he snapped. "I was getting set to mutiny, anyhow! Somebody besides me has to see that gang of eggheads and make a report on them!"

"Why?" demanded Kenmore.

"They're going batty, like I told you!" snapped Mike. "If I ever saw anybody going slaphappy, it's them! They're cracking up! I hoped the message I sent Earth from them would show it, and some of them would be ordered to quit the Lab and get straightened out. But who'd get straightened out in the City now? I tell you, though, they're really going wacky out there! And it needs somebody else's word besides mine!"

Arlene's vacuum-suited figure moved as she looked from one to the other.

"Things are bad!" insisted Mike. "They wouldn't believe me, back on Eearth. They might not believe Arlene and me. But—"

"I'll call Earth back," said Kenmore.

He wheeled and went back into the City. When he returned, his headphones picked up Arlene's voice: "Can you use a compass here, Mike?"

"Huh!" said Mike. "No need. Look up at Earth and you got your directions. Well?"

"I'll go with you," said Kenmore. "I left Moreau in charge."

He followed Arlene up the cleat ladder on the ship's fin. She went first into the lock. They settled themselves inside; five minutes later Mike joined them.

"Taking off at two gravities," he said grandly. "Slow enough for you really to see some scenery! Firing five seconds, four, three two—"

He pressed a firing button marked "5-2". There was a roaring and a very great weight. He'd counted down to firing time, because it is desirable to have one's lungs full when such acceleration begins suddenly.

The weight, though, lasted only five seconds. Five-two. Five seconds, two gravities. Then there was no weight at all. There was a great and restful silence; the rocket floated up and up. And there were ports—they would be shielded beyond the shadow of the moon, to keep sunshine out—through which Arlene could see the quite incredible landscape in the earthlight. The silence lasted, and the dusty frozen "sea" reached out and out in the pale twilight, and the mountains dropped down and down.

For ninety-odd seconds the ship floated up, and as it rose ever higher the mountains dropped more slowly. The revelation of ever-new wildernesses of peaks came more gradually, with the disclosure of ever more breathtaking wonders. At twenty-three thousand feet there were thousands of square miles of mountains visible on the one hand, and the downward-curving lunar sea on the other.

Mike said, "This view is kinda pretty, Arlene, even by earthlight. I thought you'd like to see it like this. Now we head around for the Laboratory. Settle back, now. We're blowing off." To Joe, he said crisply, "A six-three, Joe. It'll be neat."

Mike counted according to precedent: "Five, four, three, two, one—"

He pressed the firing button, and the cosmos seemed to explode.

The little ship should have disintegrated. A rocket

flamed outside, but it was not a three-gravity acceleration which flung the small spacecraft forward. It was an overwhelming, unbearable thrust which was the equivalent of a continuous explosion. Joe Kenmore was thrust back in the contour chair by a brutal pressure, which held him immovable. He could not lift his hands against it; he could not move at all. He felt his cheeks drawn back, exposing his teeth. He felt the flesh of his body straining to spread out, to flatten, to burst with the weight of blood going to the back part of his body. He fought fiercely to stay conscious, with blood draining from the forepart of his brain. His struggle seemed to last for centuries.

But it ended; he battled back to full awareness, and tried to move. His arms and legs would not obey him at first; they fluttered feebly. He croaked, "Arlene! Arlene! Are you alive?"

There was no answer, and the silence was a horrible stimulus. He reeled up—he was weightless—and a light came on in the cabin. He pulled himself to the chair which held Arlene. Her eyes were barely flickering back to life when he heard Mike Scandia's voice behind him. Mike gasped incoherently; his small body writhed with anguish and with rage. He turned blazing eyes upon Kenmore.

"This was—on purpose!" he panted. "I—checked these rockets! Somebody's been—tampering! To kill us! They switched Earth-ship rockets for Shuttle ones! Oh . . ."

He moaned with the fury that filled him. But Kenmore called again: "Arlene . . ."

She whispered faintly, "I think—I'm all right . . ."

And then Kenmore began really to appreciate the crime that had been committed against the City, and the Laboratory, and Arlene and himself. He dragged himself to a port and looked out. The ship was far, very far out

from the moon's surface; that did not matter. It was still headed out; that meant little, though its velocity would *be* of the order of half a mile per second or more. Even that was not necessarily deadly.

But one of the rockets had ben mismarked. Mike himself had chosen the rockets, and bolted them in their proper racks. But instead of a solid-fuel rocket, intended to give the Shuttle-ship three gravities acceleration for six seconds, Mike had mounted and later fired a rocket intended to lift the big ship back toward Earth. A thrust meant for a ship twenty times heavier had been used on the Shuttle; the consequences were bad, but the prospects were worse.

Any or all of the remaining rockets might be absolutely anything. Any of them might be another take-off job for the Earth-ship, and another would crumple the little Shuttle like an eggshell.

But rockets had to be fired. The ship was rising; it had to be turned back, or it would start the long fall down to Earth, into whose atmosphere it would plunge like a flaming meteor. And should they turn back toward the moon, it would need to be checked before it crashed on the rocky surface there. Somehow, the Shuttle had to be landed. Each of these maneuvers required the firing of rockets; and any of them might involve the collapse of the ship's structure under the stress of forces it was not designed to endure.

Even more: There would be little use in merely landing on the moon. On the nearside lunar hemisphere, there was the land-surface of a large continent—much more land-surface than on the entire continent of North America. In that vastness, with its mountain ranges miles high, and hundreds of miles long, there were just three guided-missile bases, and four radar-spotting posts, and the abandoned Civilian City. That was the equivalent of

four hamlets, and as many trappers' huts, on a continent-sized wilderness. And when or if the small ship landed, the people in it would be wearing vacuum suits which held just two hours' supply of air.

The odds against landing the ship as an intact object were great, the odds against surviving a landing were greater. And against landing in the lunar night, within foot-travel distance of shelter, with two hours' air travel on . . .

Survival seemed completely impossible. Appropriately enough for an emergency in space, the odds against success were astronomical.

CHAPTER VII. THE WRECK

MIKE said brittlely, "If this was a telecast, we'd walk outside the hull with magnet-soled shoes, and do something dramatic, and fix everything. Huh?"

His tone was scornful, but there was despair in his meaning. There was no simple and dramatic answer to the situation they were in. Hull-walking would do no good at all; there wasn't much chance that anything else would. They were, to all intents and purposes, already dead. So Mike watched Kenmore at work, and he had no hope at all—though he would try what Joe was preparing for. The three of them still wore their vacuum suits, save for the helmets; but Kenmore wriggled out of the top half of his armor to be able to use his fingers. He'd ripped a cushion cover to strips. He tested their strength. Now he handed a strip to Mike.

"See if it's strong enough," he commanded. "I'll tear some more. We have to have everything fixed from the beginning, in case the ship loses its air."

Mike took the cloth strip in his clumsily mittened

hands. He pulled it. He nodded, his small head looking even smaller in the full-sized neck of his cut-down vacuum suit.

"That'll pull the release," he agreed.

"Is there anything I can do?" asked Arlene quietly.

Kenmore said coldly, as he worked, "Just pray. And you're better at it than we are."

Mike added, "And I'm saying 'Amen' when you finish, Arlene!"

The little Shuttle-ship floated up and up and up. There was no weight in it. Mike still sat before the control board; this was his ship. So Kenmore made loops of torn cloth from a ripped cushion, and fastened them to the manual-release levers of the rockets outside. There were buttons for release, and the manuals were intended for use if the buttons failed. Kenmore tested each strip repeatedly.

It was strange that he could think clearly. There had been sabotage and murder in all stages of the project of which Civilian City was a part. But earlier outrages had been mere snipings—hindrances and obstacles, but no more. This was all-out, desperate assault.

Kenmore's jeep should have been crushed in a rockslide. The Earth-ship should have crashed hopelessly without a beam to land by. The Shuttle itself ought to have battered itself to scrap metal in the Apennines, on the way from the Laboratory; certainly it should have been wrecked on this take-off, if it survived the earlier landing. And there was the vanishing of all the people of the City. All these disasters should have brought them to gibbering fury or numbed despair. But somehow both reactions were inappropriate—perhaps because nobody could submit to defeat by such means as had been practiced against the City.

The Shuttle-ship's hull was already strained; another

blow, no more violent, might crumple it. Two or three, and it would inevitably become a mere tangle of junk in space.

Kenmore finished the job of the loops on the release handles. He went to Arlene, and filled the back of her helmet with stuff from the torn-upcushion, to make a pillow against more violent shocks.

"Seal up your suit," he commanded. "If there's another wrong rocket, this'll help the back of your head. Now put this helmet on, and turn on your suit-talkie."

She obeyed and settled herself in the contour chair. She smiled at him. He grimaced back; he couldn't smile. Mike carefully fitted one mittened hand into one of the strips of cloth Kenmore had fastened to a rocket-release handle. He could hold his hand up against two gravities, or three or four. But another impact like the firing of the last rocket—which had so many gravities he didn't want to guess at it—would force his hand down. Then the rocket would be freed.

"Swing the ship around," said Kenmore, taking command without thinking of it. "Aim at the City and count down. We don't make the Laboratory this trip, anyhow."

Mike said brittlely, "This *ought* to be a ten-two job. Five—four—three—two—"

Weight struck, but tolerable weight. It was a ten-two rocket; two gravities for ten seconds. They were pointed back toward the moon. Their velocity away from it was lessened, but by no means canceled.

When the pressure ended, Mike said calmly, "A six-three this time. Five—four—three—"

There was an impact like a pile driver, slamming Kenmore back into his seat. But Mike's hand was forced down by the impact, too. The manual release operated. The super-powerful Earth-ship's rocket tore away from the Shuttle with an acceleration past computing. It

would undoubtedly strike somewhere on the silent, dreary emptiness which was the moon. The ship was left weightless, its velocity unaffected. The rocket had been freed in time to prevent destruction, but the shock had still been great.

Mike asked savagely, "Anybody living?"

Arlene's voice in the helmet phones was unsteady. "I am."

"And Joe's grinding his teeth. I hear him," growled Scandia. "We're losing air. That jolt started something!"

He ripped open his face-plate and snapped into the microphone of the ship's communicator, "You lugs down there in the spotter stations! If you're trying to figure out this radar pip heading out to space, it's us. Me, Mike Scandia, with Joe Kenmore and Arlene Gray aboard the Shuttle. We're blasting to come back in. We might make it. Track us and do what you can!" Then he snapped viciously, "Somebody switched markings on the rockets at the city! Sabotage!"

He snapped his face-plate shut, and Kenmore heard him panting. Air was going fast; the needle on the pressure gauge said six pounds. Five . . . That last bump had strained the plates of the Shuttle. Mike had used the last possible second of air to pant a message directed at anybody in one of the spotter stations whose radars watched for freight-rockets coming unmanned up from Earth. There were four of those stations.

The air-pressure needle hit zero; all air was gone, now. There was no way to talk from a sealed-up suit into a space-phone, or to hear what the space-phone received. There was no way to know if Mike's message had been received. On the whole, it was not likely. Spotter-station men did not usually man their equipment unless a cargo drone was due. There was nothing for them to look for.

Mike said venomously through the talkie, when his

The incredible, pock-marked landscape of the moon enlarged slowly before them. Had there been sunshine, it would have been unbearable to look at. Yet, though the earthlight upon it was pale, all the larger features of the dead world were lighted up. They floated on—fell on—and the rate of enlargement increased. Presently Kenmore said, "About time to try some more deceleration, Mike."

Scandia unhooked from the ship's tanks and returned to the pilot's chair. Kenmore went back to his place.

"There's one likely thing," he said, after a moment. "The man who did the sabotage in the City made all his slashings in the same places. He made a routine of it. It's possible that when he started painting new marks on the Earth-ship's steering jobs he marked them all the same. He might have that kind of brain. Three times a rocket marked six-three has been wrong. Maybe the others are right. The ten-twos were right. We can't count on his marking all the wrong 'uns as six-threes, but it might be so."

"Yeah," said Mike in a gravelly voice. "But six-threes are what I loaded most of. I like three-gravity firing. But I'll do what I can."

He turned the ship about again. Ring mountains, expanding, moved sidewise below. The tumbled, unmappable confusion of a wrecked mountain chain lay beneath. Kenmore and Arlene could see it through the ports as the ship turned. The ship drifted downward, but it drifted sidewise, too. Then a featureless plain, a *mare*, a solidified lava sea, moved into position under the ship. Mike flicked on the nearest object radar.

It didn't work; it had been smashed by one of the impacts of the mismarked rockets as they were fired.

"We're landing by the seat of my pants," said Mike. "Unhook from the tank, Arlene, and strap yourself in."

Arlene obeyed; Kenmore strapped himself in also, but loosely.

"Five," said Mike. "Four—three—two—one—"

A rocket pushed mightily. Kenmore counted, straining, up to ten; Scandia had fired a ten-two. Then Mike peered down out the port. He muttered furiously, "Nothing to tell distance by! Nothing!"

He swung the ship delicately, so that its sidewise motion would be countered by the same rocket blast that checked the ship's fall.

"Five—four—three—two—one—"

Another valiant thrust. A five-two. Mike said angrily, when it ended, "But I'm running out of rockets, Joe! I've got three more six-threes—and that's all!"

"You'll have to take a chance, then," said Kenmore. He looked across the cabin. "'Luck, Arlene!"

A long, long wait. Mike said abruptly, "We're close now. I can't take a chance counting. I'm going to fire when I have to."

Ten seconds. Fifteen. Twenty.

The roaring of a rocket. Weight. Three-gravity weight. A six-three rocket which was what it purported to be. The thrust stopped. Mike said, "That's what I need to land on! One more . . ."

But this was a blow like a bomb blast. The safety loop released this rocket quickly, but a great rent appeared in the side wall of the ship's cabin; it was about to fall to pieces.

"I'm taking the last chance," said Mike abruptly. "Nothing else to do! Here goes!"

He fired the last rocket in his racks.

It was cataclysmic; it was intolerable; it was monstrous. If it was not an Earth-ship take-off rocket, it was assuredly a deceleration job, intended to halt the big

breathing was easy again, "I shoulda called them before. Not much chance, but I shouldda done it! Hang on to your tonsils! I'm firing another six-three. Five—four—three—two—one—"

Another violent blow. It was like a monstrous fist; it was enough to make anybody black out. But this rocket, too, released itself by the weight of Mike's small fist in a loop to the manual handle the instant it proved its power.

"This don't look good!" said Mike icily. "Ready, Joe? I'm trying what's marked for a four-three. Five—four—"

It *was* a four-three. The rocket pushed valiantly against the momentum that took the Shuttle toward the stars. It burned out. Mike gave warning and fired another rocket; that also was what it should be.

They ceased floating out, three firings later. Another flaming pusher and another. . . . The Shuttle-ship moved moonward, but it was airless, now. Kenmore said into his helmet phone, "Mike, we're headed back in. I think we'd better take it floating. No more shooting until we're about to touch. The ship's badly strained. It might come apart. But if we can get down in one piece, we can go outside and check the markings and make sure of what's left. We might even be able to lift off again, and land somewhere near the City. But don't risk any more firings until we're close to ground!"

Mike said grudgingly, "That makes sense. I'll spend the time figuring out what to do to the guy who switched those marks!"

The little ship floated downward. They had an indefinite velocity toward the moon, now, which increased as the feeble gravity pulled at them. It had seemed that the gravity was trivial because the rate-of-fall was slow. The ship would hit with only one-sixth the speed, and therefore one-sixth violence, of the same object falling

the same distance to Earth. From a height of six yards it would hit no harder than from a fall of one yard on the mother planet; but their height was several times six miles.

There was little for them to do, of course. They could move about, weightless, in the airless cabin. The ship's gyros still ran, and still kept its nose pointed in the direction in which the last rocket had urged it. Kenmore pulled himself to the forward vision port and sighted.

"We'll land somewhere out on a sea, Mike."

Scandia did not answer. Kenmore heard his small teeth grinding in a full-sized rage. Kenmore himself couldn't afford to indulge his feelings, yet. Right now he had to think coolly. Their chances were so few that he couldn't afford to throw away any of them. But he couldn't think of a really good move, at that.

Presently he checked the ship's reserve tanks. He had Arlene top off her suit, then fixed a hose, and had the three of them breathing the ship's reserve air. He watched out the forward port.

"We got a break," he said presently. "I think I'm getting good bearings on a spotter station I know about. We may ground as close as sixty or seventy miles from it!"

"With," growled Mike, "two hours of air in our tanks!"

"As to that, we'll see. The main thing is to get down in one piece. Maybe we'll take off again."

But Kenmore didn't believe that, and neither did Mike. It was conceivable, but hardly possible, and both of them knew it very well. Kenmore had said the optimistic thing for Arlene to hear.

Joe saw her looking at him through her transparent helmet, and she was smiling curiously. He had an uncomfortable feeling that she read his mind and knew they had little chance of living.

rocket-ship as it approached its destination. But it flew free.

There was a great silence, and the lights in the small ship were out. There were cracklings and creakings conveyed by solid conduction through the substance of the ship's torn hull.

And then the ship hit.

It crumpled. It rolled over and hit again, and crumpled once more; then it slid over moon-dust on top of the lava surface of the sea. The moon-dust served as a lubricant, as talcum might have done, and probably kept the ship from grinding itself to pieces. But even so, when the motion ended they could see the stars between stripped metal girders all about them. Kenmore hung from the acceleration chair in his straps, and the ship was a crumpled, shattered, almost unrecognizable mass of scrap metal.

He heard himself crying fiercely: "Arlene! Arlene!"

She panted, "I—think I'm all right, Joe . . . I hurt, but . . ."

Mike sputtered and was silent. Then he said with an unnatural calm, "Arlene, turn off your talkie! I've got to say something about the guy who did this to us!"

Kenmore loosened his straps. He crawled out between indented plates and strength members, then fought his way through debris to Arlene, and loosened her straps. Something had bent and imprisoned her. He turned on his chest lights and loosened the catch that held the chair in use position. He dropped it. He could feel Arlene holding herself convulsively close to him when he dragged her free. Then Mike squirmed out of nowhere, his lights also burning.

"Something hit my helmet," he said. "It's bent in. I can feel it. Almost busted it. I've postponed cussing that guy until I feel safer! We get out this way."

Two minutes later the three of them stood in the foot-thick moon-dust on the surface of the *mare*. The Earth shone brightly overhead. The Shuttle-ship looked like a tin can that had been stamped on, save that parts of its skeleton were exposed.

They looked at it. Then Kenmore moved—and found himself limping, even in moon-gravity—to see around it on the other side of the wreckage.

They were in the middle of what seemed to be a flat plain, but was not. They could see uncountable millions of stars, stretching down to an absolutely unbroken and very near horizon on either hand. There was no dimming as the stars reached the edge of the moon; they kept full brightness until the horizon cut them off.

"You might say," said Mike, breathing hard, "that we're out of sight of land. But there's nothing but land. Joe?"

"We got down," said Kenmore.

Their surroundings, actually, were more lonely and more desolate than even the stark and tragic mountains of the moon. They could see for two miles in every direction before the flat surface curved down—and there was the horizon. Not that there was anything to see but the dust-covered, powdered *mare* surface; there was nothing. Literally nothing.

Kenmore stared carefully up at Earth. It hung huge and green and brilliant in the sky. It was not quite where it had seemed to be from the City; it slanted farther away from the very center of the sky. He said, "Hm. A degree of arc on the moon here is just a fraction over seventeen miles, instead of sixty-odd on Earth.

Mike, how far has the Earth shifted from where it seems to be at the City?"

Mike squinted up; this was his business. As jockey of the Shuttle to the Space Laboratory, his journeyings-out were made on computations included in his flight orders. But his return trips to nearside, on Luna, were different. Normally, he had a radar beam to talk him down at the end of the run, but he knew where Earth should hang in the sky on the way. And of course Earth's icecaps and continents were much more serviceable than a compass.

Now he said profoundly, "Hmmm. Let's sight it."

And they did, with markings in the dust and the height of Kenmore's helmet top to furnish data. Perhaps it was not a particularly sensible undertaking, from one point of view. They had something under two hours of breathable air in their tanks, and the number of inhabited places on the nearside half of the moon could be numbered on one's fingers, with some digits left over. But the ship had started out in a specific direction toward one of those places; they had headed back from catastrophe toward their starting point. And when a degree of arc is only seventeen miles, and Earth is there, hanging overhead for an object to sight from, the fixing of positions is much simpler than on Earth. Instead of a lunar or stellar observation, they took a terrestrial one. On Earth. When they had finished Kenmore said, "It could be as little as thirty miles away, Mike."

"Not more than sixty," agreed Mike hungrily. "Let's go!"

Arlene said very gently, "Joe—Mike—you're trying to spare me for as long as you can, but we've only two hours' supply of air. We can't travel sixty miles in two hours!"

"How long was it after the Earth-ship landed and lost air before I found you, Arlene?"

"But we had the ship's tanks to breathe from!" she protested.

"This ship is pretty well smashed," submitted Joe. "But I don't remember any signs that its tanks were cracked!"

Mike emitted an astonished grunt, and darted into the wreckage. Kenmore crawled in after him, his chest light burning. Presently Mike said into his suit microphone, "I guess you've got influence, Arlene."

She waited outside. She could see only that they worked furiously inside the wreck. Mike Scandia crawled somewhere and came back. There came the extraordinary sight of a flame burning in emptiness; it was on oxhydrogen torch, whose flame in a vacuum did not look much like flame on Earth. Dense white smoke poured from it, expanded madly, and then glistened as if it were a cloud of infinitesimal diamonds floating in emptiness. But this was something rarer than diamonds on the moon. Oxygen and hydrogen, burned together, yield water vapor. In the monstrous cold of night upon the moon, water vapor could exist only inches from the flame. The white clouds were tiny ice crystals drifting slowly, very slowly downward.

The torch cut swiftly; in no more than twenty minutes from the ship's landing, they had two reserve air tanks out on the dust of the lunar sea. The tanks looked huge, but they would have been peculiarly light even on Earth, because they'd had to be shipped so far where freight was so costly. But even that light weight was divided by six on the moon.

Wherefore, out of the ship, Kenmore had Arlene painstakingly top her tanks again, and he and Mike repeated the performance. They found a torn-away sheet of steel, and Kenmore hitched himself to it with a length of that highly special plastic rope which does not become brittle

even at midnight outside Civilian City, and which is a part of normal vacuum-suit equipment. They started off.

"For this sort of traveling," said Mike kindly, "you go so, Arlene."

He showed her that eccentric moon-gait which many people never learn, even though they stay on the moon for months. It is derived from the loose-jointed shuffle of the practiced long-distance walker. It is useless in Civilian City, and most people travel outside only in jeeps. But those who work from the jeeps—whether at the mines or at retrieving freight missiles sent up from Earth —learn it of necessity.

Mike Scandia showed it to Arlene Gray. Moon-walking technique takes full advantage of the fact that one falls very slowly from a very small height. One moves forward, and bounces gently up, and floats. Then one descends very gently, while still moving forward, touches ground and gives a delicately adjusted touch to whatever is underfoot; one then bounces up and continues to move forward. It is rather like that kind of floating in which we sometimes move about in our dreams.

The three set out across the featureless and dust-covered sea. Kenmore got the sledge with the air tanks into the rhythm of his own motion, and they made a good eight miles an hour. They'd have made more but for their hourly stops to check air tanks. That was the purpose of vacuum flares Mike had made a dive back into the wreck to salvage.

When they'd traveled their first hour, there was still no break in the completely featureless moonscope. They were in the center of a gently undulating surface that was four miles in diameter; beyond was nothing. It was two miles to the horizon, where the plain dropped down

out of sight and there were only the stars and the Earth overhead.

After an hour's journey, they stopped. Mike cracked a flare and set it on the bent steel sledge; it glared blindingly with a fierce red glare, providing its own oxygen for burning. It warmed the air tank—at least a little, so there was air pressure to refill the suit reservoirs.

At the second stop, it appeared that there were mountains far beyond the horizon ahead. They could see the peaks in silhouette against the stars. The red glare made a startling sight, illuminating as it did the figures of Kenmore and Arlene in identical vacuum suits, Mike in his cut-down, bulky outfit, the bright-metal air tank, and the wide expanse of carmine-lighted dust all around.

At the third stop, Kenmore ordered Arlene to sleep for an hour. She refused, and they went on.

Before the fourth hour of their journeying was over, they had reached mountains rising steeply from the stony sea. Mike and Kenmore consulted soberly. In the end, they turned northward and skirted the precipices, keeping to the gently rolling *mare,* and not venturing into the passes. It was a question of choosing north or south.

They did not dream of venturing into unexplored mountains. Rockslides and smothering avalanches of dust await the foot-traveler in any mountain area on the moon. One does not go among mountains, even in a moon-jeep, when it can be avoided. Especially one does not move about, at all, except in passes where all possible avalanches have been precipitated in advance by setting off one-pound charges of explosive, fired against the stone, not more than a mile apart.

So the three of them went northward under the looming cliffs. The spotter post they hoped to reach was serviced by its own moon-jeep, and all trails upon the moon remain forever. If they came upon the track of the

moon-jeep to the spotter post, they could follow it safely.

Arlene was practically dead upon her feet. One-sixth gravity saves much energy, to be sure, but still a normal person needs to sleep. She had had considerably more of turmoil and excitement in the past twenty-four hours than anybody is apt to take in stride.

Presently she was stumbling, nearly blind with fatigue. After a long time, she heard the voices of the others in her headphones. They had stopped. The flicker of Mike Scandia's chest lamp had struck upon something which glittered metallically in the cliff.

Arlene roused from a stupor of exhaustion to hear Kenmore say sardonically, "Of course it's real. But it'll vanish if you go near."

Mike replied indignantly, "You're crazy! It's metal! There must have been people on the moon, once upon a time. They made it! Some of this stuff would drive those scientist guys crazy! I'm gonna pick some of it!"

"It's a waste of time," insisted Kenmore. "I don't want to waste time. We have to think of Arlene!"

She roused. "I'm all right . . ." But she was desperately weary. "I'm quite all right . . ."

The two of them peered at her, and she realized that they were in the shadow of a monstrous cliff. Earthshine did not strike here; the blackness was absolute, save for the bright chest lights of the two men's vacuum suits. Her own lights burned whitely, too, though she did not remember turning them on.

They seemed to nod at each other. Mike said gently, "You need sleep, Arlene, but there's something not half a dozen other people have ever seen. Moon flowers. Look!"

Arlene looked. Before her rose the stark dark mass of a cliff that rose past estimate overhead. It was the terrible dead-black of a moon-cliff in shadow. But the beam

of Mike's lamps shone upon a spot, quite low down, where metal shimmered and shone.

It looked like a miniature jungle of silver. There were glittering stalks, thread-thin, which rose delicately and branched; from the branches, leaves extended and drooped gracefully. The number of stalks could not be guessed. A space perhaps fifteen feet across contained the incredible foliage. There were hundreds of the moon plants, interwoven and intertangled. Some were three feet high, some five or six, and some were shorter. But they were sheer beauty. Flowers and foliage of infinite delicacy grew motionless beneath a mile-high cliff of blackness which fronted on a sea of stone.

"We take her out a way?" said Mike abruptly.

Kenmore agreed. He took her arm and moved slowly out beyond the shadow of the cliff—out to where earthshine began again, and they could see the world from which all of them had come.

He cracked a vacuum flare and said sternly, "Sit down." Arlene obeyed, sitting on the sledge which held the air tanks. And the act of relaxation was so infinitely luxurious that she barely heard Mike say, "Give her an hour, huh? I'll go pick those things. She rates a bouquet."

Arlene tried not to acquiesce by silence, but it was almost impossible to speak. She sat dully in the red, red glare of the flare. Its radiation was actually warm!

She was never quite sure how long she rested. Very probably she dozed and waked and dozed again, in such weariness that she was not aware of it. But she heard Mike's voice in her earphones, saying angrily, "There's gotta be a way to carry 'em!"

Then there was another long time, and Scandia was there before her. She saw something else, far away, but she was too tired for it to register. But Mike's mittened hands were filled with moon-dust, and across his out-

stretched arms were stalks of the impossible silver flowers. "Look quickly, Arlene. They'll be gone soon!"

Arlene said numbly, "They're beautiful, Mike! So beautiful!"

They were like gossamer, like the finest and most precious of lace. They were the most beautiful things that anyone had ever looked at. Moon flowers.

Arlene reached out and took them. Kenmore shone his chest lights on them.

She held them for just a moment, then a leaf—was not. Stalks vanished. Arlene clutched at them, startled, and they ceased to be. There was nothing left in her grasp. The shock of it brought her wide awake.

She stared, she looked down at the dust beneath her feet. Nothing.

"You get what they are, Joe?" asked Mike sharply, in her earphones. "It couldn't be anything else!"

"No," agreed Kenmore's voice. "It couldn't."

Arlene was confused, but now she was awake. She blinked and shook her head. Then she said queerly, "I've been—asleep and dreaming, I think. I thought there were—silver flowers. But that—that isn't a dream, is it?"

She pointed. There was a moving light in the distance, down on the same surface where they stood. Mike yelped in relief and satisfaction, and Kenmore growled in relief.

It was a moon-jeep. It came with extraordinary silence up to where the vacuum flare burned crimson. It stopped. A bulky figure already swung down the rope ladder.

"Mike!" rumbled a new voice in the headphones. "Joe! You two crazy fools! Why didn't you keep talkin'? We've been goin' crazy, Haney and me! Trying to find your ship . . . If we hadn't run across your trail, we'd never have got to you!"

Arlene said politely, "Hello, Chief." Then she blacked out.

CHAPTER X. ABANDON THE LABORATORY!

JOE KENMORE woke in the jeep that had picked him up with his companions. He found himself lying on its metal floor, being twitched this way and that as the jeep rolled at cruising speed over the gentle undulations of the Mare Imbrium. He smelled oil, and ozone, and hot metal. But also he smelled coffee.

He got to his feet, groggily. Arlene Gray lay on an improvised bunk in the rear of the cabin, still sleeping. The jeep, he knew, was headed for Civilian City. A very considerable number of hours had passed, but the lunar night still held. Earthshine bathed all that could be seen, but that was not very much in terms of scenery. Earth, overhead, now began to show the suspicion of a shadow at its western edge. It was now past full—corresponding to lunar midnight. It moved toward third-quarter, which was predawn on the moon.

"Food's a great invention," said Kenmore, as he moved past clutters of machinery in the jeep's cabin. "Give me some!"

Haney handed him a mug of coffee—one of those very special drinking mugs which had a great vogue on Earth, once, because they wouldn't spill liquid but could still be drunk from. Kenmore settled down on one of the folding seats for extra passengers. The same lean Haney began to build a sandwich, competently slapping down the slices of bread when the jeep's motion sent them floating in the air.

"Mike," said the dark-skinned chief amiably, "has been telling us about the doings over at the City."

Kenmore grunted assent. The chief, driving, said over his shoulder, "Plenty of trouble; How're you going to get

that code stuff to the Laboratory—if it's as important as Mike says?"

"The Earth-ship," said Kenmore dourly, "has a crumpled landing fin and some cracked ports and the like. It's toppled over. It's got to be gotten aloft with that message—according to what I think Earth will say. That is probably impossible, but I'm working on it in my mind. If it has to be done—"

The chief was a Mohawk Indian. He said in mild derision, "If Big Chief Man-in-the-Moon says so, us braves will take a whack at it. Is it a bad smash?"

"Arlene walked away from it, which may mean anything."

The chief speculated amiably. "Is that order so important because they've got it figured out back on Earth that the gang in the Laboratory has gone nuts, or because it hasn't? Could be either."

Remote as it was, the Space Laboratory was as much in the minds of all of them as their own immediate situation. They were on the moon because of it, and Civilian City had been built and maintained to serve it. There was no civilian activity off the Earth which had not ultimately been devised for the purpose of making the Laboratory possible.

The moon-jeep rumbled on, over the dust-covered sea which once had been molten rock. Presently Mike Scandia awoke, and Kenmore pounced on him for exact and detailed information about the situation. Mike gulped coffee and told what he knew. It wasn't much more than he'd already indicated to Joe, but in the context of the Laboratory's purpose, it was appalling. A long, long distance away on the other side of the moon—a fifth as far away as Earth—was a minute, man-made object floating out in emptiness; it could not be seen from nearside on the moon. In this small, compartmented

metal case, eight men lived in the greatest danger men had ever volunteered to face. The Space Laboratory was an atomic-energy workshop. It contained fissionable materials which could blast it and its occupants to radioactive gas at the temperature of the sun's very heart. No more than a moment's carelessness would be required to bring that about.

There was an energy-field which, in theory, should affect even neutrons; the mathematics of it were still largely speculative. There were facts yet to be discovered. If thus-and-so was the fact—why, power could be had for all the imaginable needs of Earth for all time to come; and nothing but power could be released. But if the fact was such-and-such—why, it was possible for any type of matter, though as thin as the gases in the vacuum of an electric-light bulb, to form a sun. In that case, the Laboratory's labors were futile or worse.

In any case, the experiments were dangerous, so the Laboratory hung in space, where the gravity of the moon was almost perfectly balanced by the orbital speed of the Laboratory around the Earth itself. It was a dead spot, some forty thousand miles out. Had there been only local attraction to consider, the Laboratory would have stayed there for all time. But solar gravitation entered into the picture, and once in two weeks—or four, or six—a small rocket had to be fired to put the Laboratory back at the center of the dead space from which it had wandered.

And the eight men there tried nerve-rackingly to find out whether the facts of subatomic physics were thus-and-so, or such-and-such. They were that far out in space to guard against the possibility that the facts might be such-and-such. In such a case, the proof would be announced by the sudden appearance of a blue-white ball of vaporized metal and human flesh and technical supplies where the Laboratory had been. Obviously, it

would not be a good idea for such a discovery to be made on the moon; the moon itself could explode. And that would be very inconvenient, because everybody on moon and Earth would die. When the jeep from the spotter station neared the City, Kenmore took his place by the chief at the controls. He itched to take over and drive himself, but forbore. A long time had passed; the soft-edged shadow at the eastern border of Earth was a hair-breadth wider. There were no other changes anywhere. And Kenmore watched across the twilit moon-dust until there came an irregularity in the sharp line of the horizon ahead. Then the sky was not blotted out with geometric precision at the horizon. Mountain peaks occluded stars. Kenmore watched until the peaks looked right.

He told the chief, who stopped, turned off the outside lights, and squinted at the outline of the mountains. "The City'll be off to the right," he said wisely, "so it's likely the Earth-ship will be that way, too. You wanna watch from the observation-blister, Joe? Mike, you watch out this way, and Haney, you watch out that."

Arlene was awake now; she had been for hours. She said urgently, "Isn't there something I can do?"

"You did plenty in the Shuttle," Mike told her. "Sit still."

The moon-jeep swung off to the right and traveled all of twenty miles; it went a mile closer to the mountains and came back to the line of its original course, then went a mile closer . . .

In time, they found the wreck of the Earth-ship. It lay on its side in the dust that looked like snow. The jeep moved up close; Kenmore, Haney, and the chief went out to look it over. The ship had been down and empty for hours before Kenmore first found it; a long time had passed since then. And the temperature of the night-side

of the moon is lower than that of liquid air. So the three of them burned vacuum flares around the wreck and waited patiently. The crimson-red torches looked strange against a field of moon-dust, under ten thousand myriads of stars. But the brittle-point of the steel used for space hulls is very low; just a few degrees of surface temperature makes a lot of difference.

Presently they went inside, and the Earth-ship's ports poured streaks of crimson light out into the night. They were burning other vacuum flares inside. Nothing could catch fire, of course, because there was no air; but wood and cloth, and many metals, would be as brittle as ice or glass at the temperature to which they'd fallen.

After another long time, the trio came out. Kenmore was carrying a lady's suitcase, and Haney and the chief bore other things. They came one by one into the jeep and Kenmore said dryly, "Your luggage, Arlene. Now you can dress up when you feel like it. Some of Cecile Ducros' stuff is here too."

The jeep stirred and went on; it swung toward the mountains. Presently a very small light shone above the plain and the jeep trundled toward it.

They saw no change in the look of things when they arrived. There was the one light above the central dome. There were the same innumerable jeep tracks around and about the three dust-heaps which were part of the hope of humanity for contentment on Earth, and high adventure in the stars. But there didn't seem to be much to hope for now.

When they entered, there was light inside the main dome, and Pitkin was puttering among the growing plants. He beamed at Kenmore and Arlene and Mike as —vacuum-suited—they emerged from the air-lock. Then he blinked at sight of the two spotter-post men following them.

"Ho!" he said. "Scientists from the Laboratory, hey? To tell us how to mend the City? We do all right!"

"*We* didn't do all right," said Kenmore. "And they're not from the Laboratory. Any news?"

"No news," said Pitkin, beaming. "None!"

Kenmore went into the air dome and found Cecile Ducros in the foulest of tempers. Osgood, the pilot of the Earth-ship, looked as if he definitely had the wind up. For a man from Earth, that was reasonable enough. Osgood could not imagine ever getting back to Earth with his ship toppled on its side and airless on a lunar sea. But Lezd, the electronics technician, looked up impassively from where he worked on a photograph to be used in some future broadcast to Earth.

"Are we still able to talk to Earth?" demanded Kenmore.

Lezd nodded. Joe Kenmore flung away to the communicator. Grimly, he reported to Earth exactly what had happened to the Shuttle-rocket. He had not been able to deliver the high-priority message to the Laboratory. The Shuttle-ship was wrecked; sabotage.

There came a sharp command for him to wait. He waited, fuming. In five minutes a very high authority indeed came face to face with him on the screen. The High Authority's face was lined, and his teeth chattered as he spoke.

There was nothing on Earth or moon more important than the immediate delivery of that message to the Space Laboratory. It must be gotten there somehow. The fate of all humanity depended on it!

Kenmore growled, "There are service ships that supply the missile bases! Why not send one of them?"

There was no possibility of a service ship's arrival on time; the moon could not be reached from Earth in less than six days of travel. This message must reach the

Space Laboratory immediately! The destruction of the Shuttle and the delay it involved—nearly thirty hours altogether—might already have doomed humanity! Six days more were unthinkable!

"There are such things as physical possibilities," said Kenmore indignantly. "How about the people of Civilian City? Are they safe?"

The High Authority gibbered. They had not yet been found; they were being searched for by jeeps from the missile bases. They were somewhere—lost—ambushed—murdered, perhaps. But the Laboratory must be reached and ordered to stop all experiment—especially all experiment along the line mentioned in the last technical report! It must be stopped, stopped, stopped; the Laboratory must be abandoned; it must be destroyed! The orders must be delivered immediately! And—The High Authority wrung his hands.

"In that case," said Joe Kenmore bitterly, "I'll attend to it."

But he regarded the communicator savagely after he had flicked it off. The abandonment of the Space Laboratory meant the abandonment of anything resembling an attempt to reach other planets, let alone the stars! It meant that Civilian City would be abandoned, too, and all the work and struggle, and the lives lost, for a high hope of splendor were so much waste. The entire accomplishment was to be written off as so much futility. Mankind would return to Earth and stay there forever.

But there was urgency in the commands he'd received; if the lives of the missing citizens of the City did not count more than the need of stopping work at the Laboratory—why, the work at the Lab must be stopped.

CHAPTER XI. DESPERATION TAKE-OFF

HE WENT in search of the spotter-station men who'd found him on the lava sea. The big brown man who'd piloted the jeep was regarding Cecile Ducros with vast admiration. Haney, the other spotter-station man, was in the act of devouring delicacies especially brought moonward for her.

"Chief!" said Kenmore angrily. "Haney! Moreau! Mike! I want you!"

He jerked his still-mittened hand toward the other dome. They followed him. Arlene came after them. "What's the matter?" she asked anxiously, once in the main dome.

"Plenty! We've got a mildly impossible job to do. Now . . ."

He began to outline, crisply, what would be needed. They had inspected the crashed Earth-ship. One landing fin was crumpled; there were cracked ports. There was at least one tear in the hull-plating. The ship had no air, and it had chilled nearly to the surface temperature of the moon at night; it would be utterly brittle and not much like a thing made of metal. But with enough flares, it could be warmed past the brittle-point; and with the materials on board for emergency repairs in space—but there never had been and never would be time to make repairs in space—it could be sealed up. Air snow could be carried from the city to refill its air tanks. Rockets could be carried to it, too . . .

"Yeah?" asked Mike Scandia ironically. "Cross-marked like they are?"

"You'll check on that," commanded Kenmore. "The odds are that the original markings were only painted

over, and false ones put on top; scrape the paint and it'll show. The rest of you come along!"

They made for the vacuum-suit racks. Arlene said, "I'm coming, too!"

He frowned at her.

"I know the last trip was bad, but am I safer in the City than with you?"

He shrugged; she wasn't—despite the Shuttle-ship sabotage. She climbed back into a suit and topped its air tanks with a professional air. He watched to make sure. She said in a low tone, "How bad is it, Joe?"

"As bad as it could be," he said bitterly. "We're all going back to Earth—if we live."

Arlene looked at him sharply. Kenmore's expression was unrelieved resentment. She slipped on her helmet without a word. If, in its concealment, she looked hopeful rather than depressed, it did not show.

They loaded the spotter-station jeep with materials from the outside storage sheds. Outside storage was best on the moon. There was no weather, and supplies kept perfectly in places where sunlight never struck, even at second-hand. Even air did not need pressure tanks for storage. It was a solid; it was snow—or a cloudy, faintly-bluish ice. They took vacuum flares by scores. They took oxhydrogen torches. They took this, and that, and the other equipment. They sealed up the jeep's cargo compartment and climbed one by one into the cabin through the air-lock.

They headed for the wrecked and airless ship. On the way, the chief said meditatively, "It's toppled; it's got to point up to take off."

Kenmore growled half a dozen words. They had two jeeps; that was explanation enough. They rode in one, and Mike Scandia would presently drive the limping, battered other jeep out with a load of rockets. The

wheels of all jeeps could be raised and lowered. They carried their large burdens slung underneath, and they crouched over them while they were fastened firmly, and then rose up. When both jeeps were available, they would get under the nose of the Earth-ship and then rise with it. Moving inward, they would get it at least partly upright; then cables and towing winches would haul it erect. The jeeps could hold the ship upright while the crumpled fin was cut away and rewelded more nearly straight.

Kenmore drove, his features dark and scowling. Moreau said apologetically, "I am not handy in such matters. What will I do?"

"You'll warm the ship's inside with flares," said Arlene confidently, "and I'll watch out the observation-blister in case—well, in case somebody wants to interfere."

Kenmore's expression changed a little. It was curious that finding the saboteurs seemed less important than the disaster to which—it now appeared—they had only contributed. Yet it was still possible that whoever had waylaid Moreau and himself, and damaged the City, and all too probably was responsible for the disappearance of the City's population—might come to interfere with work on the Earth-ship. The irony lay in the fact that saboteurs no longer needed to commit murder in order to destroy the City and the Laboratory. Both were to be abandoned, anyhow.

Miles and miles out in the lunar sea, they came to the toppled ship; what followed looked like a scene in some inferno. Glaring red vacuum flares burned fiercely on the moon-dust, their light reflected from the bright plating of the ship. Other flares burned inside, showing through the ports like furnace openings in the hull.

But the labor was swift and well-ordered. Cracked, smashed ports vanished—sealed shut with sheets of plas-

tic. An oxhydrogen torch flamed luridly, surrounded by a tiny cloud of microscopic snowflakes; it welded together the rent in the hull plating. The vacuum-suited workers glittered in the weird glare, and the moon-dust glowed a blinding crimson.

Flares burned out and were replaced. Presently, Arlene called anxiously on helmet-phone frequency that something moved out at the edge of the light. But Mike Scandia's voice came fretfully into their several headphones. "This infernal bumping wheel! Pitkin said it would fall off, and I've been expecting it to go any second!"

The limping jeep emerged from the blackness all about. Its cargo door was open and great wire-wound rockets stuck out and a bundle of other monsters dangled from chains between its wheels.

"I got Pitkin to help me load up," said Mike peevishly. "I checked the markings; some of them were just painted over, and new numbers painted on. But when I looked for that, I could tell. I guarantee those to be as marked, now!"

He came wriggling out of his air-lock. Kenmore said, "Hold it, Mike! Handle that jeep for me!"

There followed a crisp and highly technical discussion in the total silence of airlessness. But helmet antennas glittered as figures moved or gestured, and the squat vacuum-suited figure which was Mike moved to survey the exact situation of the ship. Presently he scrambled back into his jeep; the chief entered the air-lock of the other, and the spidery vehicles performed a task unthinkable for them on Earth.

The Earth-ship weighed but a sixth of its weight on its home spaceport, though ten tons earthweight was no easy mass to manage anywhere. In the unearthly, blood-red light of the flares, the skeletal jeeps seemed to

crouch down and strain to lift the ship's nose at an impossible angle. And they did; then they strove to push it higher, with wheels which tended to slip and spin upon the dusty stone. And as they pushed and strained, Haney and Kenmore and Moreau flittered in and out and under them, and under the swollen hull of the ship. They handled the cables and chains.

Presently the ship seemed to stagger erect—and one wheel of Mike's jeep collapsed under the strain of thrusting. But the jeep continued to push, nevertheless, and the two of them held the Earth-ship's nose toward the stars. Then it hung there, supported by the two insectile glittering metal things. Two flame torches worked furiously on its crumpled tail fin. Presently it was patched—cobbled would be a better word—and the white-hot joinings cooled and cooled; after a time, the chains and cables relaxed very gently and the ship stood—well, almost perfectly vertical in a ring of lurid crimson flames.

After that they fastened the rockets in their clamps. They did not pause at all. Kenmore said, "Now it's just a matter of taking off. Mike . . ."

"Yeah?" said Scandia defensively.

"I'm piloting. You and Haney take the working jeep back to the City. Chief and Moreau go with me to the Laboratory."

Mike sputtered in protest.

"There's only the one jeep working and at the City," said Kenmore. "It could take everybody on board in case of more trouble. And you know the moon's surface by heart around here. You've crossed it often enough. You stay to take care of the people who are left."

Mike sputtered again. Haney said nothing. Kenmore motioned the rest into the ship's airlock. He climbed up the ladder rungs last of all. Mike, still sputtering,

climbed gloomily into the still-operable jeep; Haney followed him. The jeep backed away to a safe distance.

There was a small pause, then. The great silvery hull pointed skyward—whitened a little with moon-dust where it had lain prone on the lunar sea. It was surrounded by a now-broken ring of fierce red vacuum flares.

Suddenly, rockets poured out flame, and the burning flares were flung crazily everywhere by the blast. A cloud of scattered dust arose, and the rocket fumes were whipped away to nothingness; then the great ship leaped upward for the sky. In seconds it was merely a moving white-hot flame which grew smaller and smaller.

But there wasn't any rocket roar; there is never any sound on the moon.

. . . And a long time later, with the pallid, mottled grayness of the moon and its mountains far below—a very long time later—Kenmore pointed. At the edge of solidity, where the stars ceased to shine, there was a speck of light. It was as far as anybody could possibly see even from many miles aloft. It was a bright, warm, brilliant dot of light at the very edge of the horizon. It was sunshine on a remote and unnamed peak.

"That's sunrise," said Kenmore somberly. "Unfortunately it's only a fact. It's not a symbol of good times coming."

CHAPTER XII. THE MAD ONES

THE SHIP continued to float upward. It was almost a shock when Kenmore closed all the port shields and dimmed the stars to specks. Arlene protested a little, and he said, "Wait!" The Earth-ship rose and rose. Presently Kenmore turned. He nodded to Arlene. "Now watch!"

She gazed out the thickly shielded port. For moments

she saw nothing at all. Then there were dots of bright light at the edge of the horizon. They increasd in number; they multiplied in size and brilliance. And then the sun came into view.

It was gigantic against the shadow-speckled edge of the moon; great streamers reached out from the edge of its disk. There were even dark places—sunspots—which were really furious and unthinkably huge storms in its photosphere. The ship went up and up again, and the lighted areas of the moon joined together—but there were still vast shadows of the ring mountains at the dawn line —and Arlene saw the moon from the most remarkable angle from which it can be seen. There is no sight in the solar system quite as unearthly, quite as dazzling, quite as strange, as the view of the moon's surface when one rises from its night into its dawn.

Arlene caught her breath. And Kenmore fired a drive rocket to set the ship on course toward the farside.

It was not really much later when Moreau began to point out the larger of the craters which bore names, to Arlene. He indicated a peculiar valley, one apparently carved by a racing planetoid which grazed the moon and gouged out a valley eighty miles long and five miles wide, and then apparently kept on out to limitless space. He showed her the immense, straight streaks of white which puzzled Earth astronomers for so long, and had so absurdly simple an explanation when men examined them *in situ*. He pointed out that very tiny crater which is quite stark and barren when the sun first strikes, and becomes filled with mist as daylight grows stronger.

"Mist!" protested Arlene. "It's not possible!"

"Moon-fog," said Moreau gravely. "Ask Joe!"

Kenmore spoke over his shoulder as he checked his course for height and velocity.

"Worse than an ordinary fog. It's a dry fog!"

Which it was. There was a special type of surface material there—neither Kenmore nor Moreau could remember the mineral, and Moreau was irritated with himself—which the alternations of day heat and night cold had broken into dust particles even finer than the dust of the lava seas. Where ordinary moon-dust is like talcum, the dust particles in this particular crater and in half a dozen other places were really microscopic in size. This dust had a photoelectric property which gave it an electric charge when the sunlight struck it. In the small gravity of the moon, and with the intense light of the sun, the particles repelled each other like charged pith-balls. The result was a fog, a mist, a cloud of electrified dust that rose slowly from the surface. It was a cloud sustained by electrostatic fields, instead of air.

"And believe it or not," said Moreau, "there are sometimes lightning-strokes in it!"

Arlene wouldn't believe that until Kenmore agreed. He hadn't been in this particular crater, but he had walked into a moon-fog on one occasion. His suit had been charged, and the dust particles had clung to it in thick masses. They formed tufts; it was like moss or whiskers growing from every part of the vacuum suit. When Joe Kenmore went back to his jeep, the discharge of static electricity could have punctured his suit if he hadn't known suitable measures to take.

Then there was the official boundary between nearside and farside, which divides the moon into two not-quite-equal halves, since four-sevenths of the moon can be seen from Earth, at one time or another. Moreau pointed out to Arlene the craters and the mountain chains that had no names on the older maps of the moon, because they were on farside. He told her the results of international squabbling, by which the invisible side of the moon is solemnly divided into sectors, with divers na-

tions having the privilege of honoring national heroes by naming things after them. Not more than fifty or sixty people out of all the Earth's more than two billion had ever seen those named features, and even fewer cared about the names.

But the farside surface, in time, began to grow remote. The ship was drawing away, going out. Arlene had a peculiar sinking feeling when she realized that Earth was no longer visible; it was hidden on the other side of the moon. She had a sensation of homelessness which was much worse than she'd felt in Civilian City. To be on the moon was thrilling, while Earth was always right overhead; but to be where Earth was invisible was a shattering experience. Arlene barely heard Moreau's lecture on the fact that the moon is egg-shaped, with the big side toward Earth, so that the horizon is less than two miles away on farside.

The ship drove on, and the unfamiliar farside dwindled. From a great expanse of sunlit, pock-marked aridness, it became a gibbous globe, because night was moving round one edge. It grew smaller, and smaller—but Earth did not reappear. Which seemed very strange, because by the time the ship drew near to the Laboratory, the moon itself was a round thing only a little larger than Earth as seen from Civilian City.

Actually, the Earth as seen from nearside is the size of a twenty-five cent piece thirty inches from one's eye; the farside of the moon seen from the Laboratory was the size of the same coin twenty inches away—the moon from Earth is the size of a quarter ten feet distant. And here, for the first time, Arlene felt the loneliness which space-travelers have to endure. She was in a rocket-ship and there was absolutely nothing in sight that she had ever seen before. The great and flaming sun was strange; it was not the familiar orb that had lighted sunshiny days

on Earth. It was a ball of hellfire, spreading slow-moving tentacles into space. The moon was unfamiliar; the central dark splotch on the farside made it impossible for her to consider it the moon she'd known. And Earth was hidden.

Arlene's teeth chattered.

But there was activity about her before she could yield to panic. The chief was at the radar, his bronze hands amazingly deft. Moreau was strapped in by the computer. When the chief called readings from the nearest-object radar dial, Moreau punched keys and curtly relayed the results to Kenmore.

"Hm . . ." said Kenmore. "A little deceleration is called for."

He swung the ship end for end, and Arlene gulped as the whole cosmos swung in great half circles about her. Kenmore said, "Deceleration coming. Five—four—three—two—one—"

There was weight. Not great weight. Not intolerable weight. But it lasted, and lasted, and lasted.

Kenmore pressed a button, and something fled away into the vastness in which all things were strange.

Then the chief said warmly, "Joe, you did a job of work!"

And Arlene Gray, with her teeth clamped tightly, looked out a shielded port on the shadow side of the ship and saw the Laboratory hanging stationary in space.

It was a rocket-ship, or it had been. It was very much larger than the Earth-ship. Since it would float in space without ever being out of sunshine, one-half of it was brightest silvery metal, and one-half was dead-black. Temperature was adjusted by varying the amount of silver which reflected heat and light away, and the black which radiated heat to the stars. There was an air-lock, much too small to admit the Earth-ship and there were

ports. There were some curious tubular blisters—position-adjusting rockets could be loaded into them from within the ship and fired.

To Arlene, the Laboratory looked like a derelict floating in emptiness; as a matter of fact, it was much more depressing than that. This was a place in which men had set out soberly to make a discovery which might be beneficent, gambling that they would not acquire knowledge by which a Madman could destroy humanity.

The space-radio speaker said wearily, "Well, who are you and what's it all about?"

"This is the Earth-ship," said Kenmore into the microphone before him. "The Shuttle's smashed. We're bringing orders from Earth. How about opening your lock?"

The voice muttered. Then it said, as wearily as before, "Opening up now. It would be amusing if . . ."

There was a muffled sound, and then silence.

The silence continued. A long time later, the chief said, "There's the lock opening. This looks queer to me!"

Kenmore shrugged. "Mike says they've all gone wacky. He says they've flipped. They're looping."

The lock in the side of the Laboratory-ship swung open. Kenmore said irritably, "I ought to do this, but—Chief, will you go in our lock and moor the two ships together?"

The chief unstrapped himself, and floated to the inner lock-door of the ship from Earth. It closed behind him. There was a long, long period during which Kenmore jockeyed the Earth-ship closer to the Laboratory, and the lock pump throbbed. Then silence. Another long wait, and they heard a singularly unpleasant clanking noise; the two ships had touched.

The chief's voice came through by suit-talkie. "I'm using the outside ladders for mooring-bitts. It means there has to be a gap between the hulls."

"No matter," said Kenmore impatiently. "We'll go on board."

"I'll go ahead. I'm stepping over to the other ship. I'll close this lock-door."

There was the sound of its closing, and Kenmore fumed a little. He was going on board the ship he'd really been working for since the beginning of things extraterrestrial, bringing instructions to quit. He felt wretched.

Moreau climbed into a vacuum suit; Arlene started to get into another.

"You can wait," suggested Kenmore ungraciously. "We shouldn't be long. They're ordered to abandon ship and come back with us."

Arlene said in a still voice, "I'd like to come, Joe."

She couldn't have explained why she wanted to board the Laboratory.

The three of them—Kenmore, Arlene, and Moreau—went into the Earth ship's air-lock and waited while the pump throbbed and their suits took on the curious, bouncy feel of a vacuum suit in emptiness. Joe loosened his space-rope and clipped the end of it through Arlene's belt; Moreau hooked on, too.

The lock-door opened, and the ships were not two feet apart, but four or five. The other lock didn't reopen; the chief had gone in the other ship. Kenmore stepped out to emptiness, and floated across the gulf. He caught at handholds and tried the lock-door. He put his helmet against the other ship's side. He said, "The pump's running. The chief went in."

He waited, and Arlene looked out of the gap between the spacecraft.

It was a mistake. She was used to no weight, of course; she was accustomed to the sensations of upside-downness, and topsy-turvy dimensions, which rocket travel in-

volves. But nobody can quite disabuse himself of an idea that there is an up, and that there is a down.

Arlene looked down toward her feet, and saw an abyss of stars. She caught her breath and looked upward; the selfsame abyss loomed there—and to either side. She could not see sun or moon or Earth; where she stood in the open airlock door there were only stars. It seemed that if she took one step outward she would fall forever, shrieking, toward nothingness.

But then Kenmore got the other air-lock open; he went in. He took a firm grip inside, and tugged at the rope attached to Arlene's waist. Sheer hysterical panic yammered at her. And then she stepped toward him and was drawn across the abyss, with her eyes tight-shut.

She did not open them again until she heard the lock-door close. Then her teeth chattered, but she did look about her. Moreau was in the lock also, and air was coming in.

But something was wrong with the air. The bouncy feeling of their suits ceased; then there was a new feeling, very peculiar and breathless. Kenmore looked at the lock air gauge, and seemed startled. He opened his face-plate. Moreau followed suit. They spoke sharply. Arlene opened her helmet. She had trouble with the face-plate; it seemed to stick, but she forced it open, and a puff of wind struck her cheek But there should be no wind in an air-lock!

Her ears buzzed and she swallowed. Arlene said, "Joe, what . . ." She gasped. Her voice was loud, too loud.

"Something's very wrong," said Kenmore grimly. He had not raised his voice at all, but it was like a shout. "The pressure's too high. Much too high!"

Arlene's ears buzzed again and she swallowed. A moment later they buzzed still once more.

Kenmore said evenly, "We can't open the outer door against this pressure! They must have had an air-tank leak inside the ship. Unless somebody's cracked up . . ."

Then they heard clankings, the perfectly natural sounds of the undogging of an inner air-lock door before it opens, only magnified.

Then the lock-door opened to the inside of the ship, and they saw the chief, his face very pale beneath its bronze pigment. His expression was sternness itself.

"Get Arlene back to the ship, Joe," he said harshly. "I'll try to argue with these guys. They've cracked up to a fare-you-well!"

His voice boomed. It roared. It echoed and re-echoed.

The eight men of the Laboratory's staff and crew were gathered in the compartment beyond the air-lock. One of them floated placidly in midair, watching the newcomers with bright eyes. A white-bearded man stood head-downward on the ceiling, held there by his magnetic-soled shoes, and looked at them with an ironic expression on his face. One man sat in a chair on a side wall.

A man in a laboratory smock, with pince-nez glasses, spoke in a refined voice which had the volume of a bellow:

"Mr. Kenmore, I believe. We expected Mike in the Shuttle. I am afraid we cannot receive you for more than a very few minutes, if you wish to be able to leave. We have loosed all our reserve air tanks into the ship. The air pressure now is ninety pounds to the square inch, or higher. It is equal to the pressure on a diver at two hundred feet underwater. If you stay more than twenty minutes, you will have what divers call—ah—the bends when you leave. We have been under this pressure for seventy-two hours, and our body tissues are thoroughly saturated with nitrogen. It is impossible for any of us to leave this

laboratory. At the least we would become paralyzed. At the best we would die immediately. Will you leave, please?"

His tone was determinedly matter-of-fact, but his hands shook uncontrollably.

The chief said, "The fools did it, Joel That guy'll show you."

The man in the chair on the wall grinned mirthlessly at them and put a cigarette to his lips. He struck a light. The flame rose six inches. He touched it to the cigarette and inhaled. The cigarette burned to ashes with the one draught upon it. Such a thing could only happen in compressed air, with a superabundance of oxygen.

Then a voice said in a tone of astonishment, "Why—it's a girl!"

And eight pairs of eyes fixed themselves upon Arlene's face with expressions of fascinated astonishment.

CHAPTER XIII. "AFTER SUCH KNOWLEDGE . . ."

THE interior of the Laboratory was quite commonplace, except for the air pressure—if anything could be commonplace in such a state. There were long corridors, painted white. There were no floors, of course—or perhaps there were no walls because all sides were floors, here where there was no weight at all. There were name plates on doors which slid aside at a touch. And Arlene Gray knew that somewhere here there was a compartment where an experiment could be set up and thrust out and away into emptiness to react, with heavy barriers of cadmium between the reaction area and the ship. In emptiness, one did not need to shield an atomic reaction except on one side. Yet, of course, any experiment with

fusion or fission could blast the Laboratory and all its occupants.

The man with the pince-nez consulted gravely with his confreres when they noticed that Arlene was actually present. A bulky man said heavily, "I say again, send her home and let's try the thing."

The man with the pince-nez and the shaking hands said very carefully, "We have not the right to try it without unanimous consent. But certainly it would be improper to let her stay more than ten minutes!"

Somebody else said in a metallic voice, "You infernal fools! You . . ."

He began to curse, his voice rising in pitch. Joe Kenmore stirred, but four members of the Laboratory staff were ahead of him; they plunged upon their fellow. The struggle in weightlessness was nightmarish. They tried to strike each other, and flung themselves backward in the attempt; they clung to each other, swarming and toppling in a swirling crazy mass in midair.

Then the bearded man said gravely, from the middle of it, "I have him. I'll strangle him if he affronts our guest again."

The others floated away. There remained two men, one with his elbow crooked about the other's throat. If he tightened his grip, his victim must choke.

"But," said the heavy-set man cynically, "in this pressure he can hold his breath ten minutes!"

"Yet," said the bearded man, "while his throat is shut off he can't swear."

"True," agreed the heavy-set man. He turned again to look at Arlene.

It was eerie; it seemed insane. But they were all extremely matter-of-fact in their eccentricity. "Let us leave it to our visitors," said someone brightly. "They have no emotions about the matter!"

Nobody paid any attention to him. The other seven looked at Arlene. Raptly. Sadly. The man with the pince-nez looked at her with a peculiarly childlike wistfulness. The bearded man, with his arm shutting off another man's breath, smiled at her benevolently. There was a man who looked at her with absolutely expressionless eyes. There was a man whose eyes were filled with tears.

Kenmore bristled; Arlene was in his care. And these eight men of the Laboratory did not look at him, or Moreau, or the chief. They gazed at Arlene, and each of them regarded her with absolute absorption and each in a different manner.

"Look here!" said Kenmore. He raised his voice by instinct, and the thickness of the air amplified it, so that he almost winced at the sound. He went on: "I came up here with orders for you to stop all experimenting. It's been found down on Earth that a new method of computation proves that you'll only get undesirable results."

The man with the pince-nez averted his eyes from Arlene long enough to regard Kenmore with high amusement. "My dear Mr. Kenmore! As if we did not know!" He looked back at Arlene.

Kenmore snapped, "What's happening here? What's the matter with all of you?"

Nobody bothered to answer. Arlene swallowed and said hesitantly, shocked by the loudness of her words, "Something must have happened! What is it that someone wants to leave to us?"

Voices spoke together: *"Whether to die now, or . . ." "Shall we prove the chain-reaction . . ." "Nobody has the right to . . ." "Let me tell her . . ."*

Kenmore felt cold chills running up and down his spine. These were eight of the best brains of Earth, and they were acting like children. Intolerable tension and unending acrimony and dispute could be read into even

the peculiar rapture with which they looked at Arlene. It was as if they felt the exact reverse of her homesickness when she found that Earth could no longer be seen. These men looked at her as if she represented to them all the things in life of which the Laboratory had been empty. As if she meant gentleness and home, and what was normal and natural and right, in an atmosphere where madness was the norm.

Kenmore pointed his finger at the man in the pince-nez glasses. Ordinarily he would have felt abashed to speak to him, because of his eminence. Now he said, "You! You tell us!"

That very great man took off his glasses and polished them, peering at Kenmore with near-sighted eyes as he did so. He smiled at Arlene.

"It is really very simple," he said apologetically. "We were sent here to make the crucial experiments with a field of force . . ."

There were warning cries of *"Careful!"*

"I will be careful," the appointed spokesman said severely. "It was known that the field affected neutrons; nothing else would. We hoped to use it as a lens, like the fields in electron microscopes, to concentrate a neutron beam instead of electrons to a focus—to a point."

A clamor rose. *"You want them to go back . . ."* *"Don't say any more . . ."* The man with the pince-nez shook his head. "I shall tell them nothing critical." He went on, to Arlene. "But we have found that there is a critical point of concentration of a neutron beam . . ." Then he said to the others, "You see?"

The man in the chair on the wall nodded happily. "Yes! *We* know what you mean, but nobody else ever will!"

"A critical concentration," repeated the man with the pince-nez, "which sets up a chain reaction. Bombard-

ment with a cyclotron means that few transformations take place. The atomic nuclei which are targets are so small, and relatively so far apart, that millions of particles have to be fired for every nucleus hit. But we can concentrate a beam of neutrons so that no nucleus—*no nucleus!*—escapes destruction in its path. You see?"

Arlene said hesitantly, "I'm not sure. But I'm sure Joe does."

The eight laughed delightedly.

"Charming!" said the man with the pince-nez. Then he added. "But *not only* nuclei are split. With practical speeds, *neutrons* are split! They must be! And the bursting of a neutron must release absolutely unchained power and unlimited destruction! Neutrons and positrons—every subatomic particle must then be bathed in pure power. Every one must break—and in breaking, break others . . . We have a chain reaction, in which every substance—even hydrogen—is an atomic explosive! If one single neutron bursts, destruction spreads by contagion. If this Laboratory were destroyed, the moon and Earth—all the cosmos—would follow it!"

Arlene smiled, with an effort. "Then I take it you do not intend to use it on Earth."

"We do not intend," said the man with the pince-nez, apologetically, "to use it at all. But we know how to do it—therefore, we do not go back to Earth. Sooner or later some fool, some madman, some maniac, would threaten to destroy the Earth unless it yielded to him. And some other madman would confront him with a similar demand. Two madmen, or ten, or a hundred, each demanding all power on penalty of destruction for all—humanity would be destroyed!"

Then he beamed at her. The man with the metallic voice cried out savagely, half-choked, "You fools! You—"

His voice cut off as the arm about his throat grew

tighter. The man with the pince-nez said generously, "You see, my dear young lady, that we cannot go back to Earth because of what we know. Each of us has the power to destroy mankind. Power corrupts. It is an axiom. Absolute power corrupts absolutely.

"Look at us! We have the power to destroy each other, and we have done so. But some of us have taken measures so that nobody else may be destroyed. We have loosened our air supply into the ship. We breathe air six times denser than normal. We have breathed it for seventy-two hours. We cannot leave this ship. We would die of explosive decompression—of the bends. We cannot seize your ship, which has the means to return to the moon, because we would die the instant we entered it."

Arlene said desperately, "But—we came up here to tell you about new orders."

"You tell us," said the man, beaming, "what we should do!"

"Let me report this," said Kenmore, "and have Earth figure out what's to be done. That's what you should do!"

"Yes!" agreed Arlene. "That's what you should do!"

The man with the expressionless eyes said abruptly, "No! We won't do it! We'll—"

A clamor arose. Arlene cringed from the sheer volume of their shouting voices. They saw it; they quieted.

"We are sorry," said the man with the pince-nez. "You can leave us now, and if you are careful, you can return to your ship. We could not go. We are grateful to you for coming to us. You are—everything we have not. But we beg you to go immediately."

A voice said indignantly, "You have told them too much! It is not safe for them to report so much!"

Moreau pushed the lock-door open. The chief thrust Arlene into it, and then backed into it, with Kenmore. Other voices took up the cry. "*You told them too much!*

They have learned more than it is safe for people to know."

Kenmore slammed the door for in-lock operation of the pumps. They throbbed; in time the suits became bouncy. Kenmore spoke into his talkie. "Watch my face, Chief!"

He cracked his face-plate, and gasped; then he nodded. The others opened their face-plates, one by one. The throbbing of the pumps went on. The pressure in the lock was lowering, and they were decompressing with it. Kenmore watched the air-lock pressure gauge. Presently its needle stirred from its pin.

"Seal up!" he commanded harshly. "They're arguing back in there whether or not they told us too much! We've got to hurry! They've cracked up! They're not thinking straight!"

The outer lock-door could be opened; Kenmore opened it. The spaceship's lock was six feet away, across an abyss of stars. Moreau plunged across the gap and grabbed a handhold, and pulled on his space-rope, still linked to the others. But Kenmore and the chief, together, threw Arlene across the emptiness. They swarmed at the ropes holding the ships together. They dived for the opposite opening. Kenmore slapped the outer lock-door shut and pulled the emergency lever to open the inner door to the Earth-ship's cabin.

"How long have we, Joe?" asked Moreau shakily.

"Don't know," panted Kenmore, "—but they'll decide it! They're crackpots! They'll do the violent and dramatic thing!"

The inner door yielded. He swarmed out of the lock, calling behind him: "Get Arlene to a chair! I'm blasting off!"

The chief heaved her in the general direction of a chair. She caught it as Kenmore strapped himself fever-

ishly into the control seat. He hadn't even opened his face-plate. He panted, "Get set! Five—four—three—two—one . . ."

There was intolerable weight. Arlene collapsed into the contour chair. She gasped for breath, with her chest and the bulky vacuum suit pressing fiercely down toward the mat behind her body. She saw the chief sink to his knees under the acceleration; she saw Kenmore straining to fire other and yet other rockets . . .

The Earth-ship turned about in mid-sky and plunged toward the moon. Its rockets poured out incredible masses of vapor as it strained to reach the highest possible speed at the earliest possible moment. Kenmore was firing the heaviest rockets the ship mounted, one after another, as fast as they burned out.

Then Kenmore slumped back to the control seat. The rockets burned on and burned on . . .

The last of them burned out; the ship went hurtling onward. Arlene felt ill from the release of pressure upon her, but the chief straightened out his body in weightlessness.

"Think we'll make it, Joe?" he asked heavily.

"I don't know," said Kenmore. "I daren't burn more rockets. We have to land."

Arlene gasped, "But what—what's the matter?"

"They're crazy," said the chief, in a vast calm. "They don't want their discovery to get back home to Earth. They've killed themselves to stop it. But they were scrapping over whether we'd been told too much before the air-lock closed on us. Being crazy, they'll decide they did, and they'll try to kill us. And they've only got one way to do it."

Arlene ached all over, but she sat up. The Earth-ship floated in emptiness. It seemed motionless, but she knew better. After all that acceleration, it would be moving

at a terrific rate. She saw the half-disk of the moon's far-side ahead. This was the part of the moon that mankind had never seen before the Laboratory was set out in space. There was the dark blotch in its center about which scientists still dispute acrimoniously. It was cut in two by the shadow which was sunset.

But then, quite suddenly, it was not a half-disk any longer. It was a round, white, glaring platter of incandescence. Something behind the fleeing Earth-ship had blazed up with a violence which lighted the moon more brightly than the sun had ever done. The Laboratory had exploded; its staff, deciding that their visitors knew too much, had blasted their own ship. The monstrous flame could reach out and engulf the Earth-ship, if it flared out in time.

The four in the fleeing vessel waited to learn if they were about to die. More, they waited to learn if the moon itself might receive some morsel of disintegration that would make it detonate with the same monstrous violence.

Of course, if that happened, it didn't matter what happened to them . . .

CHAPTER XIV. ". . . WHAT FORGIVENESS?"

ON THE WAY back toward the moon, there were things that could be done, but there was very little that Joe Kenmore found tolerable to think about. To him, the destruction of the Space Lab meant that hopes of a glorious future for humanity were abandoned. The surrender of hope meant an end to progress—utter stagnation—people dwelling in a state of apathy because there was nothing to strive for. He envisioned a slow descent back

into an abyss of world-wide barbarism, because he was sure that only a dynamic society can be healthy.

There was the discovery made in the Lab, too; according to the strictest of scientific reasoning it was possible for the cosmos to be destroyed to the last least atom of its farthest star. This was still less tolerable for Kenmore to contemplate, because it followed that there was no meaning in meaning, no law in the laws of nature, no significance in the pattern of existence. Was not all of mankind's striving worse than futile, if someday some madman could destroy all reality? The human race has never lacked madmen. If such a thing *could* be done, he thought, someday assuredly it would. If a man could undo the act of creation by which the cosmos came to be . . .

So the journey back from the Laboratory was not a happy one. Kenmore piloted the ship with his brows knitted and total bitterness in his expression. Moreau made computations—totally unneeded—from the observations the chief made—no less unnecessarily. Only Arlene did not pretend to be absorbed in trivialities. She looked at Kenmore almost remorsefuly, because the effort at least to begin the conquest of space had filled all his mind and had been the substance of all his ambition. She was very sorry for Joe Kenmore.

The farside of the moon drew near; the Earth-ship floated around it, and Earth came into view beyond a jagged rim of crater walls. And nearer there were the mountain ranges, named for the national heroes of various jealous countries, and the seas assigned for naming to the United Nations commission for lunar nomenclature. Which seemed rather unimportant, just now.

Then came the boundary of farside; Earth floated free in the sky and its continents had changed places again. It was distinctly gibbous now, and the lunar day

was nearer to Civilian City, but would be all of a hundred hours yet in reaching it. Moreau and the chief kept feverishly busy with their observing and computing, and informed Kenmore very elaborately of their results. He humored them to the extent of a very minor change in the course and velocity of the rocket-ship, which should bring it into the very optimum landing course for Civilian City.

Later they left the dawn behind, and plunged into the moon's vast cold shadow. Kenmore opened the port-shutters, and they strained their eyes to make out mountain formations in the earthlight that shone upon them. Presently, they succeeded; Moreau and the chief brightly assured Kenmore that the ship was perfectly on course. Presently, again, the Mare Imbrium came up over the curved horizon and the bay in which the City lay, next to the spiky Apennines. Kenmore turned the ship end-for-end and began the finicky process of deceleration and landing, with only disaster to report.

It was not a happy landing. The journey had been without a single satisfaction. Kenmore felt relieved that there was no landing beam—which might be mere neglect—because it required a higher degree of concentration on something other than bitterness.

So the Earth-ship drifted down and down. There were creakings and groanings as the gyros turned it in emptiness. And they were low enough to see the lonely small light atop the City's main dome before Kenmore fired his last deceleration shots.

They came creaking to the surface, on a space of lava blown clean of dust by the rocket-blast. For the rest—nothing. The City's three artificial mounds were huge for constructions by men; but they were infinitesimal by comparison with the mountains a bare three miles away. While the ship descended, the blue-white flame of its

rockets lighted those dust-heaps which were the high spot of human achievement. Then the rockets, released, flew skyward and were gone, and there was no movement anywhere. There was silence. Stillness. Desolation. Heavily, the voyagers went into the air-lock to go outside.

Kenmore was last to the ground. Wordlessly, he followed the others toward the City's lock. The physical look of things was drabness. The City's mounds colorless in the earthlight. The high, groping mountains were pallid, save where black shadows lay. Only the stars shone in innumerable colors. Kenmore thought they seemed detachedly to contemplate the defeat of men. And Earth, near the center of the sky, looked mottled and bilious and discouraged.

They went into the main dome. Pitkin again puttered happily among the plants there. Kenmore opened his face-plate and asked dourly, "Any news?"

"But yes," said Pitkin, beaming. "Rogers and Schmidt came in their jeep. There was an accident to their spotter station and they could not stay. They came in for safety. On the way they found the jeeps which had fled the City. They told, here, and Lezd informed the Earth. They went back to try to help."

Kenmore growled. It was infernally plausible. It might even be true that a spotter-station crew had left its post because of an actual accident there, making their full tour of duty impossible. He filed the information in his mind; he neither believed nor disbelieved it.

He led the way into the air dome, and found a part of the hydroponic garden shifted to make room for a surprisingly convincing stage-set representing the Space Laboratory. It had been put together out of partitions from the main dome and bits of technical apparatus from here and there. At first, it looked like a meaningless as-

sembly of propped-up shifted walls; but as he moved, it abruptly turned into a set for use with a television camera.

Lezd contemplated it with an air of satisfaction. "I have made ready for the Space Laboratory broadcast," he said placidly. "Cecile sleeps—I hope. She is wearing when she is frightened. Now she is frightened."

"Now," Kenmore told him, "she will be disappointed, too. The Laboratory is blown to atoms. Literally!"

Lezd blinked at him. Arlene said breathlessly at his elbow, "I'll tell her."

She vanished. Lezd listened with an increasingly wry expression as Kenmore told him of the destruction of the Space Laboratory—without, however, any mention of the reason for it. There was no point in disseminating causes for despair. If the reason was revealed on Earth, that would be bad enough. It shouldn't be public knowledge on the moon; certainly not yet. He'd pledged the chief and Moreau and Arlene to absolute silence—though Arlene had a clear and accurate picture of what security meant.

"But," said Lezd mournfully, with a specialist's strict absorption in his own purposes, "but this is such a good set! It is a pity to waste it!"

The chief said brightly, "Turn it into a radar-spotter post. Haney and I, we belong in one of them. We can give you all kinds of atmospherel"

Lezd brightened. "That is a good idea! And Miss Gray was almost in one, actually, when the little ship was destroyed and you two picked her up. If anything would please Cecile, that might be it!"

Kenmore went back into the main dome, to the communicator.

He called Earth and reported the blasting of the Space Laboratory. The Very High Authority, who had given

such vehement orders to carry a message to it, was called. Joe Kenmore repeated his report, and the Very High Authority seemed about to faint with relief. He went sick and weak, like somebody condemned to death who had received a last-minute reprieve.

Somebody else had to take over. It happened to be Major Gray, Arlene's father.

"Arlene's all right?" he asked sharply.

"Quite all right," said Kenmore. He added, "I understand the missing jeeps were found. Anybody alive in them?"

He waited three seconds for his voice to reach Earth and the answer to begin.

"Everybody's alive," said Gray evenly. "Jeeps from the missile bases reached them. Their air was giving out, but nobody was dead. The jeeps were sabotaged."

Kenmore felt no emotion; he'd expected that. There was consistent evidence that everything which had damaged the City had been done from within—except for the blasting of a cliff to overwhelm Moreau and himself. But it didn't seem to matter particularly, if the whole moon-project was to be abandoned.

"Well?" he asked tiredly. "What else?"

Major Gray said reservedly, "Missile-base jeeps are supplying the refugee's jeeps with air, and repairing the sabotage. They'll be returned to the City. The civilians in them aren't wanted at the bases."

"I can understand that," said Kenmore.

"They'll be brought back to Earth," said Major Gray, in measured fashion. "Naturally! They're pretty badly shocked."

"Oh, surely!" said Kenmore bitterly. "That'll be the excuse for abandoning the whole business of space-travel. Men can't stand it! That'll be the story! And if all goes well—if all goes well!—there will be a gradual

rationing of atomic power; then coal and oil will be rationed, because it has to last forever. People will putter with energy from the tides and wind, and there'll be no more thought of the stars and the worlds about them waiting for men to come and live on them! And presently . . ."

Major Gray grimaced. "I advise that you don't think too much in that train. As of the moment, I have orders for you. You will not reveal anything you learned at the Space Laboratory. You will do nothing to increase the discouragement in the City when its people trickle back in their jeeps. You will take extra precautions against further sabotage—if possible. And meanwhile, a Navy ship leaves for the missile base. Wait for orders from someone it will bring."

His image faded. Kenmore turned away.

In seconds, he was faced by a furious Cecile Ducros.

"What have you done? Arlene has just told me! And what shall I do? Meellions of people weel be waiting for my broadcast from the Space Laboratory! To promeese them reeches and happiness for all their cheeldren through some great discovery! And you let those eediots destroy themselves and the Laboratory!"

"Those idiots," said Kenmore, "were trying to destroy Arlene and the rest of us."

"But what can I do?" demanded Cecile. "I have no broadcast! What deed I come here for? To broadcast! What can I do? Notheeng!"

Arlene shook her head at Kenmore from behind Cecile's back. Kenmore said coldly, "The chief suggested a spotter station. Lezd is changing the set. Make up a pretty story about those interpid men who brave all the dangers of solitary life on the moon, to search the star-filled skies for little freight-rockets coming up from Earth."

She stamped her foot angrily, then her expression changed to one of surprise. She beamed. "Vairy good! I weel go talk to thees chief. But steel—eet was stupid to let those men destroy the Laboratory!"

She went away. Kenmore shrugged; he was numbed by the abrupt ending of all the things he'd planned to spend his life developing. Arlene shook her head.

"Poor Joe!" she said sympathetically. "You feel that you've lost your job and there isn't anything else to work at! But there are tomorrows, even if not the ones you've been planning for! It might help if you got mad, Joe. Couldn't you work up a good, healthy wrath against the people who tried to blast a cliff down on you and Moreau?"

He shook his head. "Except that Moreau and I were of some use to you, I—almost would rather that they'd succeeded."

Arlene said angrily, "They tried to kill me, too! Doesn't that mean anything?"

She turned on her heel and left him. And he might have been stirred, except that he saw through her attempt to seem indignant. He knew that she was trying to arouse him to an interest in something besides the appalling fact that all his work and hopes were futile.

CHAPTER XV. A DUCROS PRODUCTION

HE WENT heavily to the privacy-cubicle that was his own. He sat down on his cot—it took a perceptible interval between the moment when he willed to sit and the contact of his body with the object sat on—and tried to think out the matter of the sabotage, to pick out those who were guilty of it. They had, very probably, started off in a jeep with the rest of the fugitives, after

sabotaging the City. Most likely they'd lost themselves from the jeep caravan and made the attack on Kenmore and Moreau. Quite possibly they'd also attacked spotter stations and casually murdered their occupants. They might have other plans, even now. Ultimately they'd turn up with a story which couldn't be disproved, and be returned to Earth as fortunate survivors of the disasters to the moon colony. But Joe Kenmore could not think clearly. He'd worked a highly improbable number of hours without any pause; when he relaxed, exhaustion took charge. He didn't realize that he had slept until suddenly there was the chief shaking him, a steaming cup of coffee in his hand.

"Broadcast coming up," said the chief, grinning. "I'm going to act. Haney, too. Arlene says you ought to watch."

It was painful to sit up, even in moon-gravity, but Kenmore did it. The chief handed him the coffee cup. "Arlene said to let you sleep, but we need some kind of studio audience."

Kenmore gulped the coffee. "Any of the jeeps back yet?"

"Some. Coming in one by one. Man! Are those guys scared! They saw themselves strangling or roasting. They want out. They crave to go back home!"

"Including the ones who did it all," said Kenmore. "Pretty, isn't it? But they have no more reason for sabotage. The Lab is smashed and the City will be abandoned. No need for any more murders."

"Except," said the chief, "that those guys might just love their work."

Kenmore stood up and followed the chief across the main dome and into the air-plant part of the City, where hydroponic tanks nourished vegetation to purify the air and at least partly feed the colonists. Cecile prepared

her broadcast magnificently. There would be no script; there was no director. Lezd merely carried out her orders. From time to time, he offered suggestions. She accepted none; she appropriated them. Kenmore heard him make a mild suggestion about the orders of events in the coming production. She ignored him—five minutes later she repeated his suggestion in the form of a command.

From seeming chaos, presently order appeared. Lezd hung a curtain of plastic, dome-balloon material and tinted its surface blue. He set up a slide projector behind it and critically surveyed the projected image from the front. He had made a slide from pictures available in the City. The result was not convincing to the naked eye, but he nodded to Kenmore.

"It will look right to the camera," he said. "Cecile will appear in a vacuum suit and show the people of Earth what moon flowers are like. She will discover them. Fortunately, there is a photograph."

Kenmore said coldly, "Arlene is the only human being besides Mike ever to hold one in her hands!"

But what have facts to do with art?" asked Lezd. "Cecile is an artist!"

Cecile Ducros appeared in a vacuum suit with a special helmet Lezd had contrived for her. It would not be practical outside the domes—it was not airtight—but it was very becoming. She examined her own image in a monitor television screen Lezd had set up. She gave crisp, authoritative commands.

Broadcast time came; the monitor lighted, then went blank. And then Cecile Ducros' face appeared, wearing its heavy-lidded, mysterious smile.

She said sweetly, "How do you do? Thees ees your leetle Cecile Ducros, speaking from the moon. And now I speak in a special manner, because I am een a place

remote from the Ceety—from a lonely station many, many miles away—a spotter station where two intrepeed men brave all the dangers of solitary life upon the moon, to search the star-filled skies for leetle freight-sheeps coming up from Earth."

She wore the phony vacuum helmet, with its phony face-plate lifted back. The camera view widened, and the set which had been built to represent the Space Laboratory appeared quite convincing as something else. Cecile explained the function and the loneliness of these isolated posts, where two men and a moon-jeep stayed for fourteen days in the appalling airless cold of a lunar night.

She showed a view from a spotter-station port. It was close to dawn on this part of the moon, she observed excitedly, and there—look! look! look!—were the faraway specks of sunshine on the very tallest mountains.

It was actually a projection, but even those present found it was difficult to believe that the camera lens did not point out at a desolate landscape, with mysterious mountains against the stars. Of course there was no movement anywhere.

Back to Cecile. She had Haney before a convincing operations board—a spare—and he mumbled awkwardly in answer to her questions. The chief swaggered into the scene and displayed remarkable histrionic ability. There were four spotter stations, he said splendidly, occupied only during the more-than-three-hundred-hours-long night of the moon. One man was supposedly always on duty, watching for the tiny radar pips which should be freight-ships coming to the moon with food and air. Cecile deftly extracted an anecdote or two about journeys through mountain passes with avalanches waiting to plunge down in slow motion. There was a story of the spotter station where the reserve air leaked out, and

was lost. The chief told how they patched the leak, electrolyzed water into oxygen and hydrogen, and breathed that highly explosive mixture for six Earth-days, knowing that a single spark of static electricity would blow them and their station to atoms.

That was a moon-story akin to that ancient tale of the rider on the obedient mule who trotted over a precipice with a man on its back—the man's life was saved when he called *"Whoa!"* and the mule obediently halted in its descent. The chief finished with the bland statement that the really tough part of the ordeal was that they couldn't smoke except out-of-doors.

Cecile smiled sweetly at him and closed her face-plate, explaining that, "Ef theese should break, now that I go outside, I would look vairy ugly to you!" She seemed to enter an air-lock. The camera shifted, and she appeared to come into outer airlessness through the lock. There was a moon-jeep in the projected background; she pointed to its picture and explained with seeming excitement about those vehicles of burden. She explained about vacuum suits—information she'd gotten from Arlene. She lifted a handful of moon-dust, brought in for the purpose, and let it sift from her mittened hands, showing how slowly it fell. She talked of landslides and dust-lakes with a contagious shudder, which was just right to give her audience shivers without frightening it in the least.

Then she seemed to clamber a little, the camera following her, and there was a view of a moon crater, with Cecile looking across it and telling in an awed voice of the wonder of its creation. A monstrous planetoid of stone and iron had come plunging out of the sky at many miles per second, and had literally exploded from the violence of its impact. This ring mountain, miles

in diameter, was the consequence; it was the splash of that ancient catastrophe.

There was more; by the end, Kenmore was angry, because there was every appearance of Cecile Ducros leaping lightly down in the gentle gravity of the moon, to stand at last before blackness and then to say excitedly that here was something she had discovered herself. Here were flowers—the blossoms of the moon! And she was vairy proud that though other growing tufts of such moon flowers had been reported, she, Cecile Ducros, had found this leetle garden wheech the charming people of Civilian City had decided to name after her. And here eet was!

She pointed dramatically, and it seemed that lights from a moon-jeep shone upon and past her; and there was an infinitely delicate garden of slender, silver stalks and drooping leaves.

The camera seemed to approach it; the detail and the delicacy of the flowers was quite incredible, but Kenmore recognized it as a photograph. He'd taken it himself under a cliff, when he and Mike and Arlene were trying to find a spotter station after the Shuttle-ship had crashed—an hour before Haney and the chief found them.

But it was excellent television. There was not one word to hint at sabotage, murder, sudden death. Still less was there any reference to the destruction of the Space Laboratory.

The show ended when Moreau, also in a vacuum suit, appeared and gestured imperiously for Cecile to come with him. His helmet was a normal one, and his face could not be seen in it. But Cecile's helmet allowed her to be seen very clearly; she smiled at him eagerly and turned half-regretfully to the camera.

"Now I am told that eet ees dangerous for me to stay

any longer in thees wonderful, beautiful place. So I go back to the Ceety, and there I weel talk to you again." And she looked at the rather statuesque figure of Moreau in his vacuum armor—with much of its equipment removed to make it look better—and sighed audibly. "I have to do as I am told," she confided flutteringly to her audience.

"He ees vairy handsome!" And then she said, "Ah! I am so susceptible!" and moved toward Moreau.

The monitor screen went blank on an excellent public-relations job for a project which was a failure.

CHAPTER XVI. THE LAST STROKE

AMONG the more than two billion living human beings, perhaps fifty still lived who knew what the Space Laboratory had reported—that further progress in atomic science meant the suicide of humanity. Most of those fifty faced the conclusion with violent emotion. There were three suicides. Several collapsed into quasi-schizophrenic withdrawal from reality.

A few—a very few—reacted to the report by the decision that it could not be true. The cosmos, they asserted, made sense; it would not make sense if it could be destroyed by one of its own parts—man. Therefore, the report must be wrong.

And while Joe Kenmore watched Cecile Ducros' phony broadcast, there were possibly half a dozen men at work checking and rechecking the implications of the report from the Space Platform.

The data, itself, was past question. There was a field of force in which neutrons could be guided and accelerated, like electrons in a television tube. That field could be formed into lenses, which would focus a stream of

neutrons to a mathematical point, while raising their speed to any imaginable value. If such a focused stream of neutrons hit matter—why, no molecule, no atom, no subatomic particle at all could possibly escape collision. If those neutrons were hit hard enough, it seemed that they must crack; and if even one neutron cracked . . .

The cracking of a subatomic particle should mean its instant conversion into pure raw energy, equal in mass to the object destroyed. This would not be the energy of fission or fusion, but the true energy of matter—the energy of the composition of substance itself.

One cracked particle of any nature should crack other nearby particles. They should crack others. The true explosion of one single atom should set off every other atom within a horrifying range, and a chain reaction should begin in which all matter was explosive and exploded. Had this begun in the Space Laboratory, the detonation should have set off the moon, though forty thousand miles away. The moon should explode the Earth; and Earth the sun; and the sun all the planets, and the nearer stars, and they . . .

Such an explosion should be propagated even by the infinitely diluted matter in interstellar space—one atom per cubic centimeter. It should leap the gap between galaxies and turn the cosmos into flame.

This line of thought had destroyed the men in the Space Laboratory; they could not live with it. But a bare dozen men, back on Earth—scientists—refused to accept the Laboratory conclusion, and set out to find the flaw in the thinking which led to it.

It was a man named Thurston who carried the examination through. He was the same one who'd uncovered the false assumptions about kinetic energy in satellite-primary relationships. He worked out this problem on the Harvard analogue computer, at whose controls he sat for

seventy-two hours straight, gulping coffee and working with a magnificent obstinacy. When he finished, he was bleary-eyed and staggering from fatigue, and he uttered pungent and unprintable words as he explained the answer tape to those who waited for it.

It was simply that the experimenters had used the idea of a small and homogenous object as the idea of a neutron. They thought of neutrons as something like nuts; it was convenient to think of them that way. But a neutron is actually much more like a gas-giant planet than a pecan. It has an extremely dense core, but it thins out to nothingness from there.

The point brought out by the analogue computer was that the physical structure of a neutron was important. If two things like nuts collided at high speed, one or both would smash. But when a neutron of the actual sort collided with another particle, it would not smash; at any speed up to the speed of light, it would bounce. At the speed of light it would not be a neutron. It would not even be an object, but a wave.

But on the moon, Joe Kenmore knew nothing of this theoretic discovery. He sad angry, crackling things after Cecile Ducros' broadcast ended.

"Phony from beginning to end," he concluded. "Nothing but sweetness and light!—And she took the credit for everything Arlene learned at the risk of her life!"

"I don't mind," said Arlene soothingly. "I wouldn't have gotten here if she hadn't needed somebody like me to help."

"You'd be a lot better off back on . . ."

There was a very peculiar sound in the dome, an incredible sound because it came from outside. And of course there could not be any sound outside. This was a peculiarly muffled, roaring noise. It began, and grew louder and louder.

Those within the air dome froze. Kenmore started up, and saw a patch of the plastic dome wall begin to bulge outward. Then—and this happened in the fraction of a second—there was a reddish glow and instantly thereafter a flaring crimson flame burned through the plastic balloon which was the dome's inner wall and structural member. Something emitted a dense trail of red sparks. It soared across the top of the dome and plunged at the plastic on the other side. It seemed that a giant, curved, red-hot blade had been thrust through the open space from side to side. The moving flame-head vanished, but its trail of crimson fire remained. And under the roaring, there came suddenly the thin, whistling noise of air escaping to a vacuum.

Kenmore found himself crashing into Moreau. The two had leaped for patches at the same instant. But they had leaped. It was agonizing seconds before they touched ground again, seized separate sheets of plastic, and again leaped upward. There was a six-inch hole in the ceiling of the dome. It was twenty feet above the ground, but a man can jump twenty feet on the moon.

Kenmore reached the hole. The plastic snapped into place over it, drawn and held by the vacuum outside. It caught. It stuck. Kenmore felt moon-dust settling to position against it on the outside, because the outdraft of air was stopped. Moreau was performing an exactly similar feat at the other puncture. They began the agonizingly deliberate drop back to the floor.

"Get into suits," snapped Kenmore, still in mid-air. "Make it quick!"

Some of the surprisingly long-lived carmine sparks drifted down with him. They told what had done the damage, of course. A signal rocket had had a notch cut in its head to produce a small jet of flame before it; it had been thrust into the dust-heap from the outside. The

leading flame had thrust dust aside; the following flame had pushed the rocket forward. It would not conceivably have pierced anything but dust—nor anywhere but on the moon. But it had punctured the dome in two places; and it was not likely that this was the only one to be attacked.

Arlene was getting into her suit with practiced swiftness. Kenmore landed, moved swiftly to her, and pushed a mass of her hair away from the helmet gasket, so that there could be no leakage. He began to climb into his own armor.

He settled the helmet and said swiftly, "Jake! Check the other domes!"

He made sure that Arlene's face-plate was ready to be closed on an instant's notice, and said grimly to Moreau, "Watch the ceiling. If it starts down, more air's being lost somewhere we haven't caught. You can hold it, probably, with air from the air tank. But if you need to get out, do so. The air-lock's a good refuge for the time being."

He ran to the main dome. There were three gaping holes in its plastic ceiling, and a still-glowing signal rocket flamed where it was caught in a metal girder forty feet up. Mike Scandia swarmed up another girder, plastic mending sheets dangling from him, to close a leak. The chief made his way to another. Haney—vacuum-suited—fastened three long rods together. A patch waited. Haney speared the bottom of a wastebasket with his lengthened rods, spread the patch over the open end, jumped to the top of a privacy-partition and thrust the patch into place where it was too high to be jumped to and could not be reached from a girder. It stuck, held there by what air pressure remained.

Kenmore realized that the thin, clanging sound that came through his helmet was the pressure-alarm gongs. But the air situation was actually under control by now.

Kenmore made for the power dome and found a slash five feet long where a rocket had pierced the plastic at an acute angle. Three men in vacuum suits worked on it. They were scared, but they had run away once; now they knew better. They worked to save the City as a way of saving themselves.

Then Kenmore allowed himself to fly into a rage. A man had needed only to notch a certain number of signal rockets to send a small expanding flame before them, and he'd been able to puncture the City's domes at will. And he'd be outside . . .

A race back to the main dome. Its pressure gauges were far into the red, but Haney was down on the floor again and Mike and the chief were descending. Kenmore snapped, on his talkie, "I'm going out after the man who did this!"

He streaked for the air-lock, and heard the chief grunt as if he'd landed from a height that was extreme even for one-sixth gravity.

Haney said, "With you, Joe!" and Mike's voice came sputtering:

"I'm on the way, too!"

But Kenmore was out-of-doors first; he emerged into the incredible spectacle of a lunar dawn. The peaks to westward glowed with an incandescent glare. The lava bay on which the City was built still lay deep in shadows; but sunshine smote the tips of the Apennines, and there was a radiance of reflected light everywhere. One could almost be persuaded that there was an atmosphere to give so softly illumined an effect. Earth, near the zenith, was now less than at the half and would presently diminish to the smallest of crescents, with a dull-red completing line of light to prove that it remained a sphere.

Kenmore paid no heed to any of this. His eyes went to

the moon-jeeps. There were not many, as yet; only a part of the City's population was back. The returned vehicles were parked near the air-lock, and Kenmore uttered an inarticulate sound of fury. There were no tracks under them. There was what seemed to be a mist about them and among them. And there are no mists on the moon save in bright sunshine and where photoelectric substances lie on the surface. Those mists are dust-clouds, supported in emptiness by electrostatic repulsion from charged particles like themselves. This was something else.

He made for the jeeps at the highest speed that moon-gait could give him. When he arrived, he found that a few minutes sooner he might have prevented the damage, and a few minutes later he might have failed to notice it. The parked jeeps stood motionless, thinly veiled in a whitish mist which was moon-dust now drifting back downward to make a smooth, untrodden layer on the surface of the bay. It only needed seconds to make sure. The air valve—by which a man outside might hook onto a jeep's air tanks—was broken off. It was standard practice for men working outside to breathe by long hoses from the jeep that carried them. It always left two hours' breathing in the suit tanks. But now those hose connections were broken off.

The tanks had poured out their contents in a whistling stream, and the dust was already settling again. In five more minutes, only the absence of footmarks in the new-settled stuff would have given warning. If the returned fugitives had fled again, this time they would have suffocated.

The figures of Haney and the chief, and the minute figure of Mike, emerged into the morning. Kenmore called out to them by talkie, explaining what had taken place. Mike darted back into the City to give warning,

so that nobody—however panicked would take refuge in a jeep. Haney and the chief went racing around to the back of the City, to look for the saboteur's work there.

And then cries came in Kenmore's helmet phones from vacuum-suited figures within the City. He rushed; he was through the locks in seconds. He'd heard Arlene scream . . .

She'd been in the air dome. He plunged for that. A girder of the air dome had collapsed and half the ceiling sagged. A part was down to the floor, crushing hydroponic racks beneath it. Two figures dragged desperately at a third, caught under the descending ceiling with yards upon yards of moon-dust above it. Kenmore threw over the air-tank emergency valve by the lock. Great masses of expanding air rushed in. The descending ceiling wavered and retreated—a little—and he leaped forward and helped to drag, pushing at the sagged roof-stuff with one foot as he hauled with both arms.

But the entrapped figure was Lezd; he was unconscious. The active figure were Pitkin and Moreau. Kenmore cried, "Arlene! Where is she?"

She must be under the rest of the collapsing plastic balloon, no longer stiffened by girders and burdened with dust outside. Cecile panted shrilly, "Somebody came in—through the wall! The roof fell down, and she —and she—"

It was patently impossible. To walk into the dust covering of a moon-city should be the same as to walk into a dust-lake. One should be overwhelmed, submerged, packed in dust as in quicksand. Kenmore raced back and opened the air valve fully. For a moment, the ceiling lifted to show all the expanse of floor. But there was a man-high tear in the plastic at ground level on the far side. The roof came down again near that monstrous leak.

And Kenmore's throat clicked. Arlene was not in the

dome, either living or dead. All its floor had momentarily been visible. "Somebody—came through the wall!" insisted Cecile hysterically. "Somebody . . ."

And Kenmore saw that, too. Complete ruthlessness was behind this last attempt to destroy the already-doomed City. The trick was the same as that of the punctures. It couldn't have been done anywhere else. But when one thought about it, walking through a dust-lake, or a city's covering, would be quite as simple as sending a rocket through it. Signal rockets had a thrust of five pounds, earth-weight; they burned for twenty seconds. A man could hold one reversed before him, its flame and fumes roaring ahead, and the blast would literally blow away any amount of the gossamer-weight moon-dust. More might slide down, but its sliding would be slow. A man could make his own tunnel if only he moved briskly and his signal rockets held out. And Arlene had been here, in her vacuum suit . . .

Kenmore roared commands as he ran to carry out his own part in them. The fate of the City was taken care of—if it mattered. The worst leaks were patched, save in the air dome. But Arlene had been carried away!

Moreau came swarming after him. Once outside, Joe Kenmore made a terrific leap, which carried him an incredible distance. He headed for the outside storage space where supplies were kept. The chief and Haney came soaring around the City's sagging mounds.

"There's a jeep beating it for the mountains!" snapped the Indian. "We saw it! Haney yelled for it to stop and it tried to run over him!"

Kenmore panted into his suit microphone and the chief swore—unintelligible words which had blue fire around their edges. Kenmore grimly inspected and tested the nearest jeep for sabotage beyond the loss of all its air stores. Moreau came panting with an armload of

signal rockets. Mike came bouncing with magnesium marking-powder. The chief balanced a monstrous drum of air snow . . .

CHAPTER XVII. PURSUIT

It was the weirdest of scenes. The beginning dawn made the topmost peaks of the Apennines sheerly incandescent. The Mare Imbrium was not yet touched by light, yet the mountain-tops tinted it strangely. There were figures soaring here and there in the preposterous leaps of men in a hurry in light gravity. A moon-jeep moved to one, and then to another, gathering them up with their burdens, and then sped—twinkling in the dawnlight—toward the rampart of stony monsters which were the mountains.

In minutes it crawled up the beginning of the pass, through which another jeep had fled—leaving the City presumably half-wrecked and all jeeps booby-trapped by empty air tanks. The mountains here rose four miles, straight up toward the stars and Earth. Their peaks were bathed in white-hot sunshine. Their valley were dark with the darkness of the Pit. Only the faintest of earthshine now came from the more-than-gibbous Earth. The jeep's multiple lamps glared ahead; all about, hung avalanches.

In the haste of loading, the jeep's cargo doors had been opened to emptiness, and closed again, and the inner doors to the cargo space opened to admit the men who'd leaped up into it with their burdens. It was effectively empty of air, and those inside it breathed from their suit tanks, which would supply them for no more than two hours. Yet its interior was not cold with the chill of outside, and the drum of air-snow bulged until the

chief punctured its top; then there was a bubbling of liquid inside it. So the warmth of the jeep's interior gradually restored an atmosphere which was not yet breathable and utterly dry—but might presently grow thick enough to sustain life.

Moreau enlarged the opening in the air-snow drum, and gouged out masses of snow, which he zestfully mixed with magnesium marking-powder—which again he stuffed into the broken-off ends of signal rockets and sealed in. It was a singularly appropriate mixture for the end he had in view; this was the assembled explosive which had blasted a moon-cliff in the attempt to kill him and Kenmore earlier. This was the explosive used on the moon—magnesium powder in frozen air. The least spark would ignite the magnesium in its binder of solid air, melting enough air to permit a flame; then the whole mass would detonate in blinding, blue-white destructiveness. It had never been used in rockets before. The explosive-head rockets that Moreau prepared now would be the first missiles ever fired in anger on the moon.

But Arlene Gray was in the vehicle they must attack.

Kenmore had thought he knew the ultimate of futility, in the proposed abandonment of the moon and all efforts at space-voyaging. But now he felt a kind of helplessness which was literally maddening. The men he pursued were doomed, of course. They didn't know it, because nobody ever commits a crime unless he expects to dodge its consequences.

The men in the jeep undoubtedly believed that they had a perfect alibi. They could have been a part of the fugitive train away from the City in its first abandonment; and they might claim they'd gotten lost from it, had repaired their jeep themselves, and gotten back to the City to find the dome collapsed. They would anticipate that the site of the City would be visited by jeeps

from the missile bases—which would have happened—and that they themselves would then be picked up and returned to Earth.

Their scheme was already shattered, but they'd involved Arlene in the consequences of their insanity. *And this is the really ghastly part of all crime,* thought Joe Kenmore: *Criminals often injure others in destroying themselves.*

Moreau, fashioning deadly weapons, said abruptly in the jeep, "Lezd must have grappled with whoever took Arlene. His air supply was turned off. We'd better remember that trick if we come to grips with these people."

There is an air-supply control at the neck of a vacuum suit. A man can change or stop the supply of air from his tanks, according to his work or his entrance into a dome or jeep, when he opens his face-plate. Somebody had contemplated hand-to-hand combat in a vacuum, and worked out a perfect tactic on the order of lunar judo; it would not have occurred to most men.

Mike Scandia ground his teeth. The chief and Haney stared out the ports, ahead. Kenmore drove fiercely. He couldn't imagine the destruction of the other jeep without destroying Arlene. The utmost to be hoped for was instant vengeance for her abduction—and that was futility. But he was filled with that rage which is in part pure horror at the wantonness of crime.

His jeep climbed the mountain pass with a reckless speed that nevertheless seemed to him a crawl. Miles above, needlesharp mountaintops groped skyward. They could see feeble earthlight about the jeep, at times. More often, now, there was stark blackness in which the lights of the jeep seemed to cast only pitiful small gleams.

The tracks curved on a mountainside; there was a bottomless chasm to one side. More than a mile distant, the jeep lights wavered over a sheer wall of darkened stone.

There was another curving climb, and the jeep's forward ports pointed toward a sunlit mountain flank. The sun already beat on that. It held no life, yet it looked tormented—tortured—as if it strained terribly to become alive, or at the least to give shelter to some small living thing.

But those who traveled glanced at it only once. Mostly, their eyes were upon the dust of the pass before them. There were trails here; if men abandoned the moon today, their footprints would remain until the sun burned dim.

At the moment, though, the fact was only important because if the escaping jeep turned aside, the pursuers would know instantly.

Kenmore knew this path. He had traversed it more than once, and only recently he and Moreau had brought a freight-rocket's carcass back to the City, slung under a jeep with a dented wheel. Their quarry would have no actual destination; they would consider that they had wrecked the City. They fled into the mountains simply to wait until any chance survivors fled again—and this time, any such refugees would surely die, because their air tanks were empty.

They would expect lavish reward from some country's ruler, when they returned to Earth.

Joe Kenmore drove like a man demented or inspired. One needed at least three pairs of hands, and other remarkable gifts, to drive a moon-jeep properly. The faster one drove, the more urgent the need for more-than-human abilities. But Kenmore's jeep would gain on the fugitive vehicle, because its occupants would hardly expect pursuit in the panic and confusion they should have created. They might not bother to travel very far, but he meant to overtake them—fast!

And he did.

He saw the saboteur's jeep as a faint glittering in reflected dawnlight. There was a steep and narrow gateway where that light glowed down. The ungainly, faraway vehicle crawled into that partial, tinted brightness. It crawled on, out of it, between monstrous stony portals that could have opened upon nothingness itself.

Kenmore followed recklessly; he know what lay beyond. His jeep clanged and clattered through a narrow gorge. It came out, lurching crazily, to an area where earthlight seemed almost brilliant. Actually it was a weird twilight, and in it could be seen the whole of a small crater hardly a mile across, which had been formed in the wall of a greater one. A part of its own circular rampart had collapsed into an abyss to one side. There was what might be called a lunar glade—a roughly circular, almost level space. It ran some two thousand yards each way, with a mound in the center and starkly vertical cliffs everywhere but at the abyss' edge and where previous jeep trails ran close to it.

The fugitive jeep had turned aside into this place. It swung about neatly, and the motors of its four wheels stopped. Its occupants complacently set its brakes.

The pursuers could now hear the fugitives' exclamations in their helmet phones. They saw a flash of light and their complacency vanished. They felt a very faint jarring sensation, turned startled eyes and saw swirling mist and moondust mixed together, and a trail of crimson sparks leading arrow-straight away from it. At the end of that trail there was another jeep—Kenmore's—and it lurched and skittered grimly toward them. A rope ladder dangled from its air-lock and a figure swung there. A second streak of crimson sparks flamed from his hands toward them.

The fugitives were at once incredulous and appalled. The driver slammed on the motors; the jeep shot ahead.

But it had been stopped without thought of possible emergencies. It had now to be turned again for flight—and one needs many hands to operate a jeep.

Apparently, the driver panicked. He swerved, and one wide wheel ran into a place where two great stones converged, in just the fashion needed to pinch a wheel to immobility. He tried to force them apart by ramming the wheel ahead; then he tried to back. He could not.

Kenmore saw a vacuum-suited figure drop out of the other jeep's lock and run frantically to the caught wheel. A second figure swarmed down to help.

The two of them tugged; they strained terribly, and the impossible happened. The wheel came free.

And the jeep moved. A jeep is necessarily designed to take great abuse and travel anywhere. This one had stalled, but apparently its driver had not set the control intended for just such situations. There was a control which would let the jeep move forward an adjustable distance, and then stop to let its crew return to it. It is extremely useful, but it was not in use now.

The jeep moved ahead, steadily, with increasing speed, toward the chasm on which the small crater abutted.

One of the men from the jeep roared with fury. It could be heard in helmet phones in the pursuers' cabin. The other man screamed. They rushed after the moving machine. It outdistanced them, speeding toward the cliff that dropped to nothingness . . .

Kenmore flung his own jeep forward at its topmost speed, to try, quite hopelessly, to crash into and stop the runaway jeep. But Moreau fired rocket after rocket from the rope ladder, swearing hysterically because joltings spoiled his aim.

A rocket, though, smashed a front wheel when the runaway was no more than fifty yards from the chasm's edge. It slid thirty—striking sparks—before it came to

rest. There the ground sloped visibly downward. But the jeep stopped.

Kenmore stopped beside it only instants later. He plunged for the air-lock, but the chief was going through. When Kenmore touched ground, outside, the chief growled to the fugitives, "You give up if you want to, or take what's coming! But you'd better decide fast!"

He faced the two vacuum-suited figures a hundred yards away in the earthshine. One of them uttered unintelligible sounds. Moreau raised a signal rocket. "Shall I pot him?"

"Let me handle him!" panted Kenmore. "Let me . . ."

The nearer of the two fugitives rushed. He came in great leaps of forty and fifty feet, bellowing incoherently. Kenmore moved to meet him—and then saw something more satisfying than even tearing this other man apart with his hands.

"Let him go by!" he snapped.

His tone was so fierce that the others instinctively obeyed. Kenmore threw himself aside.

The one thing that hardly anyone raised on Earth can ever remember in times of stress is that gravity and momentum are different things. The bellowing man soared ferociously at the three avengers—four, when Mike got outside—with his hands outstretched to rend and tear. On Earth, he would have weighed about two hundred pounds, plus a hundred pounds or more for his his vacuum suit. Here, man and suit together came to fifty pounds or less. But his forward rush still had the momentum it would have possessed on Earth.

The big man could not stop himself. He plunged through the opening that Kenmore's sidewise movement made for him, and found himself hurtling toward the cliff edge which the crippled jeep had narrowly escaped. He howled suddenly, tried to fling himself down onto

the surface—to stop his progress at any cost. But an object falls only two and a half feet in the first second, on the moon. When this man essayed to throw himself down, his legs ceased to touch anything; but his body did not descend. He floated.

His body was two feet above the surface when it floated past the place where that surface sloped downward. He reached toward the stone, crying out in sudden shrillness, trying to seize something and stop himself.

He failed.

He floated out over the edge of the precipice, and began to curve very gently and very deliberately downward. He screamed. He screamed again.

Darkness swallowed him. He fell only five feet the following second, and not much more than ten, the third. But that particular precipice was thousands of feet high; the pit into which he dropped was thousands of feet deep. His voice came very terribly to them for what seemed centuries, screaming as he fell.

His voice stopped in the middle of a shriek. If the fall had not killed him directly, his suit was torn or his helmet crushed. There was no point at all in going after his body—even if it could have been done.

"And now," said Kenmore savagely, "that other one!"

The other armored figure had stopped. It wrung its space-gloved hands. Those who converged grimly upon it heard whimperings in their headphones.

"We'll keep you alive," said Kenmore, very coldly indeed, "until you get back to the City and tell what you know. But we don't promise more than that!"

They heard sobbings and slavering sounds. The second fugitive wailed and wailed; then he turned and fled blindly, weeping in his ultimate despair and terror.

Moreau squeezed a signal rocket. The flare of red

light jerked from his hand even as Kenmore grated a command against it. But it was two late; the signal rocket flew in an almost mathematically straight line, leaving its trail of lurid sparks. The fugitive fled in the crazy, clumsy leaps low gravity imposes upon panic The rocket seemed to miss him—to be headed past him five feet away.

But then the flame inside it reached the explosive at its head. There was a flare of sun-bright white light. No sound; no impact; nothing but a sudden flash of intolerable brilliance, and a spouting cloud of moon-dust—and the fugitive was gone.

"And now," said Kenmore, his throat dry once more, "we'll see if Arlene's all right."

She was.

CHAPTER XVIII. THURSTON'S REACTION

IT SEEMED that all the future was cut and dried, and that there were to be no surprises. Arlene Gray was alive and unharmed, which was reason for rejoicing. But the enterprise, which—by Joe Kenmore's lights—meant a magnificent future for mankind seemed to be ended. No cause for joy here.

There was, to be sure, the fact that Major Gray had told Kenmore not to think too much in such terms, and that a Navy ship was heading for a lunar missile base. But this did not seem to matter. Anyhow, it would arrive after sunrise—when travel was not practical.

Meanwhile the matter of continued existence had to be handled, even though its purpose was frustrated. There was the return of the jeeps in which the inhabitants of the City had fled—a long time ago, it seemed now. They came in one by one, their air tanks refilled

by the military, and their needed repairs made by missile-base personnel. When they learned of the destruction of the Laboratory, some of the returned men were visibly jubilant. Now they could return to Earth—not by their own fault—and they would never leave it again.

But some of them were aggressively on the defensive. They had run away, while Kenmore and others had met the emergency they fled from; so the fugitives did not show up well. They were insistently suspicious of Kenmore's behavior. Some muttered darkly that only he and the chief and Moreau really knew how the Laboratory came to be destroyed, and they might have reason not to tell the truth.

There was a time, indeed, when Kenmore and the others were considered highly doubtful characters. They'd known exactly what to do in the leaking City. How would they know how to meet an emergency like that unless they'd caused it?

Cecile Ducros stopped those murmurings by the acid comment that she, at least, would not be alive but for Kenmore. She added, "Eet ees steel posseebeel for me to broadcast to Earth on the behavior of those who *ran away,* abandoneeng the City and the landing-beam apparatus." She should have died in a crash landing, because of their desertion; and certainly she'd have died afterward but for Kenmore's search for her in a jeep.

At this point, Joe Kenmore was a very admirable person again, because nobody wanted to offend Cecile. The inhabitants of Civilian City wanted to be presented on her next broadcast, and praised to viewers on three continents. They worked feverishly to attain this end, pestering Arlene, Lezd, and Cecile herself for a promise of praise as heroes. It followed, obviously, that they interfered a great deal with Arlene's natural desire to be with Kenmore in privacy.

She complained ruefully about the persecution, and he told her dourly that there'd be at least two weeks of it to come. It would be so long before the Earth-ship was ordered to take off—after sunset—to begin the evacuation of the City. Arlene would be among the first to go; he'd see to that. For himself, he foresaw a long period of uselessness—with further uselessness awaiting him on Earth until he had an entirely new plan for his and Arlene's future worked out. He did not think to mention the Navy ship on the way out, coming to the moon to land at a missile base. It seemed to have nothing at all to do with him.

Then he grudgingly gave of his time to a highly official inquiry into the sabotage of the City. The conclusion—accurate enough—was that all the sabotage so far experienced could have been made by the men who'd made the last attack, had carried off Arlene and had been destroyed in the mountains by their pursuers. It was considered that they'd done most of it, anyhow.

But Joe Kenmore hardly cared. He was not even interested when Mike Scandia, Moreau, the chief, and Haney enthusiastically volunteered to go out and make a movie of a solar-power mine for the next broadcast. The mines were interesting, but unimportant. A solar mirror concentrated blistering, unshielded sunshine to a focus the temperature of which was comparable to that of the sun itself. Turned on a moon-cliff, the focused sunlight would melt the most refractory stone to lava. Turned on a vein of metal ore, it not only smelted but could boil metal away as steam. But, controlled properly, it brought trickles of pure liquid metal pouring down into a waiting mold.

The mining process was the subject of the broadcast. Cecile, of course, appeared on the television screen to be at the mine itself. She explained vividly the way one

traveled in daylight—when one must. One left the City in a jeep which ran swiftly through furnace heat to a place of shadow, where the jeep cooled off. Then another quick rush through the inferno which was the moon's surface in sunshine, and so to the mine itself. And the mine was merely a great sun-mirror beside a cliff, with a dust-covered sun-shelter for the jeep and those who operated the mirror.

It was an effective show. Cecile described the danger and the baking desolation with contagious shudders. She made it very clear why men were nocturnal on the moon. One could heat a vacuum suit against cold, but there was no way to cool it so that a man could live long in the sun.

But the City, itself, disapproved of the show. The returned refugees considered that she should introduce them all, one by one, to her watching audience on three continents on Earth.

Kenmore didn't even watch the production; he was sunk in gloom, dangerously close to apathy. When word came that the Navy ship had landed—the one that Major Gray had spoken of—he felt no elation. Even the news that a jeep had been especially equipped with heat reflectors and refrigeration, to try to make a journey in daylight to Civilian City, did not arouse his interest.

The chief and Moreau came to him in some excitement. After the broadcast, they'd gone back to the solar mine. They had a wild idea of casting a rocket-ship in metal smelted on the moon—running the metal straight from the vein into a mold. It was to be its own cargo. The idea was practical enough in itself, but Kenmore saw the problem of getting such a vessel back to Earth. It could be lifted past the neutral point easily enough—past the point where the Earth's and the moon's gravi-

ties cancel each other. Then it would fall to the Earth of its own weight. But landing it . . .

He told Arlene about it eventually, when, between sleep periods, she tried to arouse him from his depression.

"It's not a bad trick," he admitted. "They say they're going to see if they can cast a ship, and then figure out a way to land it. That's the problem, of course. It costs as much fuel to land a ship as to take it off. They can let drone-rockets smash on the moon, here, and it's all right. They hit the *mares,* and are spotted by radar, then a jeep goes out and picks them up. But that couldn't be done on Earth. You couldn't safely drop drone-ships, like meteors, anywhere on Earth—unless you picked the polar icecaps. But it takes three tons of fuel to land one ton of ship gently, and that three tons has to be brought up here—which is as far as ten times around the equator. The fuel to land a ship would cost more than any ship was worth in money, no matter what it was made of."

Arlene wanted to keep him talking—no matter what the subject—rather than brood as he'd been doing. She said interestedly, "Why not drop them on the icecaps? Couldn't they use helicopters instead of jeeps to pick them up?"

"Not in the Arctic," said Kenmore. "That's mostly ocean, and they'd smash through the ice and sink. On Antarctica, the weather's impossible; they melt into the snow and become invisible, anyhow."

"There must be some way," Arlene insisted, though she did not care about the problem at all. "The Sahara?"

"They'd bury themselves in sand . . . Hello!" Kenmore blinked, and said in a surprised voice, "There are places where the ocean is miles deep. A drone could be designed— Look! They could make drones like super-

sonic ships on Earth! Drop them into the ocean for their fall to be checked, and have them fixed so they'd float back up to the surface . . . They could broadcast their position . . . I've got to see about this!"

He showed animation for the first time in a long while, and Arlene seemed fascinated as he explored new angles of the idea. She went with him to the colony computer and exclaimed admiringly at the results he got. Metal, mined and cast on the moon, could be hauled up to the place where it would begin to fall to Earth—some metals, anyhow. Then mortars turned up as possibly more efficient than rockets for firings in a vacuum. With no air resistance to allow for . . .

He was deep in still further complexities when Moreau and the chief, Haney, and Mike Scandia—Mike was lately recruited into the scheme—came back from a hop-skip-and-jump journey to the solar-heat mine.

We can do it," Moreau miserably. "We can make the ship. But when we began to compute the cost of landing it, we saw that it was idiocy. No ship could pay for its fuel."

"No?" asked Kenmore. "Look at these figures!"

He leaned back, and Arlene was infinitely relieved. She sat very still as Moreau went over the computer tape, exclaimed excitedly, and then the others began to argue about the drone-ship design, talking all at once and tending to outshout each other in their enthusiasm. The chief knew where there was cobalt in quantity. Haney knew of stannous ore. There was a place where silver was to be found, and even more precious metals . . .

And there were laws—drawn up for window dressing—by which private individuals could claim minerals if quite impossibly they could make use of them. The four companions went garrulously off to comply with formali-

ties nobody had ever bothered with before. And then Kenmore said grimly:

"It'll work. And it's such a natural, for publicity, that there'll be plenty of capital available. So I probably have a job for the future, helping run the operations of Lunar Mines and Metals, Incorporated. Swell, eh?"

But his eyes were devoid of happiness. Arlene patted his hand. It wasn't her fault, but she was sorry that he was disappointed in the future he'd planned.

It was a remarkable coincidence that the specially shielded, refrigerated jeep arrived at Civilian City within an hour. Its journey was a great achievement. It had huge reflectors to cast the heat of the sun away from it. It was even shielded from heat in the moon-dust over which it rolled. It had refrigeration on a large scale. But even so, it had stopped often to cool off. It brought, however, a civilian named Thurston.

He had come to talk to Joe Kenmore. He was a weedy sort of man and still unaccustomed to moon-gravity. But he spoke with a dry precision.

"Out at the Laboratory," he told Kenmore flatly, "they made a mistake. The poor devils were under a killing strain, and it killed them. D'you know how they worked? Like men in wartime defusing shells and bombs and mines. They'd report they were going to try something, and then try it. If it didn't blow them up, they'd say so, and then report what they were going to try next. Not very soothing as a way of life for months on end."

"That's obvious," agreed Kenmore, "considering what happened."

"They'd been developing a focused, accelerated beam of neutrons," Thurston observed. He added, "I can tell you this, because you already know too much. They could focus the beam absolutely, and accelerate the neutrons to any degree. They found that, at low power,

the beam was so dense that it would break down molecules. Nice work in itself! Then they found that with even tighter focus and higher acceleration they could break the heavier atoms—bismuth and up. The power gain was terrific. They had controlled atomic fission. They reported that."

Kenmore said ironically, "Very useful!"

He meant, of course, that the whole reason for the City and the Space Laboratory was that there was a limit to the amount of atomic fission that could be done on Earth. It poisoned the air. There was a time when controlled atomic fission would have seemed occasion for delirious joy. It was so no longer.

But Thurston said mildly, "Quite useful. You see, with a dense enough beam, the released energy couldn't backfire. The release was directional."

Kenmore jumped. Controlled atomic fission with the energy released directionally would solve many problems. All the released energy could be captured and used. All of it! And in space . . .

"So we made a couple of atomic rockets to try it out," said Thurston. "The Lab was to test them. While they waited for the rockets to be made, they started to figure what would happen if the neutron beam hit lighter elements at the speed needed to break them.

"But they'd been under a killing strain. It was inhuman. It was intolerable to work under the strain they were under! So when they came up with figures stating that such a beam would start a chain reaction, one which would destroy the universe—why, they couldn't weigh it calmly. It was an answer to end all research, and they were at the breaking point. So they believed it. They couldn't help themselves!"

"I knew most of this," said Kenmore. "Go on!"

"But they happened to be wrong," Thurston told him.

"They didn't take the structure of neutrons into consideration. They forgot. So I've brought up the rockets. They may detonate, though I don't think so. But I *know* they won't start a chain reaction. Since the Lab's gone, I want to mount them in the rocket racks of the ship you've got here. The Earth-ship. Run controls inside, and mount them along with standard rockets. Use the standard ones to get aloft and well out in space—and turn on the reaction that the men in the Lab thought would set off the cosmos. It won't do that. Will you pilot the ship?"

Kenmore said hungrily, "What do you think I am? When de we start?"

It would be a matter of hours to clamp on the atomic rockets and install the complex controls inside the ship. But the test had to be made in a civilian vessel. The purpose of the City and the Laboratory had to be accomplished by civilians, or there would be anguish and accusations. If the Laboratory had been destroyed, and its work completed by the military—why, much of the world would accuse the Americans of murdering the geniuses who had achieved so much. So it was necessary, as a matter of politics, to complete the job through the international organization of the moon.

Kenmore found Arlene while missile-base technicians went to work on the Earth-ship. She smiled hopefully at him. "Anything—"

He picked her up and hugged hr. He swung her as extravagantly as a girl can be swung only on the moon. He babbled almost incoherently. Arlene freed hrself.

"This is all very nice," she said breathlessly, "but what's happened?"

He managed to control himself. He told her. She stared. Then Cecile Ducros snapped, "My next broadcast! A magneeficent broadcast. Thees I must tell about!

Arlene, you shall go weeth Kenmore and tell me of eet, and the next broadcast weel be from witheen the returned sheep and I weel tell my listeners of the triumph of mankind!"

Kenmore grinned at Arlene. "Would you like to go along?"

"You're going, aren't you?"

There was no concourse of people to watch the Earthship take off. It was midmorning on the moon—the sun was four days high—and the surface of the *mare* was already hotter than boiling water. The sunlight itself had the virulence of the glare of an open furnace door. It could have been cooked by. So there was only the jeep from the missile base nearby, with its enormous heat reflectors looking like the headdress of a nursing nun, only forty-odd feet high and of glittering silver. The missile-base men withdrew into their jeep, and Thurston ascended the sun-heated ladder rungs to the ship's airlock. He went in.

Mike Scandia said grandly, via talkie in the shadow under the jeep, "Arlene, I gave you a bouquet once, when things looked pretty bad. Now I'm giving you another one, when things look pretty good for the Lunar Mining and Metals Corporation as soon as you get back. From the Board of Directors!"

In the shadow-space beneath the reflectors there were only harsh reflections of the incandescence outside. But Mike held out something in his mittened hand. And it was incredible. Where the moon flowers Arlene had seen before were silver, these were gold. They were infinitely intricate, of impossible delicacy, of breath-taking beauty. Mike held out a bouquet of slender stalks and branching leaves. They were inextricably intertwined. They had the seeming fragility of maidenhair fern, but they were

golden, brightly shining—such things as would be dreamed of in fairy tales as suitable christening gifts for a princess.

Arlene stared at them. "Oh, beautiful! But, Mike—don't tell me they'll vanish!"

She almost wailed it, and the chief's chuckle came into the helmet phones.

"We argued about those moon flowers," he said comfortably. "They had to be mercury, of course. Mercury vapor made by sunshine of some kind of ore, condensing in shadow where they couldn't be just liquid because it was too cold. They had to be frost. Mercury frost. Snowflakes of mercury. Naturally they'd vanish when anybody came near to warm 'em! So Mike and Haney and me, we were out at the solar-heat mine, and we boiled some gold in front of a shadow-place to make sure. It couldn't happen except in low gravity but—pretty, ain't they?"

"They're lovely!" said Arlene, bright-eyed. "Lovely."

"Use 'em," said the chief, "for a bridal bouquet when you and Joe get hitched up."

He stood back. He and Haney and Mike and Moreau watched from the shadow of the jeep as Arlene climbed to the air-lock with Kenmore close behind her.

The jeep drew back and the four men trudged beneath it. Presently it stopped and they stared back at the tall Earth-ship, shining silver in a landscape of fire, with a star-speckled sky of purest black above it.

The Earth-ship spurted flame. It rose swiftly for the stars.

A long, long time later, Joe Kenmore said evenly, "You know how to do it, Arlene."

She nodded, and put her hand on his. The ship floated free, pointed away from both Earth and moon. There

was no sound inside it. Thurston, new from Earth, watched composedly as Kenmore's and Arlene's hands hovered over the control which would start atomic rockets to low-power firing outside the hull.

"Five," said Kenmore. "Four. Three. Two. One. Fire!"

Arlene pressed down on Kenmore's hand. There was a gentle rumbling, which ceased. There was a feeling of weight. Gentle weight. Kenmore pressed harder. The weight increased. He lifted his hand. It lessened. He pressed again, and the Earth-ship leaped ahead like a mettlesome horse . . .

Kenmore nodded, awed in spite of himself.

"It works," he said to Thurston. He sounded incredibly calm. "How much fuel is there?"

"A hundred hours at one gravity," said Thurston mildly. "Of course these are small rockets. We'll have bigger ones."

"We could go to Mars and back with these alone," said Kenmore very quietly. "Someday, now, we will reach the stars!"

Arlene said confidently, "Of course!"