

HALO

Galaxy, October 1952

"You disappoint me," the class superintendent said with some feeling. "I have a personal as well as a professional dislike of wastefully run farms, and you seem to have furnished a prime example." He paused briefly, watching in silence as the spheroidal forcing beds drifted smoothly about their central radiator. "Of course, I would be much more sympathetic with you if your own ill-advised actions were not so largely responsible for this situation." He checked his young listener's half-uttered protest. "Oh, I realize that youngsters have to learn, and experiment is the only source of knowledge; but why not use the results of other people's experiments? This sort of thing has happened before, I think you'll find."

"I didn't know." The answer was sullen despite the grudging respect. "How was I supposed to?"

"Did you get an education or not?" There was some heat in the query. "I can't imagine what the primary teachers do these days. Even though you are so young, I understood that you had some qualifications and even a bit of promise in agriculture. That's why I thought you could be trusted without supervision for a few years. Am I to assume that you became dissatisfied with the yield of this farm?"

"Of course. Why else study agriculture?"

"Until you can answer that for yourself, I won't try to. Tell me in detail what you did. Did you try to step up the output of the central radiator?"

"What do you think I am?" The younger being's indignation flared abruptly.

The other remained calm and exhibited faint traces of amusement, permitting the feeling to show in his answer rather more plainly than was strictly tactful.

"Don't boil your crust off. You might not be able to spare it next time you go in to harvest. People still do try the stunt I mentioned, you know.

Every now and then it works for someone after a fashion, so the rest feel it's still worth trying. If it wasn't that, just what did you do? You're missing a culture unit, if I remember this solar system correctly."

The student took a moment to find just the right words. "One of the lots seemed to be practically ideal. When it first solidified, it was just far enough from the radiator and just large enough to retain a thin surface film of light elements; and it responded beautifully to culturing with water-base growths. On the colder ones, by the way, I had good luck with ammonia cultures."

"Quite possible, in that sort of bed. I noticed a couple of them were bare, though. Was that another result of this experiment of yours?"

"Indirectly, yes." The young farmer looked a trifle apprehensive. "There was another plot, a good deal farther out and colder than my ideal one. But it was too hot for ammonia growths and too small to furnish the pressure they seem to need—at least the ones I'm familiar with." The addition was made hastily.

"I judged that it should have a good supply of food elements, cooling where it did; and since it wasn't doing well where it was, I thought it would be a good idea to move it farther in."

The listener's manner lost some of its amused aspect.

"Just how did you decide to go about that? The energy involved would have demanded several times the mass of your own body, even with total conversion—which I can't believe you've mastered."

"I don't suppose I have. It seemed to me that the unit itself could furnish the mass without serious loss, though."

"I see." The comment was grim. "Go on."

"Well, I went in and set up a conversion reaction. I touched it off as well as I could on the forward side of the unit, though that was a little hard to arrange—the thing was spinning like mad, as most of them do. Maybe that was the reason I let a little too much mass get involved, or maybe the globe wasn't as massive as I had thought."

"You mean you were uncertain of its mass? Is something wrong with your perceptive faculties as well as your judgment? Just how old are you, anyway?"

"Fifteen." The sullenness, which had began to depart from the youngster's tone as he warmed to his narrative, returned in full strength. The questioner noted it and realized that he was not being as tactful as he might be; but under the circumstances he felt entitled to a little emotion.

"Fifteen years on what scale?"

"Local—this furnace, around the mass-center of the system."

"Hmph. Continue."

"Most of the sphere was volatilized, and most of what wasn't was blown completely out of the system's gravitational influence. The rest—well, it's still circling the furnace in quite a wide variety of orbits but it's not much good to anyone."

There was a pause while the nearly useless outermost unit swung beneath the two speakers, then on to the far side of the glowing sphere of gas that held it with unbreakable fingers of gravity. The supervisor was not actually boiling—that would be difficult even for a body composed largely of methane, oxygen, and similar solids when it is at a temperature of about half a degree absolute—but his temper was simmering. After a moment he spoke again.

"Let me get this straight. You sent a slave with a message that your farm had gotten out of hand and that you would like advice. Am I to understand that you spent so much time ruining one of your units that some of the others developed culture variations whose taste didn't appeal to you? I'm afraid my sympathy grows rapidly less."

"It's not that I don't like the stuff; it's that I can't eat it." The youngster must have been angry, too; there was no other imaginable reason why he should have made a statement at once so true in fact and so misleading in implication. The superintendent, swallowing the implication whole, permitted the remains of his temper to evaporate completely.

"You can't eat it? That is really too bad. Pardon me while I go to sample some of this repulsive chemical—or perhaps you would like to come along and show me what you have been eating. There is hardly enough drift in this area to support you, particularly with a decent-sized crew of slaves. What have you been feeding them? Perhaps you ought to let someone else take over this farm and get yourself a research job out in one of the drift clouds, soaking up your nourishment from a haze of free atoms ten parsecs across for a few years. You youngsters!"

"I've been eating from the ammonia units. So have the slaves."

"Very well, then I shall look over your water culture, which by elimination must be the one that's been giving trouble. On second thought, you needn't come along. It's the third plot from the furnace. I can find my way." He moved off abruptly, not even waiting for an answer.

And the student, with no slightest shadow of an excuse, simply because of his own childish loss of temper, let him go without a word of warning.

It might, of course, have made no difference if he had spoken. The superintendent was annoyed, too, and might understandably have chosen to ignore his junior. His attention, as he permitted himself to fall toward the central radiator, was divided between his own irritation and the condition of the various plots. Only gradually did the latter feeling predominate.

He had to admit the outermost was too cold for much chemical action except actual life processes which were too slow to be useful. The fact that the youngster he had left above had induced anything at all to grow there was at least one point to his credit. It swung past only once while he was falling by its orbit. Though his gravity-given speed was slow, its speed was slower—and it had farther to go.

The next two he had noted earlier were bare of useful growths. He remembered now that the student had admitted this fact to be an indirect result of his experiment. The superintendent could not see the connection. The plots themselves, on closer inspection, seemed physically undamaged, and the student himself could not possibly have eaten them both clean, no matter what his hunger. Of course, a crowd of slaves might—but he was not going to accuse anybody yet of letting slaves get that far out from under control. They were not even allowed to approach a culture plot in person, being fed from its produce by their master.

The plots themselves were large bodies, though not the largest in the system, with their solid bulks veiled under

mile after mile of hydrogen compounds. The superintendent's senses probed in vain for the enormously complex compounds that were the preferred food of his kind. Several much smaller bodies were gravitating about each of these plots, but none was large enough to hold the light elements in the liquid or gaseous form necessary for food culture.

The next unit had the merit of interesting appearance, if nothing else. In addition to the more or less standard quota of bodies circling it, it possessed a regular halo of minute particles traveling in a solidly interwoven maze of orbits just outside the atmosphere. On the surface, and even in the atmosphere itself, its cultures were flourishing. The superintendent paused to take a sample, and had to admit that once again the youngster had not done too badly.

His temper cooling, he rode the farm plot most of the way around its orbit, taking an occasional taste and growing calmer by the moment. By the time he left the limits of its atmosphere, he was almost his normal self.

This, however, did not last long enough even for him to get rid of the globe's orbital speed, to say nothing of resuming his drop toward the sun. He had slanted some distance inward and fallen well behind the ringed sphere when his attention was drawn to another, much smaller object well to one side of his line of flight.

Physically, there was little remarkable about it. It was less massive even than his own body, though a short period of observation disclosed that it was in an orbit about the central furnace, just as the farm plots were. Sometimes its outline was clear, at others it blurred oddly. Its brightness flickered in an apparently meaningless pattern. Merely on its physical description, there was nothing remarkable about it, but it seized and held the superintendent's puzzled attention. Off his planned course though it was, he swung toward it, wondering. The student had mentioned no friends or co-workers

Gradually, details grew clearer and the superintendent's feelings grew grimmer. He did not like to believe what he saw, but the evidence was crowding in.

"Help! Please help! Master!"

The bubble of horror burst, and one of anger grew in its place. Not one of his own kind, injured or dying and an object of terror and revulsion thereby; this thing was a slave. A slave, moreover, well within the limits of the farm, where it had no business to be without supervision; a slave who dared call on him for help!

"What are you doing here?" The superintendent sent the question crackling along a tight beam toward the apparently helpless creature. "Did you enter this region without orders?"

"No, Master. I was...ordered."

"By whom? What happened to you? Speak more clearly!"

"By—I cannot, Master. Help me!" The irregular flickering of the slave's auroral halo brightened fitfully with the effort of radiating speech.

Unsympathetic as the superintendent normally was to such beings, he realized that help must be given if he were to learn anything. Conquering a distinct feeling of repugnance, he moved up beside the slave to investigate its injuries. He expected, naturally, to find the visible results of a thorough ion-lashing, that being the principal occupational hazard faced by the slaves; but what he actually saw almost made him forget his anger.

The unfortunate creature's outer crust was pitted—dotted and cratered with a pattern of circular holes which resembled nothing the superintendent had ever encountered. He knew the long, shallow scars of an ion-lashing and the broad, smoothed areas which showed on the crust of one of his people when close exposure to a sun had boiled away portions of his mass. These marks, however, looked almost as though the slave had been exposed to a pelting by granules of solid matter!

A ridiculous thought, of course. The stupidest slave could detect and avoid the occasional bits of rock and metal which were encountered in the interstellar void. After all, they had the same sensory equipment and physical powers as the masters. An unprejudiced judge might even have said they were of the same species as the masters. Whatever had caused the creature's injury, there was little that could be done for it. Grudgingly, inspired far more by curiosity than by sympathy, the superintendent did that little, supplying hydrocarbons and other organic matter lately skimmed from the ringed planet.

Food, however, was not enough. Bits of extraneous metal were im-bedded in its body, altering the precise pattern of charged metal nodes that spelled life to these beings. Some of its own field nodes had appar-ently been chipped or blown away, and others were discharged. The creature's body was only a fraction of its normal size—the regular reserve of "food" compounds that ordinarily made up so much of even a slave's bulk had long since been consumed or had evaporated.

There was no doubt that it was dying. But there was some chance that it might gain strength enough to impart information if it were fed. It was—sparingly, of course.

"No sense wasting food on a slave that's about to die," the superin-tendent explained without brutality.

"Certainly not, Master," the slave agreed without resentment.

"What happened to you?" the superintendent repeated. The slave was in no condition to be coherent; but a lifetime of conditioning brought some order to its agony-dazed mind, and it answered.

"I was ordered to the inner plots—to harvest." The word-symbols came haltingly, but with sufficient clarity to be unmistakable, shocking as their implication was.

So the student had trusted slaves near a food supply! Perhaps that accounted for the two stripped planets.

"You went to harvest when a young fool like this orders it?"

"He was a master, and he gave the order. Many of us went; many of us have been going for years—and seldom returning. We did not wish it, Master, but he ordered it. What could we do?"

"You could have asked the first superintendent who came here whether it was better to disobey a Prime Order or a young master."

"You are the first to come, Master, as far as I know. And the young master said we were not to speak of this order to anyone. It is only because you command me to speak that I do so now—that and the fact that there is little more that he could do to me, anyway."

The overseer ignored the pointed closing sentence. "You say many of you have been ordered to do this, but few have returned from the errand? What happened to them? What happened to you?"

"They die. I did not know how; now I suppose it must be—this way."

There was a pause, and the supervisor was moved to sarcasm. "I suppose they are struck by meteoric particles, as you seem to have been. Do slaves absorb personal characteristics such as stupidity from their mas-ters? Could you not dodge the meteors?"

"No, not all of them. The region near the central furnace has more of such matter than any other place I have ever seen. Some pieces are iron, some are of other matter; but they cannot be avoided. They strike too hard. They cannot be absorbed in normal fashion, but simply boil off one's body material into space. The shock is so tremendous that I, at least, could do nothing toward recovering the material until it had dissipated beyond hope of salvage. That is the reason so much of my mass is gone; it was not merely starvation.

"Some of the other slaves did better than I—as I said, some of them have survived—but others did much worse. They would dive in toward the furnace, and their bodies would come falling back out in just about the shape I am."

"And still he sends his slaves in to harvest?"

"Yes. We did not do too badly, actually, on the largest plots; but then he got interested in the others farther in. After all, they're hotter. He ven-tured in himself almost to the orbit of the plot that was destroyed—did you know that?—but came out very quickly and sent us on all such jour-neys thereafter.

"We—or, rather, those who preceded me—cleaned off the next in-ner plot, the fourth from the central furnace, fairly well, though the loss of slaves was high. Then he wanted to start on the third. I was one of the first to work on this project.

"I did not expect to live, of course, after what I had heard from the others; but the order came, and I let myself fall toward the sun. My orbit passed close to the greatest of the plots, which the master has been har-vesting himself, and I hoped to strengthen myself with a little food from it as I passed."

That confession showed how certain the slave felt of his own immi-nent death, as well as the state of demoralization into which the student's activities had permitted his servitors to fall.

"But I did not dare take any food when the time came," the slave went on feebly. "As I passed through the region where the destroyed plot had been, drifting particles began to grow more numerous. At first there would be an occasional bit of stone or iron, which I could dodge easily. Then they came in twos and threes, and sometimes I would have to change an escape curve in mid-maneuver. Then they came in dozens and clusters, and at last I could avoid them no longer. I was struck several times in rapid succession.

"For a moment I almost turned back—I had never dreamed that anything could feel like that—and then I remembered the order and went on. And I was struck again, and again, and each time the order faded in my mind. I reached the orbit of the fourth planet, crossed it—and turned out again. It didn't seem to help; I was still being pelted. For a time I must have almost lost orientation; but at last I won out to a place near the orbit of the giant planet. That was where I remembered the order again.

"I had never disobeyed a master before, and I didn't know what to do, or say, or think. I'd start back toward the sun, and remember what had happened, and come back out. Then I'd remember the master, and head in again. I didn't dare go out in the cold where he would be waiting. I didn't dare dive back into that storm of rock and metal from the old fifth planet. But I had to do something. I couldn't float by the orbit of the giant planet forever. He would find me there sooner or later, and that would be worse than if I had come out to him. I had to think." That word struck the superintendent like a shock. The very idea of a slave's thinking--making a decision for himself concerning an action he was to perform—was repugnant to a member of the dominant race. They preferred to think of their slaves as mindless creatures relying on their masters for the necessities of existence—a comforting fiction that had been maintained for so many rotations of the Galaxy that its originators had come to believe it themselves. He had suspected that this particular slave must be an unusual specimen in many ways; now he was sure of it.

It was this that kept him silent while the creature paused, visibly collected its waning energies, and resumed the tale.

"I found what I thought was the answer at last. Since the tremendous number of particles must have come from the farm that had been blown up, it seemed likely that their orbits would be more or less controlled by that and would have at least a slight family resemblance. If I were to take up a powered, nearly elliptical path through that region, matching velocities with most of them instead of falling in a practically parabolic orbit across their path, I should be able to avoid the worst of the blows."

Weakly, the shattered creature shuddered and paused, mustering strength to continue.

"I had about made up my mind to try this when I detected another slave inbound," it went on, "and it occurred to me that two would be better than one. If one died, at least the other could learn from what had happened. I caught him easily since he was in free fall and explained the idea. He seemed willing to follow any suggestion, not thinking for himself at all, so he went with me.

"For a while it worked. We got inside the orbit of the fourth planet without being hit more than a few times each—that was harder on me than on him, because I'd already been hurt quite a lot on the first trip. Into that level, a great deal of the wreckage is formed of quite large particles, anyway; it's easy to see and avoid. Farther in, though, where most of the heavy stuff either never went or was cleared out by collision with the inner planets in a few million of their revolutions, there was much more extremely fine stuff. It actually seems to increase in concentration near the sun. Maybe radiation pressure has something to do with it.

"Anyway, we began to take a bad beating again. It was a little better than before. My idea must have had something to it, but it still wasn't good. The other slave wasn't used to it, either, and lost control of himself just as I had. We were almost to the third farm plot then, but he must have gone completely blind from pain. He apparently never sensed the food so near by—that plot is incredibly rich.

"He went blundering squarely into another, useless plot that accompanies the third one in its orbit; an object too small to hold culture material in that temperature range, though still several hundred times the diameter of my body or his. He rammed it hard, and the energy involved in matching velocities was more than enough to volatilize his mass completely. The object was pretty well scarred with impact craters, but he made one of the neatest.

"I was close enough then to the third planet to start harvesting—at least, I would have been under normal circumstances. I tried, but couldn't concentrate on one course of action long enough. The bombardment was endless. There are simply no words to describe what it was like. I was not twenty of its own diameters from the most amazingly rich farm plot I have ever seen, and was not able to touch a bit of it!

"It had been so long since it was harvested that substances completely strange to me had developed in its surface layers. There were carbohydrates, of course, and light-element oxides and carbonates which anyone would expect; but there were proteins more fantastically complex than anyone could well imagine. Their emanations nearly drove me wild. They must have been building up and breaking down at incredible speed at that temperature—it had quite an atmosphere out, as a result of boiling off surface matter to use up incoming radiant energy—and they had evolved to an unheard-of degree. And I couldn't get a taste!

"I could sense them, though, and in spite of the pain of the meteor bombardment, I stayed near the planet, vacillating as I had done before, for a couple of hundred of its trips around the Sun. That may seem like a short time, but it was long enough to ruin my body past saving. It was only when my senses began to fail that I was able to turn away from it and fight my way out this far. I just managed to get into a stable orbit that would keep me clear of that hellish halo of planet fragments, and every now and then I succeeded in mustering enough energy to call for help, but I knew it was useless. Even had you come much sooner, it would still have been too late for me. "I live to warn you, however. Do not go within the orbit of the old fifth planet! Do not even look within it, for if you sense what lies on that un-harvested third world, you will be drawn to your doom as surely as I was ordered to mine!"

The slave fell silent, and the superintendent pondered its tale as they drifted on about the Sun. He could not, offhand, think of any adequate punishment for the student whose recklessness had brought about this state of affairs. The mere cruelty of ordering endless crowds of slaves to nearly certain death did not affect him particularly; but the waste of it did, very much. To him the thought of hundreds of lifeless bodies drifting endlessly about the Sun, boiling off a little more of their masses with each perihelion passage until nothing was left but a loose collection of high-melting-point pebbles, was a painful picture of economic loss. The fact that the best farm plot in the system had apparently become un-attainable was also to be considered, and the driving of at least one slave to the extreme of thinking for himself was not to be ignored.

Of course, everything should be checked before confronting the student with such charges. Only the last, after all, could be considered as yet a matter of objective knowledge.

The overseer moved abruptly away from the slave—sunward. The dying creature, seeing him depart, called once more for aid, and was silenced instantly and permanently by a slashing beam of ions. For an instant the overseer regretted the impulsive act—not from gratitude for the warning, to which he attached little weight and which was part of a slave's duty, but simply because it was impulsive rather than reasoned. But then he reflected that the creature could probably not have told much more anyway, even if it had survived until his return.

He was in no hurry. He let the gravity of the central furnace draw him in to the orbit of the giant planet, his senses covering the half-billion-mile sphere of space ahead where death was reputed to lurk.

At this range, all seemed innocuous. He watched the inner planets circling rapidly in their paths—even the giant one made most of a revolution during his fall—and noted that the slave had spoken the truth about a companion body to the third planet. But space seemed otherwise empty.

He did not completely abandon caution, however. What had proven fatal to slaves might be inconvenient or even dangerous to a master.

He stopped at the fifth planet's orbit and began a more minute examination of that suspicious volume of space. The small bodies were there, all right. Thousands of them, even though he was not trying to detect anything less than a twentieth of his own diameter. They did show a rather vague preference for the orbit of the old fifth planet, as the slave had said. The greater number circled between the present fourth and fifth orbits, at any rate. There seemed no reason why he could not match velocities well enough to keep out of trouble. Why, chance alone could be trusted to protect him from collision with a few thousand asteroids, when they were scattered through

something like ten-to-the-twenty-fourth-power cubic miles of space!

Still, there was little wisdom in going into possible danger without a very sound reason. It would be well to judge from his present position if such reason existed. His finer senses could easily operate at the half-billion miles that separated him from the farthest point of the third planet's orbit. So, holding his position, he focused his attention on the elusive farm plot in question.

Being so close to the central furnace, it revolved rapidly. He faced somewhat the same problem in examining it that a man would have trying to recognize a friend on a merry-go-round—assuming that the friend were spinning in his seat like a top at the same time.

It took the superintendent only a few revolutions of the body to adjust to this situation, however, and as details registered more and more clearly on his consciousness, he began to admit grudgingly that the slave had not exaggerated.

The plot was fabulous!

Substances for which he had no name abounded, impressing themselves on the analytical sense that was his equivalent of both taste and smell. Strange as they were, he could tell easily that they were foods—packed with available energy and carrying fascinating taste potentialities, organized to a completely unheard-of degree. They were growths of a type and complexity which simply never had a chance to evolve on the regularly harvested worlds of the Galaxy.

The overseer wondered whether it might not be worth while to let other plots run wild for a few years. His principal vice, by the standards of his people, was gluttony; but the most ascetic of his species would have been tempted uncontrollably by that planet.

He almost regretted the few tons of food he had taken on from the ringed planet—though he had, he told himself quickly, sacrificed much of that in helping the slave and would lose still more if he decided actually to penetrate into the high-temperature zones near the Sun.

Huge as his mass was, his normal temperature was so low that life processes went on at an incredibly slow pace. To him, a chemical reaction requiring only a few millennia to go to completion was like a dynamite explosion. A few pounds of organic compounds would feed his miles-thick bulk for many human lifetimes of high activity. In short, the slave had been quite right.

Almost involuntarily, rationalizing his appetite as he went, the superintendent permitted himself to drift into the asteroid zone. With only the smallest part of his attention, he assumed a parabolic, free-fall orbit in the general plane of the system, with its perihelion point approximately tangent to the orbit of the third planet. At this distance from the Sun, the difference between parabolic and circular velocities was not too great to permit him to detect even the tiniest particles in time to avoid them. That fact, of course, changed as he fell sunward.

Perhaps he had been counting on a will power naturally superior to that of the slave who had warned him. If so, he had forgotten the effects of an equally superior imagination. The pull of the third planet was correspondingly stronger and, watching the spinning globe, he was jarred out of an almost hypnotic trance by the first collision. It awakened him to the fact that his natural superiority to the slave race might not be sufficient to keep him out of serious trouble.

The space around him—he was now well inside the orbit of the fourth planet—was literally crowded with grain-of-dust meteors, each, as he had seen on the slave's crust, able to blast out a crater many times its own volume in a living body. Individually, they were insignificant; collectively, they were deadly.

His attention abruptly wrenched back to immediate problems of existence, the superintendent started to check his fall and veer once more toward the safe, frozen emptiness of interstellar space. But the spell of the gourmet's paradise he had been watching was not that easily thrown off. For long moments, while the planet circled its primary once and again, he hung poised, with gluttony and physical anguish alternately gaining the upper hand in a struggle for possession of his will. Probably he would have lost, alone; but his student did have a conscience.

"Sir!" The voice came faintly but clearly to his mind. "Don't stay! You mustn't! I should never have let you come—but I was angry! I know I was a fool; I should have told you everything!"

"I learned. It was my own fault." The superintendent found it curiously difficult to speak. "I came of my own free will and I still think that plot is worth investigation."

"No! It's not your own free will—no will could remain free after seeing what that planet has to offer. I knew it and expected you to die—but I couldn't go through with it. Come, and quickly. I will help."

The student was in an orbit almost identical with that of the superintendent, though still a good deal farther out. Perhaps it was the act of looking at him, which took his attention momentarily from the alluring object below, that made the older being waver. Whatever it was, the student perceived the break and profited by it.

"Don't even look at it again, sir. Look at me, and follow—or if you'd rather not look at me, look at that!"

He indicated the direction plainly, and the dazed listener looked almost involuntarily.

The thing he saw was recognizable enough. It consisted of a small nucleus which his senses automatically analyzed. It consisted of methane and other hydrocarbons, some free oxygen, a few other light-element compounds, and had nuggets of heavier elements scattered through it like raisins in a plum pudding. Around it for thousands of miles there extended a tenuous halo of the more volatile of its constituent compounds. The thing was moving away from the Sun in an elliptical orbit, showing no sign of intelligent control. A portion of its gaseous envelope was driven on ahead by the pressure of sunlight from below.

It was a dead slave, but it could as easily have been a dead master. A dead slave was nothing; but the thing that had killed it could do the same to him.

It was the first time in his incredibly long life that the personal possibility of death had struck home to him; and probably nothing less than that fear could have saved his life.

With the student close beside, he followed the weirdly glowing corpse out to the farthest point of its orbit; and as it started to fall back into the halo of death girdling that harmless-looking star, he pressed on out into the friendly darkness.

Perhaps some day that third planet would be harvested; but it would not be by one of his kind—not, at least, until that guarding haze had been swept up by the planets that drifted through its protecting veil.

It was not a very good group, Wright reflected. That always seemed to be the case. When he had luck with observing weather, he had no one around to appreciate the things that could be seen. He cast a regretful glance toward the dome of the sixty-inch telescope, where a fellow candidate was taking another plate of his series, and wondered whether there were not some better way than part-time instructing to pay the expenses of a doctorate program.

Still, the night was good. Most of the time in the latitude—"Mr. Wright! Is that a cloud or the Aurora?"

"If you will stop to consider the present position of the Sun below the horizon," he answered indirectly, "you will discover that the patch of light you are indicating is directly opposite that point. It lies along the path of the Earth's shadow, though, of course, well beyond it. It is called the Gegenschein and, like the Zodiacal Light, is not too commonly visible at this latitude. We did see the Light some time ago, if you remember, on an evening when we started observing earlier. Actually, the Gegenschein is a continuation of the luminous band we call the Zodiacal Light. The latter can sometimes be traced all the way around the sky to the point we are now watching."

"What causes them?"

"The most reasonable assumption is that they are light reflected from small, solid particles—meteors. Apparently a cloud of such matter extends outward for some distance past the Earth's orbit, though just how far, it is hard to say. It grows fainter with distance from the Sun, as would be expected, except for the patch we call the Gegenschein."

"Why the exception?"

"I think one of you can answer that."

"Would it be for the same reason that the full Moon is so much more than twice as bright as either quarter? Simply because the particles are rough, and appear dark in most positions because of the shadows of irregularities on their own surfaces—shadows which disappear when the light is behind the observer?"

"I think you will agree that that would account for it," Wright said. "Evidently the meteors are there, are large

compared to wavelengths of visible light, and form a definite part of the Solar System. I believe it was once estimated that if the space inside the Earth's orbit contained particles one millimeter in diameter and five miles apart, they would reflect enough light to account for what we are observing. They might, of course, be smaller and more numerous. Only that amount of reflecting surface is necessary."

"You had me worried," another voice broke in. "I'd been hearing for years that there would be little reason to fear collisions with meteors when we finally get a rocket out of the atmosphere. For a moment, I thought a cloud such as you were working up to would riddle anything that got into space. One pinhead every five miles isn't so bad, though."

"There is a fairly good chance of collision, I would say," returned Wright, "but just what damage particles of that size would do, I am not sure. It seems rather likely that they would be volatilized by impact. How the hull of a rocket would react, we will have to find out by experience. I wouldn't mind taking the risk myself. I think we can sum up the greatest possibilities by saying that the meteoric content of the Solar System has and will have nothing but nuisance value to the human race, whether or not we ever leave our own planet."

A streak of white fire arced silently across the sky, putting a fitting period to the subject.

Wright wondered whether it would appear on his friend's photographic plate.