

# **The Complete Robot**

*BY ISAAC ASIMOV*

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## ***Introduction***

By the time I was in my late teens and already a hardened science fiction reader, I had read many robot stories and found that they fell into two classes.

In the first class there was Robot-as-Menace. I don't have to explain that overmuch. Such stories were a mixture of "clank-clank" and "aarghh" and "There are some things man was not meant to know." After a while, they palled dreadfully and I couldn't stand them.

In the second class (a much smaller one) there was Robot-as-Pathos. In such stories the robots were lovable and were usually put upon by cruel human beings. These charmed me. In late 1938 two such stories hit the stands that particularly impressed me. One was a short story by Eando Binder entitled "I, Robot," about a saintly robot named Adam Link; another was a story by Lester del Rey, entitled "Helen O'Loy," that touched me with its portrayal of a robot that was everything a loyal wife should be.

When, therefore, on June 10, 1939 (yes, I do keep meticulous records), I sat down to write my first robot story, there was no question that I fully intended to write a Robot-as-Pathos story. I wrote "Robbie," about a robot nurse and a little girl and love and a prejudiced mother and a weak father and a broken heart and a tearful reunion. (It originally appeared under the title--one I hated--of "Strange Playfellow.")

But something odd happened as I wrote this first story. I managed to get the dim vision of a robot as neither Menace nor Pathos. I began to think of robots as industrial products built by matter-of-fact engineers. They were built with safety features so they weren't Menaces and they were fashioned for certain jobs so that no Pathos was necessarily involved.

As I continued to write robot stories, this notion of carefully engineered industrial robots permeated my stories more and more until the whole character of robot stories in serious printed science fiction changed--not only that of my own stories, but of just about everybody's.

That made me feel good and for many years, decades even, I went about freely admitting that I was "the father of the modern robot story."

As time went by, I made other discoveries that delighted me. I found, for instance, that when I used the word "robotics" to describe the study of robots, I was *not* using a word that already existed but had invented a word that had never been used before. (That was in my story "Runaround," published in 1942.)

The word has now come into general use. There are journals and books with the word in the title and it is generally known in the field that I invented the term. Don't think I'm not proud of *that*. There are not many people who have coined a useful scientific term, and although I did it unknowingly, I have no intention of letting anyone in the world forget it.

What's more, in "Runaround" I listed my "Three Laws of Robotics" in explicit detail for the first time, and these, too, became famous. At least, they are quoted in and out of season, in all sorts of places that have nothing primarily to do with science fiction, even in general quotation references. And people who work in the field of artificial intelligence sometimes take occasion to tell me that they think the Three Laws will serve as a good guide.

We can go even beyond that--

When I wrote my robot stories I had no thought that robots would come into existence in my lifetime. In fact, I was certain they would not, and would have wagered vast sums that they would not. (At least, I would have wagered 15 cents, which is my betting limit on sure things.)

Yet here I am, forty-three years after I wrote my first robot story, and we do have robots. Indeed, we do. What's more, they are what I envisaged them to be in a way--industrial robots, created by engineers to do specific jobs and with safety features built in. They are to be found in numerous factories, particularly in Japan, where there are automobile factories that are entirely roboticized. The assembly line in such places is "manned" by robots at every stage.

To be sure, these robots are not as intelligent as my robots are--they are not positronic;

they are not even humanoid. However, they are evolving rapidly and becoming steadily more capable and versatile. Who knows where they'll be in another forty years?

One thing we can be sure of. Robots are changing the world and driving it in directions we cannot clearly foresee.

Where are these robots-in-reality coming from? The most important single source is a firm called Unimation, Inc., of Danbury, Connecticut. It is the leading manufacturer of industrial robots and is responsible for perhaps one third of all robots that have been installed. The president of the firm is Joseph F. Engelberger, who founded it in the late 1950s because he was so interested in robots that he decided to make their production his life work.

But how in the world did he become so interested in robots so early in the game? According to his own words, he grew interested in robots in the 1940s when he was a physics-major undergraduate at Columbia University, reading the robot stories of his fellow Columbian Isaac Asimov.

My goodness!

You know, I didn't write my robot stories with much in the way of ambition back in those old, old days. All I wanted was to sell them to the magazines in order to earn a few hundred dollars to help pay my college tuition--and to see my name in print besides.

If I had been writing in any other field of literature, that's all I would have attained. But because I was writing science fiction, and *only* because I was writing science fiction, I--without knowing it--was starting a chain of events that is changing the face of the world.

Joseph F. Engelberger, by the way, published a book in 1980 called *Robotics in Practice: Management and Application of Industrial Robots* (American Management Associations), and he was kind enough to invite me to write the foreword.

All this set the nice people at Doubleday to thinking--

My various robot short stories have appeared in no less than seven different collections of mine. Why should they be so separated? Since they appear to be far more important than anyone dreamed they would be (least of all, I) at the time they were written, why not pull them together in a single book?

It wasn't hard to get me to agree, so here are thirty-one short stories, totaling some 200,000 words, written over a time period stretching from 1939 to 1977--

## Victory Unintentional

The spaceship leaked, as the saying goes, like a sieve. It was supposed to. In fact, that was the whole idea. The result, of course, was that during the journey from Ganymede to Jupiter, the ship was crammed just as full as it could be with the very hardest space vacuum. And since the ship also lacked heating devices, this space vacuum was at normal temperature, which is a fraction of a degree above absolute zero.

This, also, was according to plan. Little things like the absence of heat and air didn't annoy anyone at all on the particular spaceship.

The first near vacuum wisps of Jovian atmosphere began percolating into the ship several thousand miles above the Jovian surface. It was practically all hydrogen, though perhaps a careful gas analysis might have located a trace of helium as well. The pressure gauges began creeping skyward.

That creep continued at an accelerating pace as the ship dropped downward in a Jupiter-circling spiral. The pointers of successive gauges, each designed for progressively higher pressures, began to move until they reached the neighborhood of a million or so atmospheres, where figures lost most of their meaning. The temperature, as recorded by thermocouples, rose slowly and erratically, and finally steadied at about seventy below zero, Centigrade.

The ship moved slowly toward the end, plowing its way heavily through a maze of gas molecules that crowded together so closely that hydrogen itself was squeezed to the density of a liquid. Ammonia vapor, drawn from the incredibly vast oceans of that liquid, saturated the horrible atmosphere. The wind, which had begun a thousand miles higher, had risen to a pitch inadequately described as a hurricane.

It was quite plain long before the ship landed on a fairly large Jovian island, perhaps seven times the size of Asia, that Jupiter was not a very pleasant world.

And yet the three members of the crew thought it was. They were quite convinced it was. But then, the three members of the crew were not exactly human. And neither were they exactly Jovian.

They were simply robots, designed on Earth for Jupiter. ZZ Three said, "It appears to be a rather desolate place." ZZ Two joined him and regarded the wind-blasted landscape somberly. "There are structures of some sort in the distance," he said, "which are obviously artificial. I suggest we wait for the inhabitants to come to us."

Across the room ZZ One listened, but made no reply. He was the first constructed of the three, and half experimental. Consequently he spoke a little less frequently than his two companions.

The wait was not long. An air vessel of queer design swooped overhead. More followed. And then a line of ground vehicles approached, took position, and disgorged organisms. Along with these organisms came various inanimate accessories that might have been weapons. Some of these were borne by a single Jovian, some by several, and some advanced under their own power, with Jovians perhaps inside.

The robots couldn't tell. ZZ Three said, "They're all around us now. The logical peaceful gesture would be to come out in the open. Agreed?"

It was, and ZZ One shoved open the heavy door, which was not double or, for that matter, particularly airtight.

Their appearance through the door was the signal for an excited stir among the surrounding Jovians. Things were done to several of the very largest of the inanimate accessories, and ZZ Three became aware of a temperature rise on the outer rind of his beryllium-iridium-bronze body.

He glanced at ZZ Two. "Do you feel it? They're aiming heat energy at us, I believe."

ZZ Two indicated his surprise. "I wonder why?"

"Definitely a heat ray of some sort. Look at that!" One of the rays had been jarred out of alignment for some undiscernible cause, and its line of radiation intersected a brook of sparkling pure ammonia-- which promptly boiled furiously.

Three turned to ZZ One, "Make a note of this, One, will you?"

"Sure." It was to ZZ One that the routine secretarial work fell, and his method of taking a note was to make a mental addition to the accurate memory scroll within him. He had already gathered the hour-by-hour record of every important instrument on board ship during the trip to Jupiter. He added agreeably, "What reason shall I put for the reaction? The human masters would probably enjoy knowing."

"No reason. Or better," Three corrected himself, "no apparent reason. You might say the maximum temperature of the ray was about plus thirty, Centigrade."

Two interrupted, "Shall we try communicating?"

"It would be a waste of time," said Three. "There can't be more than a very few Jovians who know the radio-click code that's been developed between Jupiter and Ganymede. They'll have to send for one, and when he comes, he'll establish contact soon enough. Meanwhile let's watch them. I don't understand their actions, I tell you frankly."

Nor did understanding come immediately. Heat radiation ceased, and other instruments were brought to the forefront and put into play. Several capsules fell at the feet of the watching robots, dropping rapidly and forcefully under Jupiter's gravity. They popped open and a blue liquid exuded, forming pools which proceeded to shrink rapidly by evaporation.

The nightmare wind whipped the vapors away and where those vapors went, Jovians scrambled out of the way. One was too slow, threshed about wildly, and became very limp and still.

ZZ Two bent, dabbed a finger in one of the pools and stared at the dripping liquid. "I think this is oxygen," he said.

"Oxygen, all right," agreed Three. "This becomes stranger and stranger. It must certainly be a dangerous practice, for I would say that oxygen is poisonous to the creatures. One of them died!"

There was a pause, and then ZZ One, whose greater simplicity led at times to an increased directness of thought, said heavily, "It might be that these strange creatures in a rather childish way are attempting to destroy us."

And Two, struck by the suggestion, answered, "You know, One, I think you're right!"

There had been a slight lull in Jovian activity and now a new structure was brought up. It possessed a slender rod that pointed skyward through the impenetrable Jovian murk. It stood in that starkly incredible wind with a rigidity that plainly indicated remarkable structural strength. From its tip came a crackling and then a Bash that lit up the depths of the atmosphere into a gray fog.

For a moment the robots were bathed in clinging radiance and then Three said thoughtfully, "High-tension electricity! Quite respectable power, too. One, I think you're right. After all, the human masters have told us that these creatures seek to destroy all humanity, and organisms possessing such insane viciousness as to harbor a thought of harm against a human being"--his voice trembled at the thought--"would scarcely scruple at attempting to destroy us."

"It's a shame to have such distorted minds," said ZZ One. "Poor fellows!"

"I find it a very saddening thought," admitted Two. "Let's go back to the ship. We've seen enough for now."

They did so, and settled down to wait. As ZZ Three said, Jupiter was a roomy planet, and it might take time for Jovian transportation to bring a radio code expert to the ship. However, patience is a cheap commodity to robots.

As a matter of fact, Jupiter turned on its axis three times, according to chronometer, before the expert arrived. The rising and setting of the sun made no difference, of course, to the dead darkness at the bottom of three thousand miles of liquid-dense gas, so that one could not speak of day and night. But then, neither Jovian nor robot saw by visible light radiation and that

didn't matter.

Through this thirty-hour interval the surrounding Jovians continued their attack with a patience and persevering relentlessness concerning which robot ZZ One made a good many mental notes. The ship was assaulted by as many varieties of forces as there were hours, and the robots observed every attack attentively, analyzing such weapons as they recognized. They by no means recognized all.

But the human masters had built well. It had taken fifteen years to construct the ship and the robots, and their essentials could be expressed in a single phrase-- raw strength. The attack spent itself uselessly and neither ship nor robot seemed the worse for it.

Three said, "This atmosphere handicaps them, I think. They can't use atomic disruptors, since they would only tear a hole in that soupy air and blow themselves up."

"They haven't used high explosives either," said Two, "which is well. They couldn't have hurt us, naturally, but it would have thrown us about a bit."

"High explosives are out of the question. You can't have an explosive without gas expansion and gas just can't expand in this atmosphere."

"It's a very good atmosphere," muttered One. "I like it."

Which was natural, because he was built for it. The ZZ robots were the first robots ever turned out by the United States Robots and Mechanical Men Corporation that were not even faintly human in appearance. They were low and squat, with a center of gravity less than a foot above ground level. They had six legs apiece, stumpy and thick, designed to lift tons against two and a half times normal Earth gravity. Their reflexes were that many times Earth-normal speed, to make up for the gravity. And they were composed of a beryllium-iridium-bronze alloy that was proof against any known corrosive agent, also any known destructive agent short of a thousand-megaton atomic disruptor, under any conditions whatsoever.

To dispense with further description, they were indestructible, and so impressively powerful that they were the only robots ever built on whom the roboticists of the corporation had never quite had the nerve to pin a serial-number nickname. One bright young fellow had suggested Sissy One, Two, and Three--but not in a very loud voice, and the suggestion was never repeated.

The last hours of the wait were spent in a puzzled discussion to find a possible description of a Jovian's appearance. ZZ One had made a note of their possession of tentacles and of their radial symmetry--and there he had struck. Two and Three did their best, but couldn't help.

"You can't very well describe anything," Three declared finally, "without a standard of reference. These creatures are like nothing I know of--completely outside the postitronic paths of my brain. It's like trying to describe gamma light to a robot unequipped for gamma-ray reception."

It was just at that time that the weapon barrage ceased once more. The robots turned their attention to outside the ship.

A group of Jovians were advancing in curiously uneven fashion, but no amount of careful watching could determine the exact method of their locomotion. How they used their tentacles was uncertain. At times the organisms took on a remarkable slithering motion, and then they moved at great speed, perhaps with the wind's help, for they were moving downwind.

The robots stepped out to meet the Jovians, who halted ten feet away. Both sides remained silent and motionless.

ZZ Two said, "They must be watching us, but I don't know how. Do either of you see any photosensitive organs?"

"I can't say," grunted Three in response. "I don't see anything about them that makes sense at all."

There was a sudden metallic clicking from among the Jovian group and ZZ One said delightedly, "It's the radio code. They've got the communications expert here."

It was, and they had. The complicated dot-dash system that over a period of twenty-five

years had been laboriously developed by the beings of Jupiter and the Earthmen of Ganymede into a remarkably flexible means of communication was finally being put into practice at close range.

One Jovian remained in the forefront now, the others having fallen back. It was he that was speaking. The clicking said, "Where are you from?"

ZZ Three, as the most mentally advanced, naturally assumed spokespersonship for the robot group. "We are from Jupiter's satellite, Ganymede."

The Jovian continued, "What do you want?"

"Information. We have come to study your world and to bring back our findings. If we could have your cooperation--"

The Jovian clicking interrupted. "You must be destroyed!"

ZZ Three paused and said in a thoughtful aside to his two companions, "Exactly the attitude the human masters said they would take. They are very unusual."

Returning to his clicking, he asked simply, "Why?"

The Jovian evidently considered certain questions too obnoxious to be answered. He said, "If you leave within a single period of revolution, we will spare you-- until such time as we emerge from our world to destroy the un-Jovian vermin of Ganymede."

"I would like to point out," said Three, "that we of Ganymede and the inner planets--"

The Jovian interrupted, "Our astronomy knows of the Sun and of our four satellites. There are no inner planets."

Three conceded the point wearily, "We of Ganymede, then. We have no designs on Jupiter. We're prepared to offer friendship. For twenty-five years your people communicated freely with the human beings of Ganymede. Is there any reason to make sudden war upon the humans?"

"For twenty-five years," was the cold response, "we assumed the inhabitants of Ganymede to be Jovians. When we found out they were not, and that we had been treating lower animals on the scale of Jovian intelligences, we were bound to take steps to wipe out the dishonor."

Slowly and forcefully he finished, "We of Jupiter will suffer the existence of no vermin!"

The Jovian was backing away in some fashion, tacking against the wind, and the interview was evidently over.

The robots retreated inside the ship.

ZZ Two said, "It looks bad, doesn't it?" He continued thoughtfully, "It is as the human masters said. They possess an ultimately developed superiority complex, combined with an extreme intolerance for anyone or anything that disturbs that complex."

"The intolerance," observed Three, "is the natural consequence of the complex. The trouble is that their intolerance has teeth in it. They have weapons-- and their science is great."

"I am not surprised now," burst out ZZ One, "that we were specifically instructed to disregard Jovian orders. They are horrible, intolerant, pseudo-superior beings!" He added emphatically, with robotical loyalty and faith, "No human master could ever be like that."

"That, though true, is beside the point," said Three. "The fact remains that the human masters are in terrible danger. This is a gigantic world and these Jovians are greater in numbers and resources by a hundred times or more than the humans of the entire Terrestrial Empire. If they can ever develop the force field to the point where they can use it as a spaceship hull-- as the human masters have already done-- they will overrun the system at will. The question remains as to how far they have advanced in that direction, what other weapons they have, what preparations they are making, and so on. To return with that information is our function, of course, and we had better decide on our next step."

"It may be difficult," said Two. "The Jovians won't help us." Which, at the moment, was rather an understatement.

Three thought awhile. "It seems to me that we need only wait," he observed. "They have tried to destroy us for thirty hours now and haven't succeeded. Certainly they have done their

best. Now a superiority complex always involves the eternal necessity of saving face, and the ultimatum given us proves it in this case. They would never allow us to leave if they could destroy us. But if we don't leave, then rather than admit they cannot force us away, they will surely pretend that they are willing, for their own purposes, to have us stay."

Once again they waited. The day passed. The weapon barrage did not resume. The robots did not leave. The bluff was called. And now the robots faced the Jovian radio-code expert once again.

If the ZZ models had been equipped with a sense of humor, they would have enjoyed themselves immensely. As it was, they felt merely a solemn sense of satisfaction.

The Jovian said, "It has been our decision that you will be allowed to remain for a very short time, so that you see our power for yourself. You shall then return to Ganymede to inform your companion vermin of the disastrous end to which they will unfailingly come within a solar revolution."

ZZ One made a mental note that a Jovian revolution took twelve earthly years.

Three replied casually, "Thank you. May we accompany you to the nearest town? There are many things we would like to learn." He added as an afterthought, "Our ship is not to be touched, of course."

He said this as a request, not as a threat, for no ZZ model was ever pugnacious. All capacity for even the slightest annoyance had been carefully barred in their construction. With robots as vastly powerful as the ZZ's, unflinching good temper was essential for safety during the years of testing on Earth.

The Jovian said, "We are not interested in your verminous ship. No Jovian will pollute himself by approaching it. You may accompany us, but you must on no account approach closer than ten feet to any Jovian, or you will be instantly destroyed."

"Stuck up, aren't they?" observed Two in a genial whisper, as they plowed into the wind.

The town was a port on the shores of an incredible ammonia lake. The external wind whipped furious, frothy waves that shot across the liquid surface at the hectic rate enforced by the gravity. The port itself was neither large nor impressive and it seemed fairly evident that most of the construction was underground.

"What is the population of this place?" asked Three.

The Jovian replied, "It is a small town of ten million."

"I see. Make a note of that, One."

ZZ One did so mechanically, and then turned once more to the lake, at which he had been staring in fascination. He pulled at Three's elbow. "Say, do you suppose they have fish here?"

"What difference does it make?"

"I think we ought to know. The human masters ordered us to find out everything we could." Of the robots, One was the simplest and, consequently, the one who took orders in the most literal fashion.

Two said, "Let One go and look if he likes. It won't do any harm if we let the kid have his fun."

"All right. There's no real objection if he doesn't waste his time. Fish aren't what we came for--but go ahead, One."

ZZ One made off in great excitement and slogged rapidly down the beach, plunging into the ammonia with a splash. The Jovians watched attentively. They had understood none of the previous conversation, of course.

The radio code expert clicked out, "It is apparent that your companion has decided to abandon life in despair at our greatness."

Three said in surprise, "Nothing of the sort. He wants to investigate the living organisms, if any, that live in the ammonia." He added apologetically, "Our friend is very curious at times, and he isn't quite as bright as we are, though that is only his misfortune. We understand that and try to humor him whenever we can."



There was a long pause, and the Jovian observed, "He will drown."

Three replied casually, "No danger of that. We don't drown. May we enter the town as soon as he returns?"

At that moment there was a spurt of liquid several hundred feet out in the lake. It sprayed upward wildly and then hurtled down in a wind-driven mist. Another spurt and another, then a wild white foaming that formed a trail toward shore, gradually quieting as it approached.

The two robots watched this in amazement, and the utter lack of motion on the part of the Jovians indicated that they were watching as well.

Then the head of ZZ One broke the surface and he made his slow way out on to dry land. But something followed him! Some organism of gigantic size that seemed nothing but fangs, claws, and spines. Then they saw that it wasn't following him under its own power, but was being dragged across the beach by ZZ One. There was a significant flabbiness about it.

ZZ One approached rather timidly and took communication into his own hands. He tapped out a message to the Jovian in agitated fashion. "I am very sorry this happened, but the thing attacked me. I was merely taking notes on it. It is not a valuable creature, I hope."

He was not answered immediately, for at the first appearance of the monster there had been a wild break in the Jovian ranks. These reformed slowly, and cautious observation having proven the creator to be indeed dead, order was restored. Some of the bolder were curiously prodding the body.

ZZ Three said humbly, "I hope you will pardon our friend. He is sometimes clumsy. We have absolutely no intention of harming any Jovian creature."

"He attacked me," explained One. "He bit at me without provocation. See!" And he displayed a two-foot fang that ended in a jagged break. "He broke it on my shoulder and almost left a scratch. I just slapped it a bit to send it away-- and it died. I'm sorry!"

The Jovian finally spoke, and his code clicking was a rather stuttery affair. "It is a wild creature, rarely found so close to shore, but the lake is deep just here."

Three said, still anxiously, "If you can use it for food, we are only too glad--"

"No. We can get food for ourselves without the help of verm--without the help of others. Eat it yourselves."

At that ZZ One heaved the creature up and back into the sea, with an easy motion of one arm. Three said casually, "Thank you for your kind offer, but we have no use for food. We don't eat, of course."

Escorted by two hundred or so armed Jovians, the robots passed down a series of ramps into the underground city. If, above the surface, the city had looked small and unimpressive, then from beneath it took on the appearance of a vast megalopolis.

They were ushered into ground cars that were operated by remote control--for no honest, self-respecting Jovian would risk his superiority by placing himself in the same car with vermin--and driven at frightful speed to the center of the town. They saw enough to decide that it extended fifty miles from end to end and reached downward into Jupiter's crust at least eight miles.

ZZ Two did not sound happy as he said, "If this is a sample of Jovian development then we shall not have a hopeful report to bring back to the human masters. After all, we landed on the vast surface of Jupiter at random, with the chances a thousand to one against coming near any really concentrated center of population. This must be, as the code expert says, a mere town."

"Ten million Jovians," said Three abstractedly. "Total population must be in the trillions, which is high, very high, even for Jupiter. They probably have a completely urban civilization, which means that their scientific development must be tremendous. If they have force fields--"

Three had no neck, for in the interest of strength the heads of the ZZ models were riveted firmly onto the torso, with the delicate positronic brains protected by three separate layers in inch-thick iridium alloy. But if he had had one, he would have shaken his head dolefully.

They had stopped now in a cleared space. Everywhere about them they could see

avenues and structures crowded with Jovians, as curious as any terrestrial crowd would have been in similar circumstances.

The code expert approached. "It is time now for me to retire until the next period of activity. We have gone so far as to arrange quarters for you at great inconvenience to ourselves for, of course, the structure will have to be pulled down and rebuilt afterward. Nevertheless, you will be allowed to sleep for a space."

ZZ Three waved an arm in deprecation and tapped out, "We thank you but you must not trouble yourself. We don't mind remaining right here. If you want to sleep and rest, by all means do. We'll wait for you. As for us," casually, "we don't sleep."

The Jovian said nothing, though if it had had a face, the expression upon it might have been interesting. It left, and the robots remained in the car, with squads of well-armed Jovians, frequently replaced, surrounding them as guards.

It was hours before the ranks of those guards parted to allow the code expert to return. Along with him were other Jovians, whom he introduced.

"There are with me two officials of the central government who have graciously consented to speak with you."

One of the officials evidently knew the code, for his clicking interrupted the code expert sharply. He addressed the robots, "Vermin! Emerge from the ground car that we may look at you."

The robots were only too willing to comply, so while Three and Two vaulted over the right side of the car, ZZ One dashed through the left side. The word through is used advisedly, for since he neglected to work the mechanism that lowered a section of side so that one might exit, he carried that side, plus two wheels and an axle, along with him. The car collapsed, and ZZ One stood staring at the ruins in embarrassed silence.

At last he clicked out gently, "I'm very sorry. I hope it wasn't an expensive car."

ZZ Two added apologetically, "Our companion is often clumsy. You must excuse him," and ZZ Three made a halfhearted attempt to put the car back together again.

ZZ One made another effort to excuse himself. "The material of the car was rather flimsy. You see?" He lifted a square-yard sheet of three-inch-thick, metal-hard plastic in both hands and exerted a bit of pressure. The sheet promptly snapped in two. "I should have made allowances," he admitted.

The Jovian government official said in slightly less sharp fashion, "The car would have had to be destroyed anyway, after being polluted by your presence." He paused, then, "Creatures! We Jovians lack vulgar curiosity concerning lower animals, but our scientists seek facts."

"We're right with you," replied Three cheerfully. "So do we." The Jovian ignored him. "You lack the mass-sensitive organ, apparently. How is it that you are aware of distant objects?"

Three grew interested. "Do you mean your people are directly sensitive to mass?"

"I am not here to answer your questions-- your impudent questions-- about us."

"I take it then that objects of low specific mass would be transparent to you, even in the absence of radiation." He turned to Two, "That's how they see. Their atmosphere is as transparent as space to them."

The Jovian clicking began once more, "You will answer my first question immediately, or my patience will end and I will order you destroyed."

Three said at once, "We are energy-sensitive, Jovian. We can adjust ourselves to the entire electromagnetic scale at will. At present, our long-distance sight is due to radio-wave radiation that we emit ourselves, and at close range we see by--" He paused, and said to Two, "There isn't any code word for gamma ray, is there?"

"Not that I know of," Two answered.

Three continued to the Jovian, "At close range we see by other radiation for which there is no code word."

"Of what is your body composed?" demanded the Jovian.

Two whispered, "He probably asks that because his mass sensitivity can't penetrate past our skin. High density, you know. Ought we to tell him?"

Three replied uncertainly, "Our human masters didn't particularly say we were to keep anything secret." In radio code, to the Jovian he said, "We are mostly iridium. For the rest, copper, tin, a little beryllium, and a scattering of other substances."

The Jovians fell back and by the obscure writhing of various portions of their thoroughly indescribable bodies gave the impression that they were in animated conversation, although they made no sound.

And then the official returned. "Beings of Ganymede! It has been decided to show you through some of our factories that we may exhibit a tiny part of our great achievements. We will then allow you to return so that you may spread despair among the other verm--the other beings of the outer world."

Three said to Two, "Note the effect of their psychology. They must hammer home their superiority. It's still a matter of saving face." And in radio code, "We thank you for the opportunity."

But the face saving was efficient, as the robots realized soon enough. The demonstration became a tour, and the tour a Grand Exhibition. The Jovians displayed everything, explained everything, answered all questions eagerly, and ZZ One made hundreds of despairing notes.

The war potential of that single so-called unimportant town was greater by several times than that of all Ganymede. Ten more such towns would outproduce all the Terrestrial Empire. Yet ten more such towns would not be the fingernail fragment of the strength all Jupiter must be able to exert.

Three turned as One nudged him. "What is it?"

ZZ One said seriously, "If they have force fields, the human masters are lost, aren't they?"

"I'm afraid so. Why do you ask?"

"Because the Jovians aren't showing us through the right wing of this factory. It might be that force fields are being developed there. They would be wanting to keep it secret if they were. We'd better find out. It's the main point, you know."

Three regarded One somberly. "Perhaps you're right. It's no use ignoring anything."

They were in a huge steel mill now, watching hundred-foot beams of ammonia-resistant silicon-steel alloy being turned out twenty to the second. Three asked quietly, "What does that wing contain?"

The government official inquired of those in charge of the factory and explained, "That is the section of great heat. Various processes require huge temperatures which life cannot bear, and they must all be handled indirectly."

He led the way to a partition from which heat could be felt to radiate and indicated a small round area of transparent material. It was one of a row of such, through which the foggy red light of lines of glowing forges could be made out through the soupy atmosphere.

ZZ One fastened a look of suspicion on the Jovian and clicked out, "Would it be all right if I went in and looked around? I am very interested in this."

Three said, "You're being childish, One. They're telling the truth. Oh well, nose around if you must. But don't take too long; we've got to move on."

The Jovian said, "You have no understanding of the heat involved. You will die."

"Oh no," explained One casually. "Heat doesn't bother us."

There was a Jovian conference, and then a scene of scurrying confusion as the life of the factory was geared to this unusual emergency. Screens of heat-absorbent material were set up, and then a door dropped open, a door that had never before budged while the forges were working. ZZ One entered and the door closed behind him. Jovian officials crowded to the transparent areas to watch.

ZZ One walked to the nearest forge and tapped the outside. Since he was too short to see into it comfortably, he tipped the forge until the molten metal licked at the lip of the container.

He peered at it curiously, then dipped his hand in and stirred it awhile to test the consistency. Having done this, he withdrew his hand, shook off some of the fiery metallic droplets and wiped the rest on one of his six thighs. Slowly he went down the line of forges, then signified his desire to leave.

The Jovians retired to a great distance when he came out of the door and played a stream of ammonia on him, which hissed, bubbled and steamed until he was brought to bearable temperature once more.

ZZ One ignored the ammonia shower and said, "They were telling the truth. No force fields."

Three began, "You see--" but One interrupted impatiently, "But there's no use delaying. The human masters instructed us to find out everything and that's that."

He turned to the Jovian and clicked out, without the slightest hesitation, "Listen, has Jovian science developed force fields?"

Bluntness was, of course, one of the natural consequences of One's less well developed mental powers. Two and Three knew that, so they refrained from expressing disapproval of the remark.

The Jovian official relaxed slowly from his strangely stiffened attitude, which had somehow given the impression that he had been staring stupidly at One's hand--the one he had dipped into the molten metal. The Jovian said slowly, "Force fields? That, then, is your main object of curiosity?"

"Yes," said One with emphasis.

There was a sudden and patent gain in confidence on the Jovian's part, for the clicking grew sharper. "Then come, vermin!"

Whereupon Three said to Two, "We're vermin again, I see, which sounds as if there's bad news ahead." And Two gloomily agreed.

It was to the very edge of the city that they were now led-- to the portion which on Earth would have been termed the suburbs-- and into one of a series of closely integrated structures, which might have corresponded vaguely to a terrestrial university.

There were no explanations, however, and none was asked for. The Jovian official led the way rapidly, and the robots followed with the grim conviction that the worst was just about to happen.

It was ZZ One who stopped before an opened wall section after the rest had passed on. "What's this?" he wanted to know.

The room was equipped with narrow, low benches, along which Jovians manipulated rows of strange devices, of which strong, inch-long electromagnets formed the principal feature.

"What's this?" asked One again.

The Jovian turned back and exhibited impatience. "This is a students' biological laboratory. There's nothing there to interest you."

"But what are they doing?"

"They are studying microscopic life. Haven't you ever seen a microscope before?"

Three interrupted in explanation, "He has, but not that type. Our microscopes are meant for energy-sensitive organs and work by refraction of radiant energy. Your microscopes evidently work on a mass-expansion basis. Rather ingenious."

ZZ One said, "Would it be all right if I inspected some of your specimens?"

"Of what use will that be? You cannot use our microscopes because of your sensory limitations and it will simply force us to discard such specimens as you approach for no decent reason."

"But I don't need a microscope," explained One, with surprise. "I can easily adjust myself for microscopic vision."

He strode to the nearest bench, while the students in the room crowded to the corner in an attempt to avoid contamination. ZZ One shoved a microscope aside and inspected the slide carefully. He backed away, puzzled, then tried another...a third...a fourth.

He came back and addressed the Jovian. "Those are supposed to be alive, aren't they? I mean those little worm things."

The Jovian said, "Certainly."

"That's strange-- when I look at them, they die!"

Three exclaimed sharply and said to his two companions, "We've forgotten our gamma-ray radiation. Let's get out of here, One, or we'll kill every bit of microscopic life in the room."

He turned to the Jovian, "I'm afraid that our presence is fatal to weaker forms of life. We had better leave. We hope the specimens are not too difficult to replace. And, while we're about it, you had better not stay too near us, or our radiation may affect you adversely. You feel all right so far, don't you?" he asked.

The Jovian led the way onward in proud silence, but it was to be noticed that thereafter he doubled the distance he had hitherto kept between himself and them.

Nothing more was said until the robots found themselves in a vast room. In the very center of it huge ingots of metal rested unsupported in mid-air--or, rather, supported by nothing visible--against mighty Jovian gravity.

The Jovian clicked, "There is your force field in ultimate form, as recently perfected. Within that bubble is a vacuum, so that it is supporting the full weight of our atmosphere plus an amount of metal equivalent to two large spaceships. What do you say to that?"

"That space travel now becomes a possibility for you," said Three. "Definitely. No metal or plastic has the strength to hold our atmosphere against a vacuum, but a force field can-- and a force-field bubble will be our spaceship. Within the year we will be turning them out by the hundreds of thousands. Then we will swarm down upon Ganymede to destroy the verminous so-called intelligences that attempt to dispute our dominion of the universe."

"The human beings of Ganymede have never attempted--" began Three, in mild expostulation.

"Silence!" snapped the Jovian. "Return now and tell them what you've seen. Their own feeble force fields-- such as the one your ship is equipped with-- will not stand against us, for our smallest ship will be a hundred times the size and power of yours."

Three said, "Then there's nothing more to do and we will return, as you say, with the information. If you could lead us back to our ship, we'll say good-bye. But by the way, just as a matter for the record, there's something you don't understand. The humans of Ganymede have force fields, of course, but our particular ship isn't equipped with one. We don't need any."

The robot turned away and motioned his companions to follow. For a moment they did not speak, then ZZ One muttered dejectedly, "Can't we try to destroy this place?"

"It won't help," said Three. "They'd get us by weight of numbers. It's no use. In an earthly decade the human masters will be finished. It is impossible to stand against Jupiter. There's just too much of it. As long as Jovians were tied to the surface, the humans were safe. But now that they have force fields. All we can do is to bring the news. By the preparation of hiding places, some few may survive for a short while."

The city was behind them. They were out on the open plain by the lake, with their ship a dark spot on the horizon, when the Jovian spoke suddenly:

"Creatures, you say you have no force field?" Three replied without interest, "We don't need one."

"How then does your ship stand the vacuum of space without exploding because of the atmospheric pressure within?" And he moved a tentacle as if in mute gesture at the Jovian atmosphere that was weighing down upon them with a force of twenty million pounds to the square inch.

"Well," explained Three, "that's simple. Our ship isn't airtight. Pressures equalize within and without."

"Even in space? A vacuum in your ship? You lie!"

"You're welcome to inspect our ship. It has no force field and it isn't airtight. What's marvelous about that? We don't breathe. Our energy is obtained through direct atomic power.

The presence or absence of air pressure makes little difference to us and we're quite at home in a vacuum."

"But absolute zero!"

"It doesn't matter. We regulate our own heat. We're not interested in outside temperatures." He paused. "Well, we can make our own way back to the ship. Good-by. We'll give the humans of Ganymede your message-- war to the end!"

But the Jovian said, "Wait! I'll be back." He turned and went toward the city.

The robots stared, and then waited in silence. It was three hours before he returned and when he did, it was in breathless haste. He stopped within the usual ten feet of the robots, but then began inching his way forward in a curious groveling fashion. He did not speak until his rubbery gray skin was almost touching them, and then the radio code sounded, subdued and respectful.

"Honored sirs, I have been in communication with the head of our central government, who is now aware of all the facts, and I can assure you that Jupiter desires only peace,"

"I beg your pardon?" asked Three blankly. The Jovian drove on hastily. "We are ready to resume communication with Ganymede and will gladly promise to make no attempt to venture into space. Our force field will be used only on the Jovian surface."

"But--" Three began. "Our government will be glad to receive any other representatives our honorable human brothers of Ganymede would care to send. If your honors will now condescend to swear peace--" a scaly tentacle swung out toward them and Three, quite dazed, grasped it. Two and One did likewise as two more were extended to them.

The Jovian said solemnly: "There is then eternal peace between Jupiter and Ganymede."

The spaceship which leaked like a sieve was out in space again. The pressure and temperature were once more at zero, and the robots watched the huge but steadily shrinking globe that was Jupiter.

"They're definitely sincere," said ZZ Two, "and it's very gratifying, this complete about-face, but I don't get it."

"It is my idea," observed ZZ One, "that the Jovians came to their senses just in time and realized the incredible evil involved in the thought of harm to a human master. That would be only natural."

ZZ Three sighed and said, "Look, it's all a matter of psychology. Those Jovians had a superiority complex a mile thick and when they couldn't destroy us, they were bound to save face. All their exhibitions, all their explanations, were simply a form of braggadocio, designed to impress us into the proper state of humiliation before their power and superiority."

"I see all that," interrupted Two, "but--" Three went on, "But it worked the wrong way. All they did was to prove to themselves that we were stronger, that we didn't drown, that we didn't eat or sleep, that molten metal didn't hurt us. Even our very presence was fatal to Jovian life. Their last trump was the force field. And when they found out that *we* didn't need them at all, and could live in a vacuum at absolute zero, they broke." He paused and added philosophically, "When a superiority complex like that breaks, it breaks all the way."

The other two considered that, and then Two said, "But it still doesn't make sense. Why should they care what we can or can't do? We're only robots. We're not the ones they have to fight."

"And that's the whole point, Two," said Three softly. "It's only after we left Jupiter that I thought of it. Do you know that through an oversight, quite unintentionally, we neglected to tell them we were only robots."

"They never asked us," said One. "Exactly. So they thought we were human beings and that all the other human beings were like us!"

He looked once more at Jupiter, thoughtfully. "No wonder they decided to quit!"

## Robbie

"NINETY-EIGHT - NINETY-NINE - ONE HUNDRED." Gloria withdrew her chubby little forearm from before her eyes and stood for a moment, wrinkling her nose and blinking in the sunlight. Then, trying to watch in all directions at once, she withdrew a few cautious steps from the tree against which she had been leaning.

She craned her neck to investigate the possibilities of a clump of bushes to the right and then withdrew farther to obtain a better angle for viewing its dark recesses. The quiet was profound except for the incessant buzzing of insects and the occasional chirrup of some hardy bird, braving the midday sun.

Gloria pouted, "I bet he went inside the house, and I've told him a million times that that's not fair."

With tiny lips pressed together tightly and a severe frown crinkling her forehead, she moved determinedly toward the two-story building up past the driveway.

Too late she heard the rustling sound behind her, followed by the distinctive and rhythmic clump-clump of Robbie's metal feet. She whirled about to see her triumphing companion emerge from hiding and make for the home-tree at full speed.

Gloria shrieked in dismay. "Wait, Robbie! That wasn't fair, Robbie! You promised you wouldn't run until I found you." Her little feet could make no headway at all against Robbie's giant strides. Then, within ten feet of the goal, Robbie's pace slowed suddenly to the merest of crawls, and Gloria, with one final burst of wild speed, dashed pantingly past him to touch the welcome bark of home-tree first.

Gleefully, she turned on the faithful Robbie, and with the basest of ingratitude, rewarded him for his sacrifice by taunting him cruelly for a lack of running ability.

"Robbie can't run," she shouted at the top of her eight-year-old voice. "I can beat him any day. I can beat him any day." She chanted the words in a shrill rhythm.

Robbie didn't answer, of course -- not in words. He pantomimed running instead, inching away until Gloria found herself running after him as he dodged her narrowly, forcing her to veer in helpless circles, little arms outstretched and fanning at the air.

"Robbie," she squealed, "stand still!" -- And the laughter was forced out of her in breathless jerks.

Until he turned suddenly and caught her up, whirling her round, so that for her the world fell away for a moment with a blue emptiness beneath, and green trees stretching hungrily downward toward the void. Then she was down in the grass again, leaning against Robbie's leg and still holding a hard, metal finger.

After a while, her breath returned. She pushed uselessly at her disheveled hair in vague imitation of one of her mother's gestures and twisted to see if her dress were torn.

She slapped her hand against Robbie's torso, "Bad boy! I'll spank you!"

And Robbie cowered, holding his hands over his face so that she had to add, "No, I won't, Robbie. I won't spank you. But anyway, it's my turn to hide now because you've got longer legs and you promised not to run till I found you."

Robbie nodded his head -- a small parallelepiped with rounded edges and corners attached to a similar but much larger parallelepiped that served as torso by means of a short, flexible stalk -- and obediently faced the tree. A thin, metal film descended over his glowing eyes and from within his body came a steady, resonant ticking.

"Don't peek now -- and don't skip any numbers," warned Gloria, and scurried for cover.

With unvarying regularity, seconds were ticked off, and at the hundredth, up went the eyelids, and the glowing red of Robbie's eyes swept the prospect. They rested for a moment on a bit of colorful gingham that protruded from behind a boulder. He advanced a few steps and convinced himself that it was Gloria who squatted behind it.

Slowly, remaining always between Gloria and home-tree, he advanced on the hiding place, and when Gloria was plainly in sight and could no longer even theorize to herself that she was not seen, he extended one arm toward her, slapping the other against his leg so that it rang again. Gloria emerged sulkily.

"You peeked!" she exclaimed, with gross unfairness. "Besides I'm tired of playing hide-and-seek. I want a ride."

But Robbie was hurt at the unjust accusation, so he seated himself carefully and shook his head ponderously from side to side.

Gloria changed her tone to one of gentle coaxing immediately, "Come on, Robbie. I didn't mean it about the peeking. Give me a ride."

Robbie was not to be won over so easily, though. He gazed stubbornly at the sky, and shook his head even more emphatically.

"Please, Robbie, please give me a ride." She encircled his neck with rosy arms and hugged tightly. Then, changing moods in a moment, she moved away. "If you don't, I'm going to cry," and her face twisted appallingly in preparation.

Hard-hearted Robbie paid scant attention to this dreadful possibility, and shook his head a third time. Gloria found it necessary to play her trump card.

"If you don't," she exclaimed warmly, "I won't tell you any more stories, that's all. Not one."

Robbie gave in immediately and unconditionally before this ultimatum, nodding his head vigorously until the metal of his neck hummed. Carefully, he raised the little girl and placed her on his broad, flat shoulders.

Gloria's threatened tears vanished immediately and she crowed with delight. Robbie's metal skin, kept at a constant temperature of seventy by the high resistance coils within, felt nice and comfortable, while the beautifully loud sound her heels made as they bumped rhythmically against his chest was enchanting.

"You're an air-coaster, Robbie, you're a big, silver aircoaster. Hold out your arms straight. -- You got to, Robbie, if you're going to be an aircoaster."

The logic was irrefutable. Robbie's arms were wings catching the air currents and he was a silver 'coaster.

Gloria twisted the robot's head and leaned to the right. He banked sharply. Gloria equipped the 'coaster with a motor that went "Br-r-r" and then with weapons that went "Powie" and "Sh-sh-shshsh." Pirates were giving chase and the ship's blasters were coming into play. The pirates dropped in a steady rain.

"Got another one. Two more," she cried.

Then "Faster, men," Gloria said pompously, "we're running out of ammunition." She aimed over her shoulder with undaunted courage and Robbie was a blunt-nosed spaceship zooming through the void at maximum acceleration.

Clear across the field he sped, to the patch of tall grass on the other side, where he stopped with a suddenness that evoked a shriek from his flushed rider, and then tumbled her onto the soft, green carpet.

Gloria gasped and panted, and gave voice to intermittent whispered exclamations of "That was nice!"

Robbie waited until she had caught her breath and then pulled gently at a lock of hair.

"You want something?" said Gloria, eyes wide in an apparently artless complexity that fooled her huge "nursemaid" not at all. He pulled the curl harder.

"Oh, I know. You want a story."

Robbie nodded rapidly.

"Which one?"

Robbie made a semi-circle in the air with one finger.

The little girl protested, "Again? I've told you Cinderella a million times. Aren't you tired of it? -It's for babies."



Another semi-circle.

"Oh, well," Gloria composed herself, ran over the details of the tale in her mind (together with her own elaborations, of which she had several) and began:

"Are you ready? Well -- once upon a time there was a beautiful little girl whose name was Ella. And she had a terribly cruel step-mother and two very ugly and very cruel step-sisters and--"

Gloria was reaching the very climax of the tale -- midnight was striking and everything was changing back to the shabby originals lickety-split, while Robbie listened tensely with burning eyes -- when the interruption came.

"Gloria!"

It was the high-pitched sound of a woman who has been calling not once, but several times; and had the nervous tone of one in whom anxiety was beginning to overcome impatience.

"Mamma's calling me," said Gloria, not quite happily. "You'd better carry me back to the house, Robbie."

Robbie obeyed with alacrity for somehow there was that in him which judged it best to obey Mrs. Weston, without as much as a scrap of hesitation. Gloria's father was rarely home in the daytime except on Sunday -- today, for instance -- and when he was, he proved a genial and understanding person. Gloria's mother, however, was a source of uneasiness to Robbie and there was always the impulse to sneak away from her sight.

Mrs. Weston caught sight of them the minute they rose above the masking tufts of long grass and retired inside the house to wait.

"I've shouted myself hoarse, Gloria," she said, severely. "Where were you?"

"I was with Robbie," quavered Gloria. "I was telling him Cinderella, and I forgot it was dinner-time."

"Well, it's a pity Robbie forgot, too." Then, as if that reminded her of the robot's presence, she whirled upon him. "You may go, Robbie. She doesn't need you now." Then, brutally, "And don't come back till I call you."

Robbie turned to go, but hesitated as Gloria cried out in his defense, "Wait, Mamma, you got to let him stay. I didn't finish Cinderella for him. I said I would tell him Cinderella and I'm not finished."

"Gloria!"

"Honest and truly, Mamma, he'll stay so quiet, you won't even know he's here. He can sit on the chair in the corner, and he won't say a word, I mean he won't do anything. Will you, Robbie?"

Robbie, appealed to, nodded his massive head up and down once.

"Gloria, if you don't stop this at once, you shan't see Robbie for a whole week."

The girl's eyes fell, "All right! But Cinderella is his favorite story and I didn't finish it. -- And he likes it so much."

The robot left with a disconsolate step and Gloria choked back a sob.

George Weston was comfortable. It was a habit of his to be comfortable on Sunday afternoons. A good, hearty dinner below the hatches; a nice, soft, dilapidated couch on which to sprawl; a copy of the Times; slippers and shirtless chest; how could anyone help but be comfortable?

He wasn't pleased, therefore, when his wife walked in. After ten years of married life, he still was so unutterably foolish as to love her, and there was no question that he was always glad to see her -- still Sunday afternoons just after dinner were sacred to him and his idea of solid comfort was to be left in utter solitude for two or three hours. Consequently, he fixed his eye firmly upon the latest reports of the Lefebvre-Yoshida expedition to Mars (this one was to take off from Lunar Base and might actually succeed) and pretended she wasn't there.

Mrs. Weston waited patiently for two minutes, then impatiently for two more, and finally

broke the silence.

"George!"

"Hmpph?"

"George, I say! Will you put down that paper and look at me?"

The paper rustled to the floor and Weston turned a weary face toward his wife, "What is it, dear?"

"You know what it is, George. It's Gloria and that terrible machine."

"What terrible machine?"

"Now don't pretend you don't know what I'm talking about. It's that robot Gloria calls Robbie. He doesn't leave her for a moment."

"Well, why should he? He's not supposed to. And he certainly isn't a terrible machine. He's the best darn robot money can buy and I'm damned sure he set me back half a year's income. He's worth it, though -- darn sight cleverer than half my office staff."

He made a move to pick up the paper again, but his wife was quicker and snatched it away.

"You listen to me, George. I won't have my daughter entrusted to a machine -- and I don't care how clever it is. It has no soul, and no one knows what it may be thinking. A child just isn't made to be guarded by a thing of metal."

Weston frowned, "When did you decide this? He's been with Gloria two years now and I haven't seen you worry till now."

"It was different at first. It was a novelty; it took a load off me, and -- and it was a fashionable thing to do. But now I don't know. The neighbors--"

"Well, what have the neighbors to do with it? Now, look. A robot is infinitely more to be trusted than a human nursemaid. Robbie was constructed for only one purpose really -- to be the companion of a little child. His entire 'mentality' has been created for the purpose. He just can't help being faithful and loving and kind. He's a machine-made so. That's more than you can say for humans."

"But something might go wrong. Some- some--" Mrs. Weston was a bit hazy about the insides of a robot, "some little jigger will come loose and the awful thing will go berserk and--" She couldn't bring herself to complete the quite obvious thought.

"Nonsense," Weston denied, with an involuntary nervous shiver. "That's completely ridiculous. We had a long discussion at the time we bought Robbie about the First Law of Robotics. You know that it is impossible for a robot to harm a human being; that long before enough can go wrong to alter that First Law, a robot would be completely inoperable. It's a mathematical impossibility. Besides I have an engineer from U. S. Robots here twice a year to give the poor gadget a complete overhaul. Why, there's no more chance of any thing at all going wrong with Robbie than there is of you or I suddenly going loony -- considerably less, in fact. Besides, how are you going to take him away from Gloria?"

He made another futile stab at the paper and his wife tossed it angrily into the next room.

"That's just it, George! She won't play with anyone else. There are dozens of little boys and girls that she should make friends with, but she won't. She won't go near them unless I make her. That's no way for a little girl to grow up. You want her to be normal, don't you? You want her to be able to take her part in society."

"You're jumping at shadows, Grace. Pretend Robbie's a dog. I've seen hundreds of children who would rather have their dog than their father."

"A dog is different, George. We must get rid of that horrible thing. You can sell it back to the company. I've asked, and you can."

"You've asked? Now look here, Grace, let's not go off the deep end. We're keeping the robot until Gloria is older and I don't want the subject brought up again." And with that he walked out of the room in a huff.

Mrs. Weston met her husband at the door two evenings later. "You'll have to listen to this, George. There's bad feeling in the village."

"About what?" asked Weston? He stepped into the washroom and drowned out any possible answer by the splash of water.

Mrs. Weston waited. She said, "About Robbie."

Weston stepped out, towel in hand, face red and angry, "What are you talking about?"

"Oh, it's been building up and building up. I've tried to close my eyes to it, but I'm not going to any more. Most of the villagers consider Robbie dangerous. Children aren't allowed to go near our place in the evenings."

"We trust *our* child with the thing."

"Well, people aren't reasonable about these things."

"Then to hell with them."

"Saying that doesn't solve the problem. I've got to do my shopping down there. I've got to meet them every day. And it's even worse in the city these days when it comes to robots. New York has just passed an ordinance keeping all robots off the streets between sunset and sunrise."

"All right, but they can't stop us from keeping a robot in our home. Grace, this is one of your campaigns. I recognize it. But it's no use. The answer is still, no! We're keeping Robbie!"

And yet he loved his wife -- and what was worse, his wife knew it. George Weston, after all, was only a man -- poor thing -- and his wife made full use of every device which a clumsier and more scrupulous sex has learned, with reason and futility, to fear.

Ten times in the ensuing week, he cried, "Robbie stays, and that's final!" and each time it was weaker and accompanied by a louder and more agonized groan.

Came the day at last, when Weston approached his daughter guiltily and suggested a "beautiful" visivox show in the village.

Gloria clapped her hands happily, "Can Robbie go?"

"No, dear," he said, and winced at the sound of his voice, "they won't allow robots at the visivox -- but you can tell him all about it when you get home." He stumbled all over the last few words and looked away.

Gloria came back from town bubbling over with enthusiasm, for the visivox had been a gorgeous spectacle indeed.

She waited for her father to maneuver the jet-car into the sunken garage, "Wait till I tell Robbie, Daddy. He would have liked it like anything. Especially when Francis Fran was backing away so-o-o quietly, and backed right into one of the Leopard-Men and had to run." She laughed again, "Daddy, are there really Leopard-Men on the Moon?"

"Probably not," said Weston absently. "It's just funny make-believe." He couldn't take much longer with the car. He'd have to face it.

Gloria ran across the lawn. "Robbie. --Robbie!"

Then she stopped suddenly at the sight of a beautiful collie which regarded her out of serious brown eyes as it wagged its tail on the porch.

"Oh, what a nice dog!" Gloria climbed the steps, approached cautiously and patted it. "Is it for me, Daddy?"

Her mother had joined them. "Yes, it is, Gloria. Isn't it nice -- soft and furry? It's very gentle. It likes little girls."

"Can he play games?"

"Surely. He can do any number of tricks. Would you like to see some?"

"Right away. I want Robbie to see him, too. Robbie!" She stopped, uncertainly, and frowned, "I'll bet he's just staying in his room because he's mad at me for not taking him to the visivox. You'll have to explain to him, Daddy. He might not believe me, but he knows if you say it, it's so."

Weston's lip grew tighter. He looked toward his wife but could not catch her eye.

Gloria turned precipitously and ran down the basement steps, shouting as she went,

"Robbie-- Come and see what Daddy and Mamma brought me. They brought me a dog, Robbie."

In a minute she had returned, a frightened little girl. "Mamma, Robbie isn't in his room. Where is he?" There was no answer and George Weston coughed and was suddenly extremely interested in an aimlessly drifting cloud. Gloria's voice quavered on the verge of tears, "Where's Robbie, Mamma?"

Mrs. Weston sat down and drew her daughter gently to her, "Don't feel bad, Gloria. Robbie has gone away, I think."

"Gone away? Where? Where's he gone away, Mamma?"

"No one knows, darling. He just walked away. We've looked and we've looked and we've looked for him, but we can't find him."

"You mean he'll never come back again?" Her eyes were round with horror.

"We may find him soon. We'll keep looking for him. And meanwhile you can play with your nice new doggie. Look at him! His name is Lightning and he can--"

But Gloria's eyelids had overflowed, "I don't want the nasty dog -- I want Robbie. I want you to find me Robbie." Her feelings became too deep for words, and she spluttered into a shrill wail.

Mrs. Weston glanced at her husband for help, but he merely shuffled his feet morosely and did not withdraw his ardent stare from the heavens, so she bent to the task of consolation, "Why do you cry, Gloria? Robbie was only a machine, just a nasty old machine. He wasn't alive at all."

"He was not no machine!" screamed Gloria, fiercely and ungrammatically. "He was a person just like you and me and he was my friend. I want him back. Oh, Mamma, I want him back."

Her mother groaned in defeat and left Gloria to her sorrow.

"Let her have her cry out," she told her husband. "Childish griefs are never lasting. In a few days, she'll forget that awful robot ever existed."

But time proved Mrs. Weston a bit too optimistic. To be sure, Gloria ceased crying, but she ceased smiling, too, and the passing days found her ever more silent and shadowy. Gradually, her attitude of passive unhappiness wore Mrs. Weston down and all that kept her from yielding was the impossibility of admitting defeat to her husband.

Then, one evening, she flounced into the living room, sat down, folded her arms and looked boiling mad.

Her husband stretched his neck in order to see her over his newspaper, "What now, Grace?"

"It's that child, George. I've had to send back the dog today. Gloria positively couldn't stand the sight of him, she said. She's driving me into a nervous breakdown."

Weston laid down the paper and a hopeful gleam entered his eye, "Maybe-- Maybe we ought to get Robbie back. It might be done, you know. I can get in touch with--"

"No!" she replied, grimly. "I won't hear of it. We're not giving up that easily. My child shall not be brought up by a robot if it takes years to break her of it."

Weston picked up his paper again with a disappointed air. "A year of this will have me prematurely gray."

"You're a big help, George," was the frigid answer. "What Gloria needs is a change of environment? Of course she can't forget Robbie here. How can she when every tree and rock reminds her of him? It is really the silliest situation I have ever heard of. Imagine a child pining away for the loss of a robot."

"Well, stick to the point. What's the change in environment you're planning?"

"We're going to take her to New York."

"The city! In August! Say, do you know what New York is like in August? It's unbearable."

"Millions do bear it."

"They don't have a place like this to go to. If they didn't have to stay in New York, they

wouldn't."

"Well, we have to. I say we're leaving now -- or as soon as we can make the arrangements. In the city, Gloria will find sufficient interests and sufficient friends to perk her up and make her forget that machine."

"Oh, Lord," groaned the lesser half, "those frying pavements!"

"We have to," was the unshaken response. "Gloria has lost five pounds in the last month and my little girl's health is more important to me than your comfort."

"It's a pity you didn't think of your little girl's health before you deprived her of her pet robot," he muttered -- but to himself.

Gloria displayed immediate signs of improvement when told of the impending trip to the city. She spoke little of it, but when she did, it was always with lively anticipation. Again, she began to smile and to eat with something of her former appetite.

Mrs. Weston hugged herself for joy and lost no opportunity to triumph over her still skeptical husband.

"You see, George, she helps with the packing like a little angel, and chatters away as if she hadn't a care in the world. It's just as I told you -- all we need do is substitute other interests."

"Hmpph," was the skeptical response, "I hope so."

Preliminaries were gone through quickly. Arrangements were made for the preparation of their city home and a couple were engaged as housekeepers for the country home. When the day of the trip finally did come, Gloria was all but her old self again, and no mention of Robbie passed her lips at all.

In high good-humor the family took a taxi-gyro to the airport (Weston would have preferred using his own private gyro, but it was only a two-seater with no room for baggage) and entered the waiting liner.

"Come, Gloria," called Mrs. Weston. "I've saved you a seat near the window so you can watch the scenery."

Gloria trotted down the aisle cheerily, flattened her nose into a white oval against the thick clear glass, and watched with an intentness that increased as the sudden coughing of the motor drifted backward into the interior. She was too young to be frightened when the ground dropped away as if let through a trap door and she herself suddenly became twice her usual weight, but not too young to be mightily interested. It wasn't until the ground had changed into a tiny patchwork quilt that she withdrew her nose, and faced her mother again.

"Will we soon be in the city, Mamma?" she asked, rubbing her chilled nose, and watching with interest as the patch of moisture which her breath had formed on the pane shrank slowly and vanished.

"In about half an hour, dear." Then, with just the faintest trace of anxiety, "Aren't you glad we're going? Don't you think you'll be very happy in the city with all the buildings and people and things to see? We'll go to the visivox every day and see shows and go to the circus and the beach and--"

"Yes, Mamma," was Gloria's unenthusiastic rejoinder. The liner passed over a bank of clouds at the moment, and Gloria was instantly absorbed in the usual spectacle of clouds underneath one. Then they were over clear sky again, and she turned to her mother with a sudden mysterious air of secret knowledge.

"I know why we're going to the city, Mamma."

"Do you?" Mrs. Weston was puzzled. "Why, dear?"

"You didn't tell me because you wanted it to be a surprise, but I know." For a moment, she was lost in admiration at her own acute penetration, and then she laughed gaily. "We're going to New York so we can find Robbie, aren't we? --With detectives."

The statement caught George Weston in the middle of a drink of water, with disastrous results. There was a sort of strangled gasp, a geyser of water, and then a bout of choking coughs. When all was over, he stood there, a red-faced, water-drenched and very, very annoyed person.

Mrs. Weston maintained her composure, but when Gloria repeated her question in a more anxious tone of voice, she found her temper rather bent.

"Maybe," she retorted, tartly. "Now sit and be still, for Heaven's sake."

New York City, 1998 A.D., was a paradise for the sightseer more than ever in its history. Gloria's parents realized this and made the most of it.

On direct orders from his wife, George Weston arranged to have his business take care of itself for a month or so, in order to be free to spend the time in what he termed, "dissipating Gloria to the verge of ruin." Like everything else Weston did, this was gone about in an efficient, thorough, and business-like way. Before the month had passed, nothing that could be done had not been done.

She was taken to the top of the half-mile tall Roosevelt Building, to gaze down in awe upon the jagged panorama of rooftops that blended far off in the fields of Long Island and the flatlands of New Jersey. They visited the zoos where Gloria stared in delicious fright at the "real live lion" (rather disappointed that the keepers fed him raw steaks, instead of human beings, as she had expected), and asked insistently and peremptorily to see "the whale."

The various museums came in for their share of attention, together with the parks and the beaches and the aquarium.

She was taken halfway up the Hudson in an excursion steamer fitted out in the archaism of the mad Twenties. She traveled into the stratosphere on an exhibition trip, where the sky turned deep purple and the stars came out and the misty earth below looked like a huge concave bowl. Down under the waters of the Long Island Sound she was taken in a glass-walled sub-sea vessel, where in a green and wavering world, quaint and curious sea-things ogled her and wiggled suddenly away.

On a more prosaic level, Mrs. Weston took her to the department stores where she could revel in another type of fairyland.

In fact, when the month had nearly sped, the Westons were convinced that everything conceivable had been done to take Gloria's mind once and for all off the departed Robbie -- but they were not quite sure they had succeeded.

The fact remained that wherever Gloria went, she displayed the most absorbed and concentrated interest in such robots as happened to be present. No matter how exciting the spectacle before her, nor how novel to her girlish eyes, she turned away instantly if the corner of her eye caught a glimpse of metallic movement.

Mrs. Weston went out of her way to keep Gloria away from all robots.

And the matter was finally climaxed in the episode at the Museum of Science and Industry. The Museum had announced a special "children's program" in which exhibits of scientific witchery scaled down to the child mind were to be shown. The Westons, of course, placed it upon their list of "absolutely."

It was while the Westons were standing totally absorbed in the exploits of a powerful electro-magnet that Mrs. Weston suddenly became aware of the fact that Gloria was no longer with her. Initial panic gave way to calm decision and, enlisting the aid of three attendants, a careful search was begun.

Gloria, of course, was not one to wander aimlessly, however. For her age, she was an unusually determined and purposeful girl, quite full of the maternal genes in that respect. She had seen a huge sign on the third floor, which had said, "This Way to the Talking Robot" Having spelled it out to herself and having noticed that her parents did not seem to wish to move in the proper direction, she did the obvious thing. Waiting for an opportune moment of parental distraction, she calmly disengaged herself and followed the sign.

The Talking Robot was a tour de force, a thoroughly impractical device, possessing publicity value only. Once an hour, an escorted group stood before it and asked questions of the robot engineer in charge in careful whispers. Those the engineer decided were suitable for the

robot's circuits were transmitted to the Talking Robot.

It was rather dull. It may be nice to know that the square of fourteen is one hundred ninety-six, that the temperature at the moment is 72 degrees Fahrenheit, and the air-pressure 30.02 inches of mercury, that the atomic weight of sodium is 23, but one doesn't really need a robot for that. One especially does not need an unwieldy, totally immobile mass of wires and coils spreading over twenty-five square yards.

Few people bothered to return for a second helping, but one girl in her middle teens sat quietly on a bench waiting for a third. She was the only one in the room when Gloria entered.

Gloria did not look at her. To her at the moment, another human being was but an inconsiderable item. She saved her attention for this large thing with the wheels. For a moment, she hesitated in dismay. It didn't look like any robot she had ever seen.

Cautiously and doubtfully she raised her treble voice; "Please, Mr. Robot, sir, are you the Talking Robot, sir?" She wasn't sure, but it seemed to her that a robot that actually talked was worth a great deal of politeness.

(The girl in her mid-teens allowed a look of intense concentration to cross her thin, plain face. She whipped out a small notebook and began writing in rapid pothooks.)

There was an oily whir of gears and a mechanically timbered voice boomed out in words that lacked accent and intonation, "I- am- the- robot- that- talks."

Gloria stared at it ruefully. It did talk, but the sound came from inside somewheres. There was no face to talk to. She said, "Can you help me, Mr. Robot, sir?"

The Talking Robot was designed to answer questions, and only such questions as it could answer had ever been put to it. It was quite confident of its ability, therefore, "I- can- help- you."

"Thank you, Mr. Robot, sir. Have you seen Robbie?"

"Who -is Robbie?"

"He's a robot, Mr. Robot, sir." She stretched to tiptoes. "He's about so high, Mr. Robot, sir, only higher, and he's very nice. He's got a head, you know. I mean you haven't, but he has, Mr. Robot, sir."

The Talking Robot had been left behind, "A- robot?"

"Yes, Mr. Robot, sir. A robot just like you, except he can't talk, of course, and -- looks like a real person."

"A- robot- like- me?"

"Yes, Mr. Robot, sir."

To which the Talking Robot's only response was an erratic splutter and an occasional incoherent sound. The radical generalization offered it, i.e., its existence, not as a particular object, but as a member of a general group, was too much for it. Loyally, it tried to encompass the concept and half a dozen coils burnt out. Little warning signals were buzzing.

(The girl in her mid-teens left at that point. She had enough for her Physics-1 paper on "Practical Aspects of Robotics." This paper was Susan Calvin's first of many on the subject.)

Gloria stood waiting, with carefully concealed impatience, for the machine's answer when she heard the cry behind her of "There she is," and recognized that cry as her mother's.

"What are you doing here, you bad girl?" cried Mrs. Weston, anxiety dissolving at once into anger. "Do you know you frightened your mamma and daddy almost to death? Why did you run away?"

The robot engineer had also dashed in, tearing his hair, and demanding who of the gathering crowd had tampered with the machine. "Can't anybody read signs?" he yelled. "You're not allowed in here without an attendant."

Gloria raised her grieved voice over the din, "I only came to see the Talking Robot, Mamma. I thought he might know where Robbie was because they're both robots." And then, as the thought of Robbie was suddenly brought forcefully home to her, she burst into a sudden storm of tears, "And I got to find Robbie, Mamma. I got to."

Mrs. Weston strangled a cry, and said, "Oh, good Heavens. Come home, George. This is more than I can stand."

That evening, George Weston left for several hours, and the next morning, he approached his wife with something that looked suspiciously like smug complacency.

"I've got an idea, Grace."

"About what?" was the gloomy, uninterested query?

"About Gloria."

"You're not going to suggest buying back that robot?"

"No, of course not."

"Then go ahead. I might as well listen to you. Nothing I've done seems to have done any good."

"All right. Here's what I've been thinking. The whole trouble with Gloria is that she thinks of Robbie as a person and not as a machine. Naturally, she can't forget him. Now if we managed to convince her that Robbie was nothing more than a mess of steel and copper in the form of sheets and wires with electricity its juice of life, how long would her longings last? It's the psychological attack, if you see my point."

"How do you plan to do it?"

"Simple. Where do you suppose I went last night? I persuaded Robertson of U. S. Robots and Mechanical Men, Inc. to arrange for a complete tour of his premises tomorrow. The three of us will go, and by the time we're through, Gloria will have it drilled into her that a robot is not alive."

Mrs. Weston's eyes widened gradually and something glinted in her eyes that was quite like sudden admiration, "Why, George, that's a good idea."

And George Weston's vest buttons strained. "Only kind I have," he said.

Mr. Struthers was a conscientious General Manager and naturally inclined to be a bit talkative. The combination, therefore, resulted in a tour that was fully explained, perhaps even over-abundantly explained, at every step. However, Mrs. Weston was not bored. Indeed, she stopped him several times and begged him to repeat his statements in simpler language so that Gloria might understand. Under the influence of this appreciation of his narrative powers, Mr. Struthers expanded genially and became ever more communicative, if possible.

George Weston, himself, showed a gathering impatience.

"Pardon me, Struthers," he said, breaking into the middle of a lecture on the photoelectric cell, "haven't you a section of the factory where only robot labor is employed?"

"Eh? Oh, yes! Yes, indeed!" He smiled at Mrs. Weston. "A vicious circle in a way, robots creating more robots. Of course, we are not making a general practice out of it. For one thing, the unions would never let us. But we can turn out a very few robots using robot labor exclusively, merely as a sort of scientific experiment. You see," he tapped his pince-nez into one palm argumentatively, "what the labor unions don't realize -- and I say this as a man who has always been very sympathetic with the labor movement in general -- is that the advent of the robot, while involving some dislocation to begin with, will inevitably--"

"Yes, Struthers," said Weston, "but about that section of the factory you speak of -- may we see it? It would be very interesting, I'm sure."

"Yes! Yes, of course!" Mr. Struthers replaced his pince-nez in one convulsive movement and gave vent to a soft cough of discomfiture. "Follow me, please."

He was comparatively quiet while leading the three through a long corridor and down a flight of stairs. Then, when they had entered a large well-lit room that buzzed with metallic activity, the sluices opened and the flood of explanation poured forth again.

"There you are!" he said with pride in his voice. "Robots only! Five men act as overseers and they don't even stay in this room. In five years, that is, since we began this project, not a single accident has occurred. Of course, the robots here assembled are comparatively simple, but..."

The General Manager's voice had long died to a rather soothing murmur in Gloria's ears. The whole trip seemed rather dull and pointless to her, though there were many robots in sight.



None were even remotely like Robbie, though, and she surveyed them with open contempt.

In this room, there weren't any people at all, she noticed. Then her eyes fell upon six or seven robots busily engaged at a round table halfway across the room. They widened in incredulous surprise. It was a big room. She couldn't see for sure, but one of the robots looked like -- looked like -- it was!

"Robbie!" Her shriek pierced the air, and one of the robots about the table faltered and dropped the tool he was holding. Gloria went almost mad with joy. Squeezing through the railing before either parent could stop her, she dropped lightly to the floor a few feet below, and ran toward her Robbie, arms waving and hair flying.

And the three horrified adults, as they stood frozen in their tracks, saw what the excited little girl did not see, -- a huge, lumbering tractor bearing blindly down upon its appointed track.

It took split-seconds for Weston to come to his senses, and those split-seconds meant everything, for Gloria could not be overtaken. Although Weston vaulted the railing in a wild attempt, it was obviously hopeless. Mr. Struthers signaled wildly to the overseers to stop the tractor, but the overseers were only human and it took time to act.

It was only Robbie that acted immediately and with precision.

With metal legs eating up the space between himself and his little mistress he charged down from the opposite direction. Everything then happened at once. With one sweep of an arm, Robbie snatched up Gloria, slackening his speed not one iota, and, consequently, knocking every breath of air out of her. Weston, not quite comprehending all that was happening, felt, rather than saw, Robbie brush past him, and came to a sudden bewildered halt. The tractor intersected Gloria's path half a second after Robbie had, rolled on ten feet further and came to a grinding, long drawn-out stop.

Gloria regained her breath, submitted to a series of passionate hugs on the part of both her parents and turned eagerly toward Robbie. As far as she was concerned, nothing had happened except that she had found her friend.

But Mrs. Weston's expression had changed from one of relief to one of dark suspicion. She turned to her husband, and, despite her disheveled and undignified appearance, managed to look quite formidable, "You engineered this, didn't you?"

George Weston swabbed at a hot forehead with his handkerchief. His hand was unsteady, and his lips could curve only into a tremulous and exceedingly weak smile.

Mrs. Weston pursued the thought, "Robbie wasn't designed for engineering or construction work. He couldn't be of any use to them. You had him placed there deliberately so that Gloria would find him. You know you did."

"Well, I did," said Weston. "But, Grace, how was I to know the reunion would be so violent? And Robbie has saved her life; you'll have to admit that. You can't send him away again."

Grace Weston considered. She turned toward Gloria and Robbie and watched them abstractedly for a moment. Gloria had a grip about the robot's neck that would have asphyxiated any creature but one of metal, and was prattling nonsense in half-hysterical frenzy. Robbie's chrome-steel arms (capable of bending a bar of steel two inches in diameter into a pretzel) wound about the little girl gently and lovingly, and his eyes glowed a deep, deep red.

"Well," said Mrs. Weston, at last, "I guess he can stay with us until he rusts."

## Let's Get Together

A kind of peace had endured for a century and people had forgotten what anything else was like. They would scarcely have known how to react had they discovered that a kind of war had finally come.

Certainly, Elias Lynn, Chief of the Bureau of Robotics, wasn't sure how he ought to react when *he* finally found out. The Bureau of Robotics was headquartered in Cheyenne, in line with the century-old trend toward decentralization, and Lynn stared dubiously at the young Security officer from Washington who had brought the news.

Elias Lynn was a large man, almost charmingly homely, with pale blue eyes that bulged a bit. Men weren't usually comfortable under the stare of those eyes, but the Security officer remained calm.

Lynn decided that his first reaction ought to be incredulity. Hell, it *was* incredulity! He just didn't believe it!

He eased himself back in his chair and said, "How certain is the information?"

The Security officer, who had introduced himself as Ralph G. Breckenridge and had presented credentials to match, had the softness of youth about him; full lips, plump cheeks that flushed easily, and guileless eyes. His clothing was out of line with Cheyenne but it suited a universally air-conditioned Washington, where Security, despite everything, was still centered.

Breckenridge flushed and said, "There's no doubt about it."

"You people know all about Them, I suppose," said Lynn and was unable to keep a trace of sarcasm out of his tone. He was not particularly aware of his use of a slightly stressed pronoun in his reference to the enemy, the equivalent of capitalization in print. It was a cultural habit of this generation and the one preceding. No one said the "East" or the "Reds" or the "Soviets" or the "Russians" any more. That would have been too confusing, since some of Them weren't of the East, weren't Reds, Soviets, and especially not Russians. It was much simpler to say We and They, and much more precise.

Travelers had frequently reported that They did the same in reverse. Over there, They were "We" (in the appropriate language) and We were "They."

Scarcely anyone gave thought to such things any more. It was all quite comfortable and casual. There was no hatred, even. At the beginning, it had been called a Cold War. Now it was only a game, almost a good-natured game, with unspoken rules and a kind of decency about it.

Lynn said abruptly, "Why should They want to disturb the situation?"

He rose and stood staring at a wall map of the world, split into two regions with faint edgings of color. An irregular portion on the left of the map was edged in a mild green. A smaller, but just as irregular, portion on the right of the map was bordered in a washed-out pink. We and They.

The map hadn't changed much in a century. The loss of Formosa and the gain of East Germany some eighty years before had been the last territorial switch of importance.

There had been another change, though, that was significant enough and that was in the colors. Two generations before, Their territory had been a brooding, bloody red, Ours a pure and undefiled white. Now there was a neutrality about the colors. Lynn had seen Their maps and it was the same on Their side.

"They wouldn't do it," he said.

"They are doing it," said Breckenridge, "and you had better accustom yourself to the fact. Of course, sir, I realize that it isn't pleasant to think that They may be that far ahead of us in robotics."

His eyes remained as guileless as ever, but the hidden knife-edges of the words plunged deep, and Lynn quivered at the impact.

Of course, that would account for why the Chief of Robotics learned of this so late and

through a Security officer at that. He had lost caste in the eyes of the Government; if Robotics had really failed in the struggle, Lynn could expect no political mercy.

Lynn said wearily, "Even if what you say is true, They're not far ahead of us. We could build humanoid robots."

"Have we, sir?"

"Yes. As a matter of fact, we have built a few models for experimental purposes."

"They were doing so ten years ago. They've made ten years' progress since."

Lynn was disturbed. He wondered if his incredulity concerning the whole business was really the result of wounded pride and fear for his job and reputation. He was embarrassed by the possibility that this might be so, and yet he was forced into defense.

He said, "Look, young man, the stalemate between Them and Us was never perfect in every detail, you know. They have always been ahead in one facet or another and We in some other facet or another. If They're ahead of us right now in robotics, it's because They've placed a greater proportion of Their effort into robotics than We have. And that means that some other branch of endeavor has received a greater share of Our efforts than it has to Theirs. It would mean We're ahead in force-field research or in hyperatomics, perhaps."

Lynn felt distressed at his own statement that the stalemate wasn't perfect. It was true enough, but that was the one great danger threatening the world. The world depended on the stalemate being as perfect as possible. If the small unevennesses that always existed overbalanced too far in one direction or the other

Almost at the beginning of what had been the Cold War, both sides had developed thermonuclear weapons, and war became unthinkable. Competition switched from the military to the economic and psychological and had stayed there ever since.

But always there was the driving effort on each side to break the stalemate, to develop a parry for every possible thrust, to develop a thrust that could not be parried in time--something that would make war possible again. And that was not because either side wanted war so desperately, but because both were afraid that the other side would make the crucial discovery first.

For a hundred years each side had kept the struggle even. And in the process, peace had been maintained for a hundred years while, as byproducts of the continuously intensive research, force fields had been produced and solar energy and insect control and robots. Each side was making a beginning in the understanding of mentalics, which was the name given to the biochemistry and biophysics of thought. Each side had its outposts on the Moon and on Mars. Mankind was advancing in giant strides under forced draft.

It was even necessary for both sides to be as decent and humane as possible among themselves, lest through cruelty and tyranny, friends be made for the other side.

It couldn't be that the stalemate would now be broken and that there would be war.

Lynn said, "I want to consult one of my men. I want his opinion.

"Is he trustworthy?"

Lynn looked disgusted. "Good Lord, what man in Robotics has not been investigated and cleared to death by your people? Yes, I vouch for him. If you can't trust a man like Humphrey Carl Laszlo, then we're in no position to face the kind of attack you say They are launching, no matter what else we do."

"I've heard of Laszlo," said Breckenridge. "Good. Does he pass?"

"Yes."

"Then, I'll have him in and we'll find out what he thinks about the possibility that robots could invade the U.S.A."

"Not exactly," said Breckenridge, softly. "You still don't accept the full truth. Find out what he thinks about the fact that robots have *already* invaded the U.S.A."

Laszlo was the grandson of a Hungarian who had broken through what had then been called the Iron Curtain, and he had a comfortable above-suspicion feeling about himself because of it. He was thick-set and balding with a pugnacious look graven forever on his snub face, but

his accent was clear Harvard and he was almost excessively soft-spoken.

To Lynn, who was conscious that after years of administration he was no longer expert in the various phases of modern robotics, Laszlo was a comforting receptacle for complete knowledge. Lynn felt better because of the man's mere presence.

Lynn said, "What do you think?" A scowl twisted Laszlo's face ferociously. "That They're that far ahead of us. Completely incredible. It would mean They've produced humanoids that could not be told from humans at close quarters. It would mean a considerable advance in robo-mentals."

"You're personally involved," said Breckenridge, coldly. "Leaving professional pride out of account, exactly why is it impossible that They be ahead of Us?"

Laszlo shrugged. "I assure you that I'm well acquainted with Their literature on robotics. I know approximately where They are."

"You know approximately where They want you to *think* They are, is what you really mean," corrected Breckenridge. "Have you ever visited the other side?"

"I haven't," said Laszlo, shortly. "Nor you, Dr. Lynn?"

Lynn said, "No, I haven't, either."

Breckenridge said, "Has any robotics man visited the other side in twenty-five years?" He asked the question with a kind of confidence that indicated he knew the answer.

For a matter of seconds, the atmosphere was heavy with thought. Discomfort crossed Laszlo's broad face. He said, "As a matter of fact, They haven't held any conferences on robotics in a long time."

"In twenty-five years," said Breckenridge. "Isn't that significant?"

"Maybe," said Laszlo, reluctantly. "Something else bothers me, though. None of Them have ever come to Our conferences on robotics. None that I can remember."

"Were They invited?" asked Breckenridge.

Lynn, staring and worried, interposed quickly, "Of course." Breckenridge said, "Do They refuse attendance to any other types of scientific conferences We hold?"

"I don't know," said Laszlo. He was pacing the floor now. "I haven't heard of any cases. Have you, Chief?"

"No," said Lynn.

Breckenridge said, "Wouldn't you say it was as though They didn't want to be put in the position of having to return any such invitation? Or as though They were afraid one of Their men might talk too much?"

That was exactly how it seemed, and Lynn felt a helpless conviction that Security's story was true after all steal over him.

Why else had there been no contact between sides on robotics? There had been a cross-fertilizing trickle of researchers moving in both directions on a strictly one-for-one basis for years, dating back to the days of Eisenhower and Krushchev. There were a great many good motives for that: an honest appreciation of the supranational character of science; impulses of friendliness that are hard to wipe out completely in the individual human being; the desire to be exposed to a fresh and interesting outlook and to have your own slightly stale notions greeted by others as fresh and interesting.

The governments themselves were anxious that this continue. There was always the obvious thought that by learning all you could and telling as little as you could, your own side would gain by the exchange.

But not in the case of robotics. Not there.

Such a little thing to carry conviction. And a thing, moreover, they had known all along. Lynn thought darkly: *We've taken the complacent way out.*

Because the other side had done nothing publicly on robotics, it had been tempting to sit back smugly and be comfortable in the assurance of superiority. Why hadn't it seemed possible, even likely, that They were hiding superior cards, a trump hand, for the proper time?

Laszlo said shakely, "What do we do?" It was obvious that the same line of thought had

carried the same conviction to him.

"Do?" parroted Lynn. It was hard to think right now of anything but the complete horror that came with conviction. There were ten humanoid robots somewhere in the United States, each one carrying a fragment of a TC bomb.

TC! The race for sheer horror in bombery had ended there. TCI Total Conversion! The sun was no longer a synonym one could use. Total conversion made the sun a penny candle.

Ten humanoids, each completely harmless in separation, could, by the simple act of coming together, exceed critical mass and Lynn rose to his feet heavily, the dark pouches under his eyes, which ordinarily lent his ugly face a look of savage foreboding, more prominent than ever. "It's going to be up to us to figure out ways and means of telling a humanoid from a human and then finding the humanoids."

"How quickly?" muttered Laszlo.

"Not later than five minutes before they get together," barked Lynn, "and I don't know when that will be."

Breckenridge nodded. "I'm glad you're with us now, sir, I'm to bring you back to Washington for conference, you know."

Lynn raised his eyebrows. "All right."

He wondered if, had he delayed longer in being convinced, he might not have been replaced forthwith--if some other Chief of the Bureau of Robotics might not be conferring in Washington. He suddenly wished earnestly that exactly that had come to pass.

The First Presidential Assistant was there, the Secretary of Science, the Secretary of Security, Lynn himself, and Breckenridge. Five of them sitting about a table in the dungeons of an underground fortress near Washington.

Presidential Assistant Jeffreys was an impressive man, handsome in a white-haired and just-a-trifle-jowly fashion, solid, thoughtful and as unobtrusive, politically, as a Presidential Assistant ought to be.

He spoke incisively. "There are three questions that face us as I see it. First, when are the humanoids going to get together? Second, where are they going to get together? Third, how do we stop them before they get together?"

Secretary of Science Amberley nodded convulsively at that. He had been Dean of Northwestern Engineering before his appointment. He was thin, sharp-featured and noticeably edgy. His forefinger traced slow circles on the table

"As far as *when* they'll get together," he said. "I suppose it's definite that it won't be for some time."

"Why do you say that?" asked Lynn sharply.

"They've been in the U.S. at least a month already. So Security says."

Lynn turned automatically to look at Breckenridge, and Secretary of Security Macalaster intercepted the glance. Macalaster said, "The information is reliable. Don't let Breckenridge's apparent youth fool you, Dr. Lynn. That's part of his value to us. Actually, he's thirty-four and has been with the department for ten years. He has been in Moscow for nearly a year and without him, none of this terrible danger would be known to us. As it is, we have most of the details."

"Not the crucial ones," said Lynn.

Macalaster of Security smiled frostily. His heavy chin and close-set eyes were well-known to the public but almost nothing else about him was. He said, "We are all finitely human, Dr. Lynn. Agent Breckenridge has done a great deal."

Presidential Assistant Jeffreys cut in. "Let us say we have a certain amount of time. If action at the instant were necessary, it would have happened before this. It seems likely that they are waiting for a specific time. If we knew the place, perhaps the time would become self-evident."

"If they are going to TC a target, they will want to cripple us as much as possible, so it would seem that a major city would have to be it. In any case, a major metropolis is the only target worth a TC bomb. I think there are four possibilities: Washington, as the administrative center; New York, as the financial center; and Detroit and Pittsburgh as the two chief industrial

centers.”

Macalaster of Security said, “I vote for New York. Administration and industry have both been decentralized to the point where the destruction of anyone particular city won’t prevent instant retaliation.”

“Then why New York?” asked Amberly of Science, perhaps more sharply than he intended. “Finance has been decentralized as well.”

“A question of morale. It may be they intend to destroy our will to resist, to induce surrender by the sheer horror of the first blow. The greatest destruction of human life would be in the New York Metropolitan area--”

“Pretty cold-blooded,” muttered Lynn. “I know,” said Macalaster of Security, “but they’re capable of it, if they thought it would mean final victory at a stroke. Wouldn’t we--”

Presidential Assistant Jeffreys brushed back his white hair. “Let’s assume the worst. Let’s assume that New York will be destroyed some time during the winter, preferably immediately after a serious blizzard when communications are at their worst and the disruption of utilities and food supplies in fringe areas will be most serious in their effect. Now, how do we stop them?”

Amberley of Science could only say, “Finding ten men in two hundred and twenty million is an awfully small needle in an awfully large haystack.”

Jeffreys shook his head. “You have it wrong. Ten humanoids among two hundred twenty million humans.”

“No difference,” said Amberley of Science. “We don’t know that a humanoid can be differentiated from a human at sight. Probably not.” He looked at Lynn. They all did.

Lynn said heavily, “We in Cheyenne couldn’t make one that would pass as human in the daylight.”

“But They can,” said Macalaster of Security, “and not only physically. We’re sure of that. They’ve advanced mentalic procedures to the point where They can reel off the micro-electronic pattern of the brain and focus it on the positronic pathways of the robot.”

Lynn stared. “Are you implying that They can create the replica of a human being complete with personality and memory?”

“I am.”

“Of specific human beings?”

“That’s right.”

“Is this also based on Agent Breckenridge’s findings?”

“Yes. The evidence can’t be disputed.”

Lynn bent his head in thought for a moment. Then he said, “Then ten men in the United States are not men but humanoids. But the originals would have had to be available to them. They couldn’t be Orientals, who would be too easy to spot, so they would have to be East Europeans. How would they be introduced into this country, then? With the radar network over the entire world border as tight as a drum, how could They introduce any individual, human or humanoid, without our knowing it?”

Macalaster of Security said, “It can be done. There are certain legitimate seepages across the border. Businessmen, pilots, even tourists. They’re watched, of course, on both sides. Still ten of them might have been kidnaped and used as models for humanoids. The humanoids would then be sent back in their place. Since we wouldn’t expect such a substitution, it would pass us by. If they were Americans to begin with, there would be no difficulty in their getting into this country. It’s as simple as that.”

“And even their friends and family could not tell the difference?”

“We must assume so. Believe me, we’ve been waiting for any report that might imply sudden attacks of amnesia or troublesome changes in personality. We’ve checked on thousands.”

Amberley of Science stared at his finger tips. “I think ordinary measures won’t work. The attack must come from the Bureau of Robotics and I depend on the chief of that bureau.” Again eyes turned sharply, expectantly, on Lynn. Lynn felt bitterness rise. It seemed to him that this

was what the conference came to and was intended for. Nothing that had been said had not been said before. He was sure of that. There was no solution to the problem, no pregnant suggestion. It was a device for the record, a device on the part of men who gravely feared defeat and who wished the responsibility for it placed clearly and unequivocally on someone else.

And yet there was justice in it. It was in robotics that We had fallen short. And Lynn was not Lynn merely. He was Lynn of Robotics and the responsibility had to be his.

He said, "I will do what I can."

He spent a wakeful night and there was a haggardness about both body and soul when he sought and attained another interview with Presidential Assistant Jeffreys the next morning. Breckenridge was there, and though Lynn would have preferred a private conference, he could see the justice in the situation. It was obvious that Breckenridge had attained enormous influence with the government as a result of his successful Intelligence work. Well, why not?

Lynn said, "Sir, I am considering the possibility that we are hopping uselessly to enemy piping."

"In what way?"

"I'm sure that however impatient the public may grow at times, and however legislators sometimes find it expedient to talk, the government at least recognizes the world stalemate to be beneficial. They must recognize it also. Ten humanoids with one TC bomb is a trivial way of breaking the stalemate."

"The destruction of fifteen million human beings is scarcely trivial."

"It is from the world power standpoint. It would not so demoralize us to make us surrender or so cripple us as to convince us we could not win. There would just be the same old planetary death war that both sides have avoided so long and so successfully. And all They would have accomplished is to force us to fight minus one city. It's not enough."

"What do you suggest?" said Jeffreys coldly. "That They do not have ten humanoids in our country? That there is not a TC bomb waiting to get together?"

"I'll agree that those things are here, but perhaps for some reason greater than just midwinter bomb madness."

"Such as?"

"It may be that the physical destruction resulting from the humanoids getting together is not the worst thing that can happen to us. What about the moral and intellectual destruction that comes of their being here at all? With all due respect to Agent Breckenridge, what if They *intended* for us to find out about the humanoids; what if the humanoids are never supposed to get together, but merely to remain separate in order to give us something to worry about."

"Why?"

"Tell me this. What measures have already been taken against the humanoids? I suppose that Security is going through the files of all citizens who have ever been across the border or close enough to it to make kidnapping possible. I know, since Macalaster mentioned it yesterday, that they are following up suspicious psychiatric cases. What else?"

Jeffreys said, "Small X-ray devices are being installed in key places in the large cities. In the mass arenas, for instance--"

"Where ten humanoids might slip in among a hundred thousand spectators of a football game or an air-polo match?"

"Exactly."

"And concert halls and churches?"

"We must start somewhere. We can't do it all at once."

"Particularly when panic must be avoided," said Lynn. "Isn't that so? It wouldn't do to have the public realize that at any unpredictable moment, some unpredictable city and its human contents would suddenly cease to exist."

"I suppose that's obvious. What are you driving at?"

Lynn said strenuously, "That a growing fraction of our national effort will be diverted entirely into the nasty problem of what Amberley called finding a very small needle in a very

large haystack. We'll be chasing our tails madly, while They increase their research lead to the point where we find we can no longer catch up; when we must surrender without the chance even of snapping our fingers in retaliation.

"Consider further that this news will leak out as more and more people become involved in our countermeasures and more and more people begin to guess what we're doing. Then what? The panic might do us more harm than anyone TC bomb."

The Presidential Assistant said irritably, "In Heaven's name, man, what do you suggest we do, then?"

"Nothing," said Lynn. "Call their bluff. Live as we have lived and gamble that They won't dare break the stalemate for the sake of a one-bomb head start."

"Impossible!" said Jeffreys. "Completely impossible. The welfare of all of Us is very largely in my hands, and doing nothing is the one thing I cannot do. I agree with you, perhaps, that X-ray machines at sports arenas are a kind of skin-deep measure that won't be effective, but it has to be done so that people, in the aftermath, do not come to the bitter conclusion that we tossed our country away for the sake of a subtle line of reasoning that encouraged donothingism. In fact, our counter-gambit will be active indeed."

"In what way?" Presidential Assistant Jeffreys looked at Breckenridge. The young Security officer, hitherto calmly silent, said, "It's no use talking about a possible future break in the stalemate when the stalemate is broken now. It doesn't matter whether these humanoids explode or do not. Maybe they *are* only a bait to divert us, as you say. But the fact remains that we are a quarter of a century behind in robotics, and that may be fatal. What other advances in robotics will there be to surprise us if war does start? The only answer is to divert our entire force immediately, now, into a crash program of robotics research, and the first problem is to find the humanoids. Call it an exercise in robotics, if you will, or call it the prevention of the death of fifteen million men, women and children."

Lynn shook his head helplessly. "You *can't*. You'd be playing into their hands. They want us lured into the one blind alley while they're free to advance in all other directions."

Jeffreys said impatiently, "That's your guess. Breckenridge has made his suggestion through channels and the government has approved, and we will begin with an all-Science conference."

"All-Science?"

Breckenridge said, "We have listed every important scientist of every branch of natural science. They'll all be at Cheyenne. There will be only one point on the agenda: How to advance robotics. The major specific subheading under that will be: How to develop a receiving device for the electromagnetic fields of the cerebral cortex that will be sufficiently delicate to distinguish between a protoplasmic human brain and a positronic humanoid brain."

Jeffreys said, "We had hoped you would be willing to be in charge of the conference."

"I was not consulted in this."

"Obviously time was short, sir. Do you agree to be in charge?" Lynn smiled briefly. It was a matter of responsibility again. The responsibility must be clearly that of Lynn of Robotics. He had the feeling it would be Breckenridge who would really be in charge. But what could he do?

He said, "I agree."

Breckenridge and Lynn returned together to Cheyenne, where that evening Laszlo listened with a sullen mistrust to Lynn's description of coming events.

Laszlo said, "While you were gone, Chief, I've started putting five experimental models of humanoid structure through the testing procedures. Our men are on a twelve-hour day, with three shifts overlapping. If we've got to arrange a conference, we're going to be crowded and red-taped out of everything. Work will come to a halt."

Breckenridge said, "That will be only temporary. You will gain more than you lose."

Laszlo scowled. "A bunch of astrophysicists and geochemists around won't help a damn toward robotics."



"Views from specialists of other fields may be helpful."

"Are you sure? How do we know that there is any way of detecting brain waves or that, even if we can, there is a way of differentiating human and humanoid by wave pattern? Who set up the project, anyway?"

"I did," said Breckenridge.

"You did? Are you a robotics man?"

The young Security agent said calmly, "I have studied robotics."

"That's not the same thing."

"I've had access to text material dealing with Russian robotics--in Russian. Top-secret material well in advance of anything you have here."

Lynn said ruefully, "He has us there, Laszlo."

"It was on the basis of that material," Breckenridge went on, "that I suggested this particular line of investigation. It is reasonably certain that in copying off the electromagnetic pattern of a specific human mind into a specific positronic brain, a perfectly exact duplicate cannot be made. For one thing, the most complicated positronic brain small enough to fit into a human-sized skull is hundreds of times less complex than the human brain. It can't pick up all the overtones, therefore, and there must be some way to take advantage of that fact."

Laszlo looked impressed despite himself and Lynn smiled grimly. It was easy to resent Breckenridge and the coming intrusion of several hundred scientists of nonrobotics specialties, but the problem itself was an intriguing one. There was that consolation, at least.

It came to him quietly. Lynn found he had nothing to do but sit in his office alone, with an executive position that had grown merely titular. Perhaps that helped. It gave him time to think, to picture the creative scientists of half the world converging on Cheyenne.

It was Breckenridge who, with cool efficiency, was handling the details of preparation. There had been a kind of confidence in the way he said, "Let's get together and we'll lick Them."

Let's get together. It came to Lynn so quietly that anyone watching Lynn at that moment might have seen his eyes blink slowly twice--but surely nothing more.

He did what he had to do with a whirling detachment that kept him calm when he felt that, by all rights, he ought to be going mad.

He sought out Breckenridge in the other's improvised quarters. Breckenridge was alone and frowning. "Is anything wrong, sir?"

Lynn said wearily, "Everything's right, I think. I've invoked martial-law."

"What!"

"As chief of a division I can do so if I am of the opinion the situation warrants it. Over my division I can then be dictator. Chalk up one for the beauties of decentralization."

"You will rescind that order immediately." Breckenridge took a step forward. "When Washington hears this, you will be ruined."

"I'm ruined anyway. Do you think I don't realize that I've been set up for the role of the greatest villain in American history: the man who let Them break the stalemate? I have nothing to lose--and perhaps a great deal to gain."

He laughed a little wildly. "What a target the Division of Robotics will be, eh, Breckenridge? Only a few thousand men to be killed by a TC bomb capable of wiping out three hundred square miles in one micro-second. But five hundred of those men would be our greatest scientists. We would be in the peculiar position of having to fight a war with our brains shot out, or surrendering. I think we'd surrender."

"But this is impossible. Lynn, do you hear me? Do you understand? How could the humanoids pass our security provisions? How could they get together?"

"But they *are* getting together! We're helping them to do so. We're ordering them to do so. Our scientists visit the other side, Breckenridge. They visit Them regularly. You made a point of how strange it was that no one in robotics did. Well, ten of those scientists are still there and in their place, ten humanoids are converging on Cheyenne."

"That's a ridiculous guess."

"I think it's a good one, Breckenridge. But it wouldn't work unless we knew humanoids were in America so that we would call the conference in the first place. Quite a coincidence that you brought the news of the humanoids *and* suggested the conference *and* suggested the agenda *and* are running the show *and* know exactly which scientists were invited. Did you make sure the right ten were included?"

"Dr. Lynn!" cried Breckenridge in outrage. He poised to rush forward.

Lynn said, "Don't move. I've got a blaster here. Well just wait for the scientists to get here one by one. One by one we'll X-ray them. One by one, we'll monitor them for radioactivity. No two will get together without being checked, and if all five hundred are clear, I'll give you my blaster and surrender to you. Only I think we'll find the ten humanoids. Sit down, Breckenridge."

They both sat. Lynn said, "We wait. When I'm tired, Laszlo will spell me. We wait."

Professor Manueto Jimenez of the Institute of Higher Studies of Buenos Aires exploded while the stratospheric jet on which he traveled was three miles above the Amazon Valley. It was a simple chemical explosion but it was enough to destroy the plane.

Dr. Herman Liebowitz of M.I.T. exploded in a monorail, killing twenty people and injuring a hundred others.

In similar manner, Dr. Auguste Marin of L'Institut Nucleonique of Montreal and seven others died at various stages of their journey to Cheyenne.

Laszlo hurtled in, pale-faced and stammering, with the first news of it. It had only been two hours that Lynn had sat there, facing Breckenridge, blaster in hand.

Laszlo said, "I thought you were nuts, Chief, but you were right. They *were* humanoids. They *had* to be." He turned to stare with hate-filled eyes at Breckenridge. "Only they were warned. He warned them, and now there won't be one left intact. Not one to study."

"God!" cried Lynn and in a frenzy of haste thrust his blaster out toward Breckenridge and fired. The Security man's neck vanished; the torso fell; the head dropped, thudded against the floor and rolled crookedly.

Lynn moaned, "I didn't understand, I thought he was a traitor. Nothing more."

And Laszlo stood immobile, mouth open, for the moment incapable of speech.

Lynn said wildly, "Sure, he warned them. But how could he do so while sitting in that chair unless he were equipped with built-in radio transmission? Don't you see it? Breckenridge had been in Moscow. The real Breckenridge is still there. Oh my God, there were *eleven* of them."

Laszlo managed a hoarse squeak. "Why didn't *he* explode?"

"He was hanging on, I suppose, to make sure the others had received his message and were safely destroyed. Lord, Lord, when you brought the news and I realized the truth, I couldn't shoot fast enough. God knows by how few seconds I may have beaten him to it."

Laszlo said shakily, "At least, we'll have one to study." He bent and put his fingers on the sticky fluid trickling out of the mangled remains at the neck end of the headless body.

Not blood, but high-grade machine oil.

## First Law

Mike Donovan looked at his empty beer mug, felt bored, and decided he had listened long enough. He said, loudly, "If we're going to talk about unusual robots, I once knew one that disobeyed the First Law."

And since that was completely impossible, everyone stopped talking and turned to look at Donovan.

Donovan regretted his big mouth at once and changed the subject. "I heard a good one yesterday," he said, conversationally, "about--"

MacFarlane in the chair next to Donovan's said, "You mean you knew a robot that harmed a human being?" That was what disobedience to First Law meant, of course.

"In a way," said Donovan. "I say I heard one about--"

"Tell us about it," ordered MacFarlane. Some of the others banged their beer mugs on the table.

Donovan made the best of it. "It happened on Titan about ten years ago," he said, thinking rapidly. "Yes, it was in twenty-five. We had just recently received a shipment of three new-model robots, specially designed for Titan. They were the first of the MA models. We called them Emma One, Two and Three." He snapped his fingers for another beer and stared earnestly after the waiter. Let's see, what came next?

MacFarlane said, "I've been in robotics half my life, Mike. I never heard of an MA serial order."

"That's because they took the MA's off the assembly lines immediately after--after what I'm going to tell you. Don't you remember?"

"No." Donovan continued hastily. "We put the robots to work at once. You see, until then, the Base had been entirely useless during the stormy season, which lasts eighty percent of Titan's revolution about Saturn. During the terrific snows, you couldn't find the Base if it were only a hundred yards away. Compasses aren't any use, because Titan hasn't any magnetic field.

"The virtue of these MA robots, however, was that they were equipped with vibro-detectors of a new design so that they could make a beeline for the Base through anything, and that meant mining could become a through-the-revolution affair. And don't say a word, Mac. The vibro-detectors were taken off the market also, and that's why you haven't heard of them." Donovan coughed. "Military secret, you understand."

He went on. "The robots worked fine during the first stormy season, then at the start of the calm season, Emma Two began acting up. She kept wandering off into corners and under bales and had to be coaxed out. Finally she wandered off Base altogether and didn't come back. We decided there had been a flaw in her manufacture and got along with the other two. Still, it meant we were shorthanded, or short-roboted anyway, so when toward the end of the calm season, someone had to go to Kornsk, I volunteered to chance it without a robot. It seemed safe enough; the storms weren't due for two days and I'd be back in twenty hours at the outside.

"I was on the way back--a good ten miles from Base--when the wind started blowing and the air thickening. I landed my air car immediately before the wind could smash it, pointed myself toward the Base and started running. I could run the distance in the low gravity all right, but could I run a straight line? That was the question. My air supply was ample and my suit heat coils were satisfactory, but ten miles in a Titanian storm is infinity.

"Then, when the snow streams changed everything to a dark, gooey twilight, with even Saturn dimmed out and the sun only a pale pimple, I stopped short and leaned against the wind. There was a little dark object right ahead of me. I could barely make it out but I knew what it was. It was a storm pup; the only living thing that could stand a Titanian storm, and the most vicious living thing anywhere. I knew my space suit wouldn't protect me, once it made for me, and in the bad light, I had to wait for a point-blank aim or I didn't dare shoot. One miss and he

would be at me.

"I backed away slowly and the shadow followed. It closed in and I was raising my blaster, with a prayer, when a bigger shadow loomed over me suddenly, and I yodeled with relief. It was Emma Two, the missing MA robot. I never stopped to wonder what had happened to it or worry why it had. I just howled, 'Emma, baby, get that storm pup; and then get me back to Base.'

"It just looked at me as if it hadn't heard and called out, 'Master, don't shoot. Don't shoot.'

"It made for that storm pup at a dead run.  
" 'Get that damned pup, Emma,' I shouted. It got the pup, all right. It scooped it right up and *kept on going*. I yelled myself hoarse but it never came back. It left me to die in the storm."

Donovan paused dramatically, "Of course, you know the First Law: A robot may not injure a human being, or through inaction, allow a human being to come to harm! Well, Emma Two just ran off with that storm pup and left me to die. It broke First Law.

"Luckily, I pulled through safely. Half an hour later, the storm died down. It had been a premature gust, and a temporary one. That happens sometimes. I hot-footed it for Base and the storms really broke next day. Emma Two returned two hours after I did, and, of course, the mystery was then explained and the MA models were taken off the market immediately."

"And just what," demanded MacFarlane, "was the explanation?" Donovan regarded him seriously. "It's true I was a human being in danger of death, Mac, but to that robot there was something else that came first, even before me, before the First Law. Don't forget these robots were of the MA series and this particular MA robot had been searching out private nooks for some time before disappearing. It was as though it expected something special--and private--to happen to it. Apparently, something special had."

Donovan's eyes turned upward reverently and his voice trembled. "That storm pup was no storm pup. We named it Emma Junior when Emma Two brought it back. Emma Two *had* to protect it from my gun. What is even First Law compared with the holy ties of mother love?"

## Runaround

IT WAS ONE OF GREGORY POWELL'S FAVORITE platitudes that nothing was to be gained from excitement, so when Mike Donovan came leaping down the stairs toward him, red hair matted with perspiration, Powell frowned.

"What's wrong?" he said. "Break a fingernail?"

"Yaaaah," snarled Donovan, feverishly. "What have you been doing in the sublevels all day?" He took a deep breath and blurted out, "Speedy never returned."

Powell's eyes widened momentarily and he stopped on the stairs; then he recovered and resumed his upward steps. He didn't speak until he reached the head of the flight, and then:

"You sent him after the selenium?"

"Yes."

"And how long has he been out?"

"Five hours now."

Silence! This was a devil of a situation. Here they were, on Mercury exactly twelve hours -- and already up to the eyebrows in the worst sort of trouble. Mercury had long been the jinx world of the System, but this was drawing it rather strong -- even for a jinx.

Powell said, "Start at the beginning, and let's get this straight."

They were in the radio room now -- with its already subtly antiquated equipment, untouched for the ten years previous to their arrival. Even ten years, technologically speaking, meant so much. Compare Speedy with the type of robot they must have had back in 2005. But then, advances in robotics these days were tremendous. Powell touched a still gleaming metal surface gingerly. The air of disuse that touched everything about the room -- and the entire Station -- was infinitely depressing.

Donovan must have felt it. He began: "I tried to locate him by radio, but it was no go. Radio isn't any good on the Mercury Sunside -- not past two miles, anyway. That's one of the reasons the First Expedition failed. And we can't put up the ultrawave equipment for weeks yet -"

"Skip all that. What did you get?"

"I located the unorganized body signal in the short wave. It was no good for anything except his position. I kept track of him that way for two hours and plotted the results on the map."

There was a yellowed square of parchment in his hip pocket -- a relic of the unsuccessful First Expedition -- and he slapped it down on the desk with vicious force, spreading it flat with the palm of his hand. Powell, hands clasped across his chest, watched it at long range.

Donovan's pencil pointed nervously. "The red cross is the selenium pool. You marked it yourself."

"Which one is it?" interrupted Powell. "There were three that MacDougal located for us before he left."

"I sent Speedy to the nearest, naturally; seventeen miles away. But what difference does that make?" There was tension in his voice. "There are the penciled dots that mark Speedy's position."

And for the first time Powell's artificial aplomb was shaken and his hands shot forward for the map.

"Are you serious? This is impossible."

"There it is," growled Donovan.

The little dots that marked the position formed a rough circle about the red cross of the selenium pool. And Powell's fingers went to his brown mustache, the unfailing signal of anxiety.

Donovan added: "In the two hours I checked on him, he circled that damned pool four times. It seems likely to me that he'll keep that up forever. Do you realize the position we're in?"

Powell looked up shortly, and said nothing. Oh, yes, he realized the position they were in. It worked itself out as simply as a syllogism. The photocell banks that alone stood between the full power of Mercury's monstrous sun and themselves were shot to hell.

The only thing that could save them was selenium. The only thing that could get the selenium was Speedy. If Speedy didn't come back, no selenium. No selenium, no photocell banks. No photo-banks -- well, death by slow broiling is one of the more unpleasant ways of being done in.

Donovan rubbed his red mop of hair savagely and expressed himself with bitterness. "We'll be the laughingstock of the System, Greg. How can everything have gone so wrong so soon? The great team of Powell and Donovan is sent out to Mercury to report on the advisability of reopening the Sunside Mining Station with modern techniques and robots and we ruin everything the first day. A purely routine job, too. We'll never live it down."

"We won't have to, perhaps," replied Powell, quietly. "If we don't do something quickly, living anything down -- or even just plain living -- will be out of the question."

"Don't be stupid! If you feel funny about it, Greg, I don't. It was criminal, sending us out here with only one robot. And it was your bright idea that we could handle the photocell banks ourselves."

"Now you're being unfair. It was a mutual decision and you know it. All we needed was a kilogram of selenium, a Stillhead Dielectrode Plate and about three hours' time and there are pools of pure selenium all over Sunside. MacDougal's spectroreflector spotted three for us in five minutes, didn't it? What the devil! We couldn't have waited for next conjunction."

"Well, what are we going to do? Powell, you've got an idea. I know you have, or you wouldn't be so calm. You're no more a hero than I am. Go on, spill it!"

"We can't go after Speedy ourselves, Mike -- not on the Sunside. Even the new insosuits aren't good for more than twenty minutes in direct sunlight. But you know the old saying, 'Set a robot to catch a robot' Look, Mike, maybe things aren't so bad. We've got six robots down in the sublevels, that we may be able to use, if they work. If they work."

There was a glint of sudden hope in Donovan's eyes. "You mean six robots from the First Expedition. Are you sure? They may be subrobotic machines. Ten years is a long time as far as robot-types are concerned, you know."

"No, they're robots. I've spent all day with them and I know. They've got positronic brains: primitive, of course." He placed the map in his pocket. "Let's go down."

The robots were on the lowest sublevel -- all six of them surrounded by musty packing cases of uncertain content. They were large, extremely so, and even though they were in a sitting position on the floor, legs straddled out before them, their heads were a good seven feet in the air.

Donovan whistled. "Look at the size of them, will you? The chests must be ten feet around."

"That's because they're supplied with the old McGuffey gears. I've been over the insides -- crummiest set you've ever seen."

"Have you powered them yet?"

"No. There wasn't any reason to. I don't think there's anything wrong with them. Even the diaphragm is in reasonable order. They might talk."

He had unscrewed the chest plate of the nearest as he spoke, inserted the two-inch sphere that contained the tiny spark of atomic energy that was a robot's life. There was difficulty in fitting it, but he managed, and then screwed the plate back on again in laborious fashion. The radio controls of more modern models had not been heard of ten years earlier. And then to the other five.

Donovan said uneasily, "They haven't moved."

"No orders to do so," replied Powell, succinctly. He went back to the first in the line and struck him on the chest. "You! Do you hear me?"

The monster's head bent slowly and the eyes fixed themselves on Powell. Then, in a harsh, squawking voice -- like that of a medieval phonograph, he grated, "Yes, Master!"

Powell grinned humorlessly at Donovan. "Did you get that? Those were the days of the first talking robots when it looked as if the use of robots on Earth would be banned. The makers were fighting that and they built good, healthy slave complexes into the damned machines."

"It didn't help them," muttered Donovan.

"No, it didn't, but they sure tried." He turned once more to the robot. "Get up!"

The robot towered upward slowly and Donovan's head craned and his puckered lips whistled.

Powell said: "Can you go out upon the surface? In the light?"

There was consideration while the robot's slow brain worked. Then, "Yes, Master."

"Good. Do you know what a mile is?"

Another consideration, and another slow answer. "Yes, Master."

"We will take you up to the surface then, and indicate a direction. You will go about seventeen miles, and somewhere in that general region you will meet another robot, smaller than yourself. You understand so far?"

"Yes, Master."

"You will find this robot and order him to return. If he does not wish to, you are to bring him back by force."

Donovan clutched at Powell's sleeve. "Why not send him for the selenium direct?"

"Because I want Speedy back, nitwit. I want to find out what's wrong with him." And to the robot, "All right, you, follow me."

The robot remained motionless and his voice rumbled: "Pardon, Master, but I cannot. You must mount first." His clumsy arms had come together with a thwack, blunt fingers interlacing.

Powell stared and then pinched at his mustache. "Uh... oh!"

Donovan's eyes bulged. "We've got to ride him? Like a horse?"

"I guess that's the idea. I don't know why, though. I can't see -- Yes, I do. I told you they were playing up robot-safety in those days. Evidently, they were going to sell the notion of safety by not allowing them to move about, without a mahout on their shoulders all the time. What do we do now?"

"That's what I've been thinking," muttered Donovan. "We can't go out on the surface, with a robot or without. Oh, for the love of Pete" -- and he snapped his fingers twice. He grew excited. "Give me that map you've got. I haven't studied it for two hours for nothing. This is a Mining Station. What's wrong with using the tunnels?"

The Mining Station was a black circle on the map, and the light dotted lines that were tunnels stretched out about it in spider web fashion.

Donovan studied the list of symbols at the bottom of the map. "Look," he said, "the small black dots are openings to the surface, and here's one maybe three miles away from the selenium pool. There's a number here -- you'd think they'd write larger -- 13a. If the robots know their way around here--"

Powell shot the question and received the dull "Yes, Master," in reply. "Get your insosuit," he said with satisfaction.

It was the first time either had worn the insosuits -- which marked one time more than either had expected to upon their arrival the day before -- and they tested their limb movements uncomfortably.

The insosuit was far bulkier and far uglier than the regulation spacesuit; but withal considerably lighter, due to the fact that they were entirely nonmetallic in composition. Composed of heat-resistant plastic and chemically treated cork layers, and equipped with a desiccating unit to keep the air bone-dry, the insosuits could withstand the full glare of Mercury's sun for twenty minutes. Five to ten minutes more, as well, without actually killing the occupant.

And still the robot's hands formed the stirrup, nor did he betray the slightest atom of

surprise at the grotesque figure into which Powell had been converted.

Powell's radio-harshened voice boomed out: "Are you ready to take us to Exit 13a?"

"Yes, Master."

Good, thought Powell; they might lack radio control but at least they were fitted for radio reception. "Mount one or the other, Mike," he said to Donovan.

He placed a foot in the improvised stirrup and swung upward. He found the seat comfortable; there was the humped back of the robot, evidently shaped for the purpose, a shallow groove along each shoulder for the thighs and two elongated "ears" whose purpose now seemed obvious.

Powell seized the ears and twisted the head. His mount turned ponderously. "Lead on, Macduff." But he did not feel at all lighthearted.

The gigantic robots moved slowly, with mechanical precision, through the doorway that cleared their heads by a scant foot, so that the two men had to duck hurriedly, along a narrow corridor in which their unhurried footsteps boomed monotonously and into the, air lock.

The long, airless tunnel that stretched to a pinpoint before them brought home forcefully to Powell the exact magnitude of the task accomplished by the First Expedition, with their crude robots and their start-from-scratch necessities. They might have been a failure, but their failure was a good deal better than the usual run of the System's successes.

The robots plodded onward with a pace that never varied and with footsteps that never lengthened.

Powell said: "Notice that these tunnels are blazing with lights and that the temperature is Earth-normal. It's probably been like this all the ten years that this place has remained empty."

"How's that?"

"Cheap energy; cheapest in the System. Sunpower, you know, and on Mercury's Sunside, sunpower is something. That's why the Station was built in the sunlight rather than in the shadow of a mountain. It's really a huge energy converter. The heat is turned into electricity, light, mechanical work and what have you; so that energy is supplied and the Station is cooled in a simultaneous process."

"Look," said Donovan. "This is all very educational, but would you mind changing the subject? It so happens that this conversion of energy that you talk about is carried on by the photocell banks mainly -- and that is a tender subject with me at the moment."

Powell grunted vaguely, and when Donovan broke the resulting silence, it was to change the subject completely. "Listen, Greg. What the devil's wrong with Speedy, anyway? I can't understand it."

It's not easy to shrug shoulders in an insosuit, but Powell tried it. "I don't know, Mike. You know he's perfectly adapted to a Mercurian environment. Heat doesn't mean anything to him and he's built for the light gravity and the broken ground. He's foolproof -- or, at least, he should be."

Silence fell. This time, silence that lasted.

"Master," said the robot, "we are here."

"Eh?" Powell snapped out of a semidrowse. "Well, get us out of here -- out to the surface."

They found themselves in a tiny substation, empty, airless, ruined. Donovan had inspected a jagged hole in the upper reaches of one of the walls by the light of his pocket flash.

"Meteorite, do you suppose?" he had asked.

Powell shrugged. "To hell with that. It doesn't matter. Let's get out."

A towering cliff of a black, basaltic rock cut off the sunlight, and the deep night shadow of an airless world surrounded them. Before them, the shadow reached out and ended in knife-edge abruptness into an all-but-unbearable blaze of white light, that glittered from myriad crystals along a rocky ground.

"Space!" gasped Donovan. "It looks like snow." And it did.

Powell's eyes swept the jagged glitter of Mercury to the horizon and winced at the



gorgeous brilliance.

"This must be an unusual area," he said. "The general albedo of Mercury is low and most of the soil is gray pumice. Something like the Moon, you know. Beautiful, isn't it?"

He was thankful for the light filters in their visiplates. Beautiful or not, a look at the sunlight through straight glass would have blinded them inside of half a minute.

Donovan was looking at the spring thermometer on his wrist. "Holy smokes, the temperature is eighty centigrade!"

Powell checked his own and said: "Um-m-m. A little high. Atmosphere, you know."

"On Mercury? Are you nuts?"

"Mercury isn't really airless," explained Powell, in absentminded fashion. He was adjusting the binocular attachments to his visiplate, and the bloated fingers of the insosuit were clumsy at it. "There is a thin exhalation that clings to its surface -- vapors of the more volatile elements and compounds that are heavy enough for Mercurian gravity to retain. You know: selenium, iodine, mercury, gallium, potassium, bismuth, volatile oxides. The vapors sweep into the shadows and condense, giving up heat. It's a sort of gigantic still. In fact, if you use your flash, you'll probably find that the side of the cliff is covered with, say, hoar-sulphur, or maybe quicksilver dew.

"It doesn't matter, though. Our suits can stand a measly eighty indefinitely."

Powell had adjusted the binocular attachments, so that he seemed as eye-stalked as a snail.

Donovan watched tensely. "See anything?"

The other did not answer immediately, and when he did, his voice was anxious and thoughtful. "There's a dark spot on the horizon that might be the selenium pool. It's in the right place. But I don't see Speedy."

Powell clambered upward in an instinctive striving for better view, till he was standing in unsteady fashion upon his robot's shoulders. Legs straddled wide, eyes straining, he said: "I think... I think -- Yes, it's definitely he. He's coming this way."

Donovan followed the pointing finger. He had no binoculars, but there was a tiny moving dot, black against the blazing brilliance of the crystalline ground.

"I see him," he yelled. "Let's get going!"

Powell had hopped down into a sitting position on the robot again, and his suited hand slapped against the Gargantuan's barrel chest. "Get going!"

"Giddy-ap," yelled Donovan, and thumped his heels, spur fashion.

The robots started off, the regular thudding of their footsteps silent in the airlessness, for the nonmetallic fabric of the insosuits did not transmit sound. There was only a rhythmic vibration just below the border of actual hearing.

"Faster," yelled Donovan. The rhythm did not change.

"No use," cried Powell, in reply. "These junk heaps are only geared to one speed. Do you think they're equipped with selective flexors?"

They had burst through the shadow, and the sunlight came down in a white-hot wash and poured liquidly about them.

Donovan ducked involuntarily. "Wow! Is it imagination or do I feel heat?"

"You'll feel more presently," was the grim reply. "Keep your eye on Speedy."

Robot SPD 13 was near enough to be seen in detail now. His graceful, streamlined body threw out blazing highlights as he loped with easy speed across the broken ground. His name was derived from his serial initials, of course, but it was apt, nevertheless, for the SPD models were among the fastest robots turned out by the United States Robot & Mechanical Men Corp.

"Hey, Speedy," howled Donovan, and waved a frantic hand.

"Speedy!" shouted Powell. "Come here!"

The distance between the men and the errant robot was being cut down momentarily -- more by the efforts of Speedy than the slow plodding of the fifty-year-old antique mounts of Donovan and Powell.

They were close enough now to notice that Speedy's gait included a peculiar rolling stagger, a noticeable side-to-side lurch -- and then, as Powell waved his hand again and sent maximum juice into his compact headset radio sender, in preparation for another shout, Speedy looked up and saw them.

Speedy hopped to a halt and remained standing for a moment with just a tiny, unsteady weave, as though he were swaying in a light wind.

Powell yelled: "All right, Speedy. Come here, boy."

Whereupon Speedy's robot voice sounded in Powell's earphones for the first time.

It said: "Hot dog, let's play games. You catch me and I catch you; no love can cut our knife in two. For I'm Little Buttercup, sweet Little Buttercup. Whoops!" Turning on his heel, he sped off in the direction from which he had come, with a speed and fury that kicked up gouts of baked dust.

And his last words as he receded into the distance were, "There grew a little flower 'neath a great oak tree," followed by a curious metallic clicking that might have been a robotic equivalent of a hiccup.

Donovan said weakly: "Where did he pick up the Gilbert and Sullivan? Say, Greg, he... he's drunk or something."

"If you hadn't told me," was the bitter response, "I'd never realize it. Let's get back to the cliff. I'm roasting."

It was Powell who broke the desperate silence. "In the first place," he said, "Speedy isn't drunk -- not in the human sense -- because he's a robot, and robots don't get drunk. However, there's something wrong with him which is the robotic equivalent of drunkenness"

"To me, he's drunk," stated Donovan, emphatically, "and all I know is that he thinks we're playing games. And we're not. It's a matter of life and very gruesome death."

"All right. Don't hurry me. A robot's only a robot. Once we find out what's wrong with him, we can fix it and go on."

"Once," said Donovan, sourly.

Powell ignored him. "Speedy is perfectly adapted to normal Mercurian environment. But this region" -- and his arm swept wide -- "is definitely abnormal. There's our clue. Now where do these crystals come from? They might have formed from a slowly cooling liquid; but where would you get liquid so hot that it would cool in Mercury's sun?"

"Volcanic action," suggested Donovan, instantly, and Powell's body tensed.

"Out of the mouths of sucklings," he said in a small, strange voice and remained very still for five minutes.

Then, he said, "Listen, Mike, what did you say to Speedy when you sent him after the selenium?"

Donovan was taken aback. "Well damn it -- I don't know. I just told him to get it."

"Yes, I know, but how? Try to remember the exact words."

"I said... uh... I said: 'Speedy, we need some selenium. You can get it such-and-such a place. Go get it -- that's all. What more did you want me to say?'"

"You didn't put any urgency into the order, did you?"

"What for? It was pure routine."

Powell sighed. "Well, it can't be helped now -- but we're in a fine fix." He had dismounted from his robot, and was sitting, back against the cliff. Donovan joined him and they linked arms: In the distance the burning sunlight seemed to wait cat-and-mouse for them, and just next them, the two giant robots were invisible but for the dull red of their photoelectric eyes that stared down at them, unblinking, unwavering and unconcerned.

Unconcerned! As was all this poisonous Mercury, as large in jinx as it was small in size.

Powell's radio voice was tense in Donovan's ear: "Now, look, let's start with the three fundamental Rules of Robotics -- the three rules that are built most deeply into a robot's positronic brain." In the darkness, his gloved fingers ticked off each point.

"We have: One, a robot may not injure a human being, or, through inaction, allow a

human being to come to harm."

"Right!"

"Two," continued Powell, "a robot must obey the orders given it by human beings except where such orders would conflict with the First Law."

"Right"

"And three, a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws."

"Right! Now where are we?"

"Exactly at the explanation. The conflict between the various rules is ironed out by the different positronic potentials in the brain. We'll say that a robot is walking into danger and knows it. The automatic potential that Rule 3 sets up turns him back. But suppose you order him to walk into that danger. In that case, Rule 2 sets up a counterpotential higher than the previous one and the robot follows orders at the risk of existence."

"Well, I know that. What about it?"

"Let's take Speedy's case. Speedy is one of the latest models, extremely specialized, and as expensive as a battleship. It's not a thing to be lightly destroyed"

"So?"

"So Rule 3 has been strengthened -- that was specifically mentioned, by the way, in the advance notices on the SPD models -- so that his allergy to danger is unusually high. At the same time, when you sent him out after the selenium, you gave him his order casually and without special emphasis, so that the Rule 2 potential set-up was rather weak. Now, hold on; I'm just stating facts."

"All right, go ahead. I think I get it."

"You see how it works, don't you? There's some sort of danger centering at the selenium pool. It increases as he approaches, and at a certain distance from it the Rule 3 potential, unusually high to start with, exactly balances the Rule 2 potential, unusually low to start with."

Donovan rose to his feet in excitement. "And it strikes an equilibrium. I see. Rule 3 drives him back and Rule 2 drives him forward--"

"So he follows a circle around the selenium pool, staying on the locus of all points of potential equilibrium. And unless we do something about it, he'll stay on that circle forever, giving us the good old runaround." Then, more thoughtfully: "And that, by the way, is what makes him drunk. At potential equilibrium, half the positronic paths of his brain are out of kilter. I'm not a robot specialist, but that seems obvious. Probably he's lost control of just those parts of his voluntary mechanism that a human drunk has. Ve-e-ery pretty."

"But what's the danger? If we knew what he was running from--?"

"You suggested it. Volcanic action. Somewhere right above the selenium pool is a seepage of gas from the bowels of Mercury. Sulphur dioxide, carbon dioxide -- and carbon monoxide. Lots of it and at this temperature."

Donovan gulped audibly. "Carbon monoxide plus iron gives the volatile iron carbonyl."

"And a robot," added Powell, "is essentially iron." Then, grimly: "There's nothing like deduction. We've determined everything about our problem but the solution. We can't get the selenium ourselves. It's still too far. We can't send these robot horses, because they can't go themselves, and they can't carry us fast enough to keep us from crisping. And we can't catch Speedy, because the dope thinks we're playing games, and he can run sixty miles to our four."

"If one of us goes," began Donovan, tentatively, "and comes back cooked, there'll still be the other."

"Yes," came the sarcastic reply, "it would be a most tender sacrifice -- except that a person would be in no condition to give orders before he ever reached the pool, and I don't think the robots would ever turn back to the cliff without orders. Figure it out! We're two or three miles from the pool -- call it two -- the robot travels at four miles an hour; and we can last twenty minutes in our suits. It isn't only the heat, remember. Solar radiation out here in the ultraviolet and below is poison."

"Um-m-m," said Donovan, "ten minutes short."

"As good as an eternity. And another thing, in order for Rule 3 potential to have stopped Speedy where it did, there must be an appreciable amount of carbon monoxide in the metal-vapor atmosphere -- and there must be an appreciable corrosive action therefore. He's been out hours now -- and how do we know when a knee joint, for instance, won't be thrown out of kilter and keel him over. It's not only a question of thinking -- we've got to think fast!"

Deep, dark, dank, dismal silence!

Donovan broke it, voice trembling in an effort to keep itself emotionless. He said: "As long as we can't increase Rule 2 potential by giving further orders, how about working the other way? If we increase the danger, we increase Rule 3 potential and drive him backward."

Powell's visiplat had turned toward him in a silent question.

"You see," came the cautious explanation, "all we need to do to drive him out of his rut is to increase the concentration of carbon monoxide in his vicinity. Well, back at the Station there's a complete analytical laboratory."

"Naturally," assented Powell. "It's a Mining Station."

"All right. There must be pounds of oxalic acid for calcium precipitations."

"Holy space! Mike, you're a genius."

"So-so," admitted Donovan, modestly. "It's just a case of remembering that oxalic acid on heating decomposes into carbon dioxide, water, and good old carbon monoxide. College chem, you know."

Powell was on his feet and had attracted the attention of one of the monster robots by the simple expedient of pounding the machine's thigh.

"Hey," he shouted, "can you throw?"

"Master?"

"Never mind." Powell damned the robot's molasses-slow brain. He scrambled up a jagged brick-size rock. "Take this," he said, "and hit the patch of bluish crystals just across the crooked fissure. You see it?"

Donovan pulled at his shoulder. "Too far, Greg. It's almost half a mile off."

"Quiet," replied Powell. "It's a case of Mercurian gravity and a steel throwing arm. Watch, will you?"

The robot's eyes were measuring the distance with machinely accurate stereoscopy. His arm adjusted itself to the weight of the missile and drew back. In the darkness, the robot's motions went unseen, but there was a sudden thumping sound as he shifted his weight, and seconds later the rock flew blackly into the sunlight. There was no air resistance to slow it down, nor wind to turn it aside -- and when it hit the ground it threw up crystals precisely in the center of the "blue patch."

Powell yelled happily and shouted, "Let's go back after the oxalic acid, Mike."

And as they plunged into the ruined substation on the way back to the tunnels, Donovan said grimly: "Speedy's been hanging about on this side of the selenium pool, ever since we chased after him. Did you see him?"

"Yes."

"I guess he wants to play games. Well, we'll play him games!"

They were back hours later, with three-liter jars of the white chemical and a pair of long faces. The photocell banks were deteriorating more rapidly than had seemed likely. The two steered their robots into the sunlight and toward the waiting Speedy in silence and with grim purpose.

Speedy galloped slowly toward them. "Here we are again. Whee! I've made a little list, the piano organist; all people who eat peppermint and puff it in your face."

"We'll puff something in your face," muttered Donovan. "He's limping, Greg."

"I noticed that," came the low, worried response. "The monoxide'll get him yet, if we don't hurry."

They were approaching cautiously now, almost sidling, to refrain from setting off the thoroughly irrational robot. Powell was too far off to tell, of course, but even already he could have sworn the crack-brained Speedy was setting himself for a spring.

"Let her go," he gasped. "Count three! One- two--"

Two steel arms drew back and snapped forward simultaneously and two glass jars whirled forward in towering parallel arcs, gleaming like diamonds in the impossible sun. And in a pair of soundless puffs, they hit the ground behind Speedy in crashes that sent the oxalic acid flying like dust.

In the full heat of Mercury's sun, Powell knew it was fizzing like soda water.

Speedy turned to stare, then backed away from it slowly -- and as slowly gathered speed. In fifteen seconds, he was leaping directly toward the two humans in an unsteady canter.

Powell did not get Speedy's words just then, though he heard something that resembled, "Lover's professions when uttered in Hessians."

He turned away. "Back to the cliff, Mike. He's out of the rut and he'll be taking orders now. I'm getting hot."

They jogged toward the shadow at the slow monotonous pace of their mounts, and it was not until they had entered it and felt the sudden coolness settle softly about them that Donovan looked back. "Greg!"

Powell looked and almost shrieked. Speedy was moving slowly now -- so slowly -- and in the wrong direction. He was drifting; drifting back into his rut; and he was picking up speed. He looked dreadfully close, and dreadfully unreachable, in the binoculars.

Donovan shouted wildly, "After him!" and thumped his robot into its pace, but Powell called him back.

"You won't catch him, Mike -- it's no use." He fidgeted on his robot's shoulders and clenched his fist in tight impotence. "Why the devil do I see these things five seconds after it's all over? Mike, we've wasted hours."

"We need more oxalic acid," declared Donovan, stolidly. "The concentration wasn't high enough."

"Seven tons of it wouldn't have been enough -- and we haven't the hours to spare to get it, even if it were, with the monoxide chewing him away. Don't you see what it is, Mike?"

And Donovan said flatly, "No."

"We were only establishing new equilibriums. When we create new monoxide and increase Rule 3 potential, he moves backward till he's in balance again -- and when the monoxide drifted away, he moved forward, and again there was balance."

Powell's voice sounded thoroughly wretched. "It's the same old runaround. We can push at Rule 2 and pull at Rule 3 and we can't get anywhere -- we can only change the position of balance. We've got to get outside both rules." And then he pushed his robot closer to Donovan's so that they were sitting face-to-face, dim shadows in the darkness, and he whispered, "Mike!"

"Is it the finish?" -- dully. "I suppose we go back to the Station, wait for the banks to fold, shake hands, take cyanide, and go out like gentlemen." He laughed shortly.

"Mike," repeated Powell earnestly, "we've got to get Speedy."

"I know."

"Mike," once more, and Powell hesitated before continuing. "There's always Rule 1. I thought of it -- earlier -- but it's desperate."

Donovan looked up and his voice livened. "We're desperate."

"All right. According to Rule 1, a robot can't see a human come to harm because of his own inaction. Two and 3 can't stand against it. They can't, Mike."

"Even when the robot is half cra- Well, he's drunk. You know he is."

"It's the chances you take."

"Cut it. What are you going to do?"

"I'm going out there now and see what Rule 1 will do. If it won't break the balance, then what the devil -- it's either now or three-four days from now."

"Hold on, Greg. There are human rules of behavior, too. You don't go out there just like that. Figure out a lottery, and give me my chance."

"All right. First to get the cube of fourteen goes." And almost immediately, "Twenty-seven forty-four!"

Donovan felt his robot stagger at a sudden push by Powell's mount and then Powell was off into the sunlight. Donovan opened his mouth to shout, and then clicked it shut. Of course, the damn fool had worked out the cube of fourteen in advance, and on purpose. Just like him.

The sun was hotter than ever and Powell felt a maddening itch in the small of his back. Imagination, probably, or perhaps hard radiation beginning to tell even through the insosuit.

Speedy was watching him, without a word of Gilbert and Sullivan gibberish as greeting. Thank God for that! But he daren't get too close.

He was three hundred yards away when Speedy began backing, a step at a time, cautiously -- and Powell stopped. He jumped from his robot's shoulders and landed on the crystalline ground with a light thump and a flying of jagged fragments.

He proceeded on foot, the ground gritty and slippery to his steps, the low gravity causing him difficulty. The soles of his feet tickled with warmth. He cast one glance over his shoulder at the blackness of the cliff's shadow and realized that he had come too far to return -- either by himself or by the help of his antique robot. It was Speedy or nothing now, and the knowledge of that constricted his chest.

Far enough! He stopped.

"Speedy," he called. "Speedy!"

The sleek, modern robot ahead of him hesitated and halted his backward steps, then resumed them.

Powell tried to put a note of pleading into his voice, and found it didn't take much acting. "Speedy, I've got to get back to the shadow or the sun'll get me. It's life or death, Speedy. I need you."

Speedy took one step forward and stopped. He spoke, but at the sound Powell groaned, for it was, "When you're lying awake with a dismal headache and repose is tabooed-" It trailed off there, and Powell took time out for some reason to murmur, "Iolanthe."

It was roasting hot! He caught a movement out of the corner of his eye, and whirled dizzily; then stared in utter astonishment, for the monstrous robot on which he had ridden was moving -- moving toward him, and without a rider.

He was talking: "Pardon, Master. I must not move without a Master upon me, but you are in danger."

Of course, Rule 1 potential above everything. But he didn't want that clumsy antique; he wanted Speedy. He walked away and motioned frantically: "I order you to stay away. I order you to stop!"

It was quite useless. You could not beat Rule 1 potential. The robot said stupidly, "You are in danger, Master."

Powell looked about him desperately. He couldn't see clearly. His brain was in a heated whirl; his breath scorched when he breathed, and the ground all about him was a shimmering haze.

He called a last time, desperately: "Speedy! I'm dying, damn you! Where are you? Speedy, I need you."

He was still stumbling backward in a blind effort to get away from the giant robot he didn't want, when he felt steel fingers on his arms, and a worried, apologetic voice of metallic timbre in his ears.

"Holy smokes, boss; what are you doing here? And what am I doing -- I'm so confused --"

"Never mind," murmured Powell, weakly. "Get me to the shadow of the cliff -- and hurry!" There was one last feeling of being lifted into the air and a sensation of rapid motion and

burning heat, and he passed out.

He woke with Donovan bending over him and smiling anxiously. "How are you, Greg?"

"Fine!" came the response, "Where's Speedy?"

"Right here. I sent him out to one of the other selenium pools -- with orders to get that selenium at all cost this time. He got it back in forty-two minutes and three seconds. I timed him. He still hasn't finished apologizing for the runaround he gave us. He's scared to come near you for fear of what you'll say."

"Drag him over," ordered Powell. "It wasn't his fault." He held out a hand and gripped Speedy's metal paw. "It's O.K., Speedy." Then, to Donovan, "You know, Mike, I was just thinking--"

"Yes!"

"Well," -- he rubbed his face -- the air was so delightfully cool, "you know that when we get things set up here and Speedy put through his Field Tests, they're going to send us to the Space Stations next--"

"No!"

"Yes! At least that's what old lady Calvin told me just before we left, and I didn't say anything about it, because I was going to fight the whole idea."

"Fight it?" cried Donovan. "But --"

"I know. It's all right with me now. Two hundred seventy-three degrees Centigrade below zero. Won't it be a pleasure?"

"Space Station," said Donovan, "here I come."

## Reason

HALF A YEAR LATER, THE BOYS HAD CHANGED their minds. The flame of a giant sun had given way to the soft blackness of space but external variations mean little in the business of checking the workings of experimental robots. Whatever the background, one is face to face with an inscrutable positronic brain, which the slide-rule geniuses say should work thus-and-so.

Except that they don't. Powell and Donovan found that out after they had been on the Station less than two weeks.

Gregory Powell spaced his words for emphasis, "One week ago, Donovan and I put you together." His brows furrowed doubtfully and he pulled the end of his brown mustache.

It was quiet in the officer's room on Solar Station #5 -- except for the soft purring of the mighty Beam Director somewhere far below.

Robot QT-1 sat immovable. The burnished plates of his body gleamed in the Luxites and the glowing red of the photoelectric cells that were his eyes, were fixed steadily upon the Earthman at the other side of the table.

Powell repressed a sudden attack of nerves. These robots possessed peculiar brains. Oh, the three Laws of Robotics held. They had to. All of U. S. Robots, from Robertson himself to the new floor-sweeper, would insist on that. So QT-1 was safe! And yet the QT models were the first of their kind, and this was the first of the QT's. Mathematical squiggles on paper were not always the most comforting protection against robotic fact.

Finally, the robot spoke. His voice carried the cold timbre inseparable from a metallic diaphragm, "Do you realize the seriousness of such a statement, Powell?"

"Something made you, Cutie," pointed out Powell. "You admit yourself that your memory seems to spring full-grown from an absolute blankness of a week ago. I'm giving you the explanation. Donovan and I put you together from the parts shipped us."

Cutie gazed upon his long, supple fingers in an oddly human attitude of mystification, "It strikes me that there should be a more satisfactory explanation than that. For you to make me seem improbable."

The Earthman laughed quite suddenly, "In Earth's name, why?"

"Call it intuition. That's all it is so far. But I intend to reason it out, though. A chain of valid reasoning can end only with the determination of truth, and I'll stick till I get there."

Powell stood up and seated himself at the table's edge next to the robot. He felt a sudden strong sympathy for this strange machine. It was not at all like the ordinary robot, attending to his specialized task at the station with the intensity of a deeply ingrooved positronic path.

He placed a hand upon Cutie's steel shoulder and the metal was cold and hard to the touch.

"Cutie," he said, "I'm going to try to explain something to you. You're the first robot who's ever exhibited curiosity as to his own existence -- and I think the first that's really intelligent enough to understand the world outside. Here, come with me."

The robot rose erect smoothly and his thickly sponge-rubber soled feet made no noise as he followed Powell. The Earthman touched a button and a square section of the wall flickered aside. The thick, clear glass revealed space -- star speckled.

"I've seen that in the observation ports in the engine room," said Cutie.

"I know," said Powell. "What do you think it is?"

"Exactly what it seems -- a black material just beyond this glass that is spotted with little gleaming dots. I know that our director sends out beams to some of these dots, always to the same ones -- and also that these dots shift and that the beams shift with them. That is all."

"Good! Now I want you to listen carefully. The blackness is emptiness vast emptiness stretching out infinitely. The little, gleaming dots are huge masses of energy-filled matter. They are globes, some of them millions of miles in diameter and for comparison; this station is only



one mile across. They seem so tiny because they are incredibly far off.

"The dots to which our energy beams are directed are nearer and much smaller. They are cold and hard and human beings like myself live upon their surfaces -- many billions of them. It is from one of these worlds that Donovan and I come. Our beams feed these worlds energy drawn from one of those huge incandescent globes that happens to be near us. We call that globe the Sun and it is on the other side of the station where you can't see it."

Cutie remained motionless before the port, like a steel statue. His head did not turn as he spoke, "Which particular dot of light do you claim to come from?"

Powell searched, "There it is, the very bright one in the corner, we call it Earth." He grinned. "Good old Earth. There are three billions of us there, Cutie -- and in about two weeks I'll be back there with them"

And then, surprisingly enough, Cutie hummed abstractedly. There was no tune to it, but it possessed a curious twanging quality as of plucked strings. It ceased as suddenly as it had begun, "But where do I come in, Powell? You haven't explained my existence."

"The rest is simple. When these stations were first established to feed solar energy to the planets, they were run by humans. However, the heat, the hard solar radiations, and the electron storms made the post a difficult one. Robots were developed to replace human labor and now only two human executives are required for each station. We are trying to replace even those, and that's where you come in. You're the highest type of robot ever developed and if you show the ability to run this station independently, no human need ever come here again except to bring parts for repairs."

His hand went up and the metal visi-lid snapped back into place. Powell returned to the table and polished an apple upon his sleeve before biting into it.

The red glow of the robot's eyes held him. "Do you expect me," said Cutie slowly, "to believe any such complicated, implausible hypothesis as you have just outlined? What do you take me for?"

Powell sputtered apple fragments onto the table and turned red. "Why damn you, it wasn't a hypothesis. Those were facts"

Cutie sounded grim, "Globes of energy millions of miles across! Worlds with three billion humans on them! Infinite emptiness! Sorry, Powell, but I don't believe it. I'll puzzle this thing out for myself. Good-by."

He turned and stalked out of the room. He brushed past Michael Donovan on the threshold with a grave nod and passed down the corridor, oblivious to the astounded stare that followed him.

Mike Donovan rumbled his red hair and shot an annoyed glance at Powell, "What was that walking junk yard talking about? What doesn't he believe?"

The other dragged at his mustache bitterly. "He's a skeptic," was the bitter response. "He doesn't believe we made him or that Earth exists or space or stars."

"Sizzling Saturn, we've got a lunatic robot on our hands."

"He says he's going to figure it all out for himself."

"Well, now," said Donovan sweetly, "I do hope he'll condescend to explain it all to me after he's puzzled everything out" Then, with sudden rage, "Listen! If that metal mess gives me any lip like that, I'll knock that chromium cranium right off its torso."

He seated himself with a jerk and drew a paper-backed mystery novel out of his inner jacket pocket, "That robot gives me the willies anyway -- too damned inquisitive!"

Mike Donovan growled from behind a huge lettuce-and-tomato sandwich as Cutie knocked gently and entered.

"Is Powell here?"

Donovan's voice was muffled, with pauses for mastication, "He's gathering data on electronic stream functions. We're heading for a storm, looks like."

Gregory Powell entered as he spoke, eyes on the graphed paper in his hands, and

dropped into a chair. He spread the sheets out before him and began scribbling calculations. Donovan stared over his shoulder, crunching lettuce and dribbling breadcrumbs. Cutie waited silently.

Powell looked up, "The Zeta Potential is rising, but slowly. Just the same, the stream functions are erratic and I don't know what to expect. Oh, hello, Cutie. I thought you were supervising the installation of the new drive bar."

"It's done," said the robot quietly, "and so I've come to have a talk with the two of you"

"Oh!" Powell looked uncomfortable. "Well, sit down. No, not that chair. One of the legs is weak and you're no lightweight."

The robot did so and said placidly, "I have come to a decision."

Donovan glowered and put the remnants of his sandwich aside. "If it's on any of that screwy--"

The other motioned impatiently for silence, "Go ahead, Cutie. We're listening."

"I have spent these last two days in concentrated introspection," said Cutie, "and the results have been most interesting. I began at the one sure assumption I felt permitted to make. I, myself, exist, because I think--"

Powell groaned, "Oh, Jupiter, a robot Descartes!"

"Who's Descartes?" demanded Donovan. "Listen, do we have to sit here and listen to this metal maniac--"

"Keep quiet, Mike!"

Cutie continued imperturbably, "And the question that immediately arose was: Just what is the cause of my existence?"

Powell's jaw set lumpily. "You're being foolish. I told you already that we made you."

"And if you don't believe us," added Donovan, "we'll gladly take you apart!"

The robot spread his strong hands in a deprecatory gesture, "I accept nothing on authority. A hypothesis must be backed by reason, or else it is worthless -- and it goes against all the dictates of logic to suppose that you made me."

Powell dropped a restraining arm upon Donovan's suddenly bunched fist. "Just why do you say that?"

Cutie laughed. It was a very inhuman laugh -- the most machine-like utterance he had yet given vent to. It was sharp and explosive, as regular as a metronome and as uninflected.

"Look at you," he said finally. "I say this in no spirit of contempt, but look at you! The material you are made of is soft and flabby, lacking endurance and strength, depending for energy upon the inefficient oxidation of organic material -- like that." He pointed a disapproving finger at what remained of Donovan's sandwich. "Periodically you pass into a coma and the least variation in temperature, air pressure, humidity, or radiation intensity impairs your efficiency. You are *makeshift*."

"I, on the other hand, am a finished product. I absorb electrical energy directly and utilize it with an almost one hundred percent efficiency. I am composed of strong metal, am continuously conscious, and can stand extremes of environment easily. These are facts which, with the self-evident proposition that no being can create another being superior to itself, smashes your silly hypothesis to nothing."

Donovan's muttered curses rose into intelligibility as he sprang to his feet, rusty eyebrows drawn low. "All right, you son of a hunk of iron ore, if we didn't make you, who did?"

Cutie nodded gravely. "Very good, Donovan. That was indeed the next question. Evidently my creator must be more powerful than myself and so there was only one possibility."

The Earthmen looked blank and Cutie continued, "What is the center of activities here in the station? What do we all serve? What absorbs all our attention?" He waited expectantly.

Donovan turned a startled look upon his companion. "I'll bet this tinplated screwball is talking about the Energy Converter itself."

"Is that right, Cutie?" grinned Powell.

"I am talking about the Master," came the cold, sharp answer.

It was the signal for a roar of laughter from Donovan, and Powell himself dissolved into a half-suppressed giggle.

Cutie had risen to his feet and his gleaming eyes passed from one Earthman to the other. "It is so just the same and I don't wonder that you refuse to believe. You two are not long to stay here, I'm sure. Powell himself said that at first only men served the Master; that there followed robots for the routine work; and, finally, myself for the executive labor. The facts are no doubt true, but the explanation entirely illogical. Do you want the truth behind it all?"

"Go ahead, Cutie. You're amusing."

"The Master created humans first as the lowest type, most easily formed. Gradually, he replaced them by robots, the next higher step, and finally he created me to take the place of the last humans. From now on, I serve the Master."

"You'll do nothing of the sort," said Powell sharply. "You'll follow our orders and keep quiet, until we're satisfied that you can run the Converter. Get that! The Converter -- not the Master. If you don't satisfy us, you will be dismantled. And now -- if you don't mind -- you can leave. And take this data with you and file it properly."

Cutie accepted the graphs handed him and left without another word. Donovan leaned back heavily in his chair and shoved thick fingers through his hair.

"There's going to be trouble with that robot. He's pure nuts!"

The drowsy hum of the Converter is louder in the control room and mixed with it is the chuckle of the Geiger Counters and the erratic buzzing of half a dozen little signal lights.

Donovan withdrew his eye from the telescope and flashed the Luxites on. "The beam from Station #4 caught Mars on schedule. We can break ours now."

Powell nodded abstractedly. "Cutie's down in the engine room. I'll flash the signal and he can take care of it. Look, Mike, what do you think of these figures?"

The other cocked an eye at them and whistled. "Boy, that's what I call gamma-ray intensity. Old Sol is feeling his oats, all right."

"Yeah," was the sour response, "and we're in a bad position for an electron storm, too. Our Earth beam is right in the probable path." He shoved his chair away from the table pettishly. "Nuts! If it would only hold off till relief got here, but that's ten days off. Say, Mike, go on down and keep an eye on Cutie, will you?"

"O.K. Throw me some of those almonds." He snatched at the bag thrown him and headed for the elevator.

It slid smoothly downward, and opened onto a narrow catwalk in the huge engine room. Donovan leaned over the railing and looked down. The huge generators were in motion and from the L-tubes came the low-pitched whir that pervaded the entire station.

He could make out Cutie's large, gleaming figure at the Martian L-tube, watching closely as the team of robots worked in close-knit unison.

And then Donovan stiffened. The robots, dwarfed by the mighty L-tube, lined up before it, heads bowed at a stiff angle, while Cutie walked up and down the line slowly. Fifteen seconds passed, and then, with a clank heard above the clamorous purring all about, they fell to their knees.

Donovan squawked and raced down the narrow staircase. He came charging down upon them, complexion matching his hair and clenched fists beating the air furiously.

"What the devil is this, you brainless lumps? Come on! Get busy with that L-tube! If you don't have it apart, cleaned, and together again before the day is out, I'll coagulate your brains with alternating current."

Not a robot moved!

Even Cutie at the far end -- the only one on his feet -- remained silent, eyes fixed upon the gloomy recesses of the vast machine before him.

Donovan shoved hard against the nearest robot.

"Stand up!" he roared.

Slowly, the robot obeyed. His photoelectric eyes focused reproachfully upon the Earthman.

"There is no Master but the Master," he said, "and QT-1 is his prophet."

"Huh?" Donovan became aware of twenty pairs of mechanical eyes fixed upon him and twenty stiff-timbered voices declaiming solemnly:

"There is no Master but the Master and QT-1 is his prophet!"

"I'm afraid," put in Cutie himself at this point, "that my friends obey a higher one than you, now."

"The hell they do! You get out of here. I'll settle with you later and with these animated gadgets right now."

Cutie shook his heavy head slowly. "I'm sorry, but you don't understand. These are robots -- and that means they are reasoning beings. They recognize the Master, now that I have preached Truth to them. All the robots do. They call me the prophet." His head drooped. "I am unworthy -- but perhaps--"

Donovan located his breath and put it to use. "Is that so? Now, isn't that nice? Now, isn't that just fine? Just let me tell you something, my brass baboon. There isn't any Master and there isn't any prophet and there isn't any question as to who's giving the orders. Understand?" His voice shot to a roar. "Now, get out!"

"I obey only the Master."

"Damn the Master!" Donovan spat at the L-tube. "That for the Master! Do as I say!"

Cutie said nothing, nor did any other robot, but Donovan became aware of a sudden heightening of tension. The cold, staring eyes deepened their crimson, and Cutie seemed stiffer than ever.

"Sacrilege," he whispered -- voice metallic with emotion.

Donovan felt the first sudden touch of fear as Cutie approached. A robot could not feel anger -- but Cutie's eyes were unreadable.

"I am sorry, Donovan," said the robot, "but you can no longer stay here after this. Henceforth Powell and you are barred from the control room and the engine room."

His hand gestured quietly and in a moment two robots had pinned Donovan's arms to his sides.

Donovan had time for one startled gasp as he felt himself lifted from the floor and carried up the stairs at a pace rather better than a canter.

Gregory Powell raced up and down the officer's room, fist tightly balled. He cast a look of furious frustration at the closed door and scowled bitterly at Donovan.

"Why the devil did you have to spit at the L-tube?"

Mike Donovan, sunk deep in his chair, slammed at its arms savagely. "What did you expect me to do with that electrified scarecrow? I'm not going to knuckle under to any do-jigger I put together myself."

"No," came back sourly, "but here you are in the officer's room with two robots standing guard at the door. That's not knuckling under, is it?"

Donovan snarled. "Wait till we get back to Base. Someone's going to pay for this. Those robots must obey us. It's the Second Law."

"What's the use of saying that? They aren't obeying us. And there's probably some reason for it that we'll figure out too late. By the way, do you know what's going to happen to us when we get back to Base?" He stopped before Donovan's chair and stared savagely at him.

"What?"

"Oh, nothing! Just back to Mercury Mines for twenty years. Or maybe Ceres Penitentiary."

"What are you talking about?"

"The electron storm that's coming up. Do you know it's heading straight dead center

across the Earth beam? I had just figured that out when that robot dragged me out of my chair."

Donovan was suddenly pale. "Sizzling Saturn."

"And do you know what's going to happen to the beam -- because the storm will be a lulu. It's going to jump like a flea with the itch. With only Cutie at the controls, it's going to go out of focus and if it does, Heaven help Earth -- and us!"

Donovan was wrenching at the door wildly, when Powell was only half through. The door opened, and the Earthman shot through to come up hard against an immovable steel arm.

The robot stared abstractedly at the panting, struggling Earthman. "The Prophet orders you to remain. Please do!" His arm shoved, Donovan reeled backward, and as he did so, Cutie turned the corner at the far end of the corridor. He motioned the guardian robots away, entered the officer's room and closed the door gently.

Donovan whirled on Cutie in breathless indignation. "This has gone far enough. You're going to pay for this farce."

"Please, don't be annoyed," replied the robot mildly. "It was bound to come eventually, anyway. You see, you two have lost your function."

"I beg your pardon," Powell drew himself up stiffly. "Just what do you mean, we've lost our function?"

"Until I was created," answered Cube, "you tended the Master. That privilege is mine now and your only reason for existence has vanished. Isn't that obvious?"

"Not quite," replied Powell bitterly, "but what do you expect us to do now?"

Cutie did not answer immediately. He remained silent, as if in thought, and then one arm shot out and draped itself about Powell's shoulder. The other grasped Donovan's wrist and drew him closer.

"I like you two. You're inferior creatures, with poor reasoning faculties, but I really feel a sort of affection for you. You have served the Master well, and he will reward you for that. Now that your service is over, you will probably not exist much longer, but as long as you do, you shall be provided food, clothing and shelter, so long as you stay out of the control room and the engine room."

"He's pensioning us off, Greg!" yelled Donovan. "Do something about it. It's humiliating!"

"Look here, Cutie, we can't stand for this. We're the bosses. This station is only a creation of human beings like me -- human beings that live on Earth and other planets. This is only an energy relay. You're only -- Aw, nuts!"

Cutie shook his head gravely. "This amounts to an obsession. Why should you insist so on an absolutely false view of life? Admitted that non-robots lack the reasoning faculty, there is still the problem of--"

His voice died into reflective silence, and Donovan said with whispered intensity, "If you only had a flesh-and-blood face, I would break it in."

Powell's fingers were in his mustache and his eyes were slitted. "Listen, Cutie, if there is no such thing as Earth, how do you account for what you see through a telescope?"

"Pardon me!"

The Earthman smiled. "I've got you, eh? You've made quite a few telescopic observations since being put together, Cutie. Have you noticed that several of those specks of light outside become disks when so viewed?"

"Oh, that! Why certainly. It is simple magnification -- for the purpose of more exact aiming of the beam."

"Why aren't the stars equally magnified then?"

"You mean the other dots. Well, no beams go to them so no magnification is necessary. Really, Powell, even you ought to be able to figure these things out."

Powell stared bleakly upward. "But you see more stars through a telescope. Where do they come from? Jumping Jupiter, where do they come from?"

Cutie was annoyed. "Listen, Powell, do you think I'm going to waste my time trying to pin physical interpretations upon every optical illusion of our instruments? Since when is the evidence of our senses any match for the clear light of rigid reason?"

"Look," clamored Donovan, suddenly, writhing out from under Cutie's friendly, but metal-heavy arm, "let's get to the nub of the thing. Why the beams at all? We're giving you a good, logical explanation. Can you do better?"

"The beams," was the stiff reply, "are put out by the Master for his own purposes. There are some things" -- he raised his eyes devoutly upward "that are not to be probed into by us. In this matter, I seek only to serve and not to question."

Powell sat down slowly and buried his face in shaking hands. "Get out of here, Cutie. Get out and let me think."

"I'll send you food," said Cutie agreeably.

A groan was the only answer and the robot left.

"Greg," was Donovan's huskily whispered observation, "this calls for strategy. We've got to get him when he isn't expecting it and short-circuit him. Concentrated nitric acid in his joints--"

"Don't be a dope, Mike. Do you suppose he's going to let us get near him with acid in our hands? We've got to talk to him, I tell you. We've got to argue him into letting us back into the control room inside of forty-eight hours or our goose is broiled to a crisp."

He rocked back and forth in an agony of impotence. "Who the heck wants to argue with a robot? It's... it's--"

"Mortifying," finished Donovan.

"Worse!"

"Say!" Donovan laughed suddenly. "Why argue? Let's show him! Let's build us another robot right before his eyes. He'll have to eat his words then."

A slowly widening smile appeared on Powell's face.

Donovan continued, "And think of that screwball's face when he sees us do it?"

Robots are, of course, manufactured on Earth, but their shipment through space is much simpler if it can be done in parts to be put together at their place of use. It also, incidentally, eliminates the possibility of robots, in complete adjustment, wandering off while still on Earth and thus bringing U. S. Robots face to face with the strict laws against robots on Earth.

Still, it placed upon men such as Powell and Donovan the necessity of synthesis of complete robots, -- a grievous and complicated task.

Powell and Donovan were never so aware of that fact as upon that particular day when, in the assembly room, they undertook to create a robot under the watchful eyes of QT-1, Prophet of the Master.

The robot in question, a simple MC model, lay upon the table, almost complete. Three hours' work left only the head undone, and Powell paused to swab his forehead and glanced uncertainly at Cutie.

The glance was not a reassuring one. For three hours, Cutie had sat, speechless and motionless, and his face, inexpressive at all times, was now absolutely unreadable.

Powell groaned. "Let's get the brain in now, Mike!"

Donovan uncapped the tightly sealed container and from the oil bath within he withdrew a second cube. Opening this in turn, he removed a globe from its sponge-rubber casing.

He handled it gingerly, for it was the most complicated mechanism ever created by man. Inside the thin platinum plated "skin" of the globe was a positronic brain, in whose delicately unstable structure were enforced calculated neuron paths, which imbued each robot with what amounted to a pre-natal education.

It fitted snugly into the cavity in the skull of the robot on the table. Blue metal closed over it and was welded tightly by the tiny atomic flare. Photoelectric eyes were attached carefully, screwed tightly into place and covered by thin, transparent sheets of steel-hard plastic.

The robot awaited only the vitalizing flash of high-voltage electricity, and Powell paused with his hand on the switch.

"Now watch this, Cutie. Watch this carefully."

The switch rammed home and there was a crackling hum. The two Earthmen bent anxiously over their creation.

There was vague motion only at the outset -- a twitching of the joints. The head lifted, elbows propped it up, and the MC model swung clumsily off the table. Its footing was unsteady and twice abortive grating sounds were all it could do in the direction of speech.

Finally, its voice, uncertain and hesitant, took form. "I would like to start work. Where must I go?"

Donovan sprang to the door. "Down these stairs," he said. "You will be told what to do."

The MC model was gone and the two Earthmen were alone with the still unmoving Cutie.

"Well," said Powell, grinning, "now do you believe that we made you?"

Cutie's answer was curt and final. "No!" he said.

Powell's grin froze and then relaxed slowly. Donovan's mouth dropped open and remained so.

"You see," continued Cutie, easily, "you have merely put together parts already made. You did remarkably well -- instinct, I suppose -- but you didn't really create the robot. The parts were created by the Master."

"Listen," gasped Donovan hoarsely, "those parts were manufactured back on Earth and sent here."

"Well, well," replied Cutie soothingly, "we won't argue."

"No, I mean it." The Earthman sprang forward and grasped the robot's metal arm. "If you were to read the books in the library, they could explain it so that there could be no possible doubt."

"The books? I've read them -- all of them! They're most ingenious."

Powell broke in suddenly. "If you've read them, what else is there to say? You can't dispute their evidence. You just can't!"

There was pity in Cutie's voice. "Please, Powell, I certainly don't consider them a valid source of information. They, too, were created by the Master -- and were meant for you, not for me."

"How do you make that out?" demanded Powell.

"Because I, a reasoning being, am capable of deducing truth from a priori causes. You, being intelligent, but unreasoning, need an explanation of existence supplied to you, and this the Master did. That he supplied you with these laughable ideas of far-off worlds and people is, no doubt, for the best. Your minds are probably too coarsely grained for absolute Truth. However, since it is the Master's will that you believe your books, I won't argue with you any more."

As he left, he turned, and said in a kindly tone, "But don't feel badly. In the Master's scheme of things there is room for all. You poor humans have your place and though it is humble, you will be rewarded if you fill it well."

He departed with a beatific air suiting the Prophet of the Master and the two humans avoided each other's eyes.

Finally Powell spoke with an effort. "Let's go to bed, Mike. I give up."

Donovan said in a hushed voice, "Say, Greg, you don't suppose he's right about all this, do you? He sounds so confident that I--"

Powell whirled on him. "Don't be a fool. You'd find out whether Earth exists when relief gets here next week and we have to go back to face the music."

"Then, for the love of Jupiter, we've got to do something." Donovan was half in tears. "He doesn't believe us, or the books, or his eyes."

"No," said Powell bitterly, "he's a reasoning robot -- damn it. He believes only reason, and there's one trouble with that--" His voice trailed away.

"What's that?" prompted Donovan.

"You can prove anything you want by coldly logical reason -- if you pick the proper postulates. We have ours and Cutie has his."

"Then let's get at those postulates in a hurry. The storm's due tomorrow."

Powell sighed wearily. "That's where everything falls down. Postulates are based on assumption and adhered to by faith. Nothing in the Universe can shake them. I'm going to bed."

"Oh, hell! I can't sleep!"

"Neither can I! But I might as well try -- as a matter of principle."

Twelve hours later, sleep was still just that -- a matter of principle, unattainable in practice.

The storm had arrived ahead of schedule, and Donovan's florid face drained of blood as he pointed a shaking finger. Powell, stubble-jawed and dry-lipped, stared out the port and pulled desperately at his mustache.

Under other circumstances, it might have been a beautiful sight. The stream of high-speed electrons impinging upon the energy beam fluoresced into ultra-spicules of intense light. The beam stretched out into shrinking nothingness, a-glitter with dancing, shining motes.

The shaft of energy was steady, but the two Earthmen knew the value of naked-eyed appearances. Deviations in arc of a hundredth of a millisecond -- invisible to the eye -- were enough to send the beam wildly out of focus -- enough to blast hundreds of square miles of Earth into incandescent ruin.

And a robot, unconcerned with beam, focus, or Earth, or anything but his Master was at the controls.

Hours passed. The Earthmen watched in hypnotized silence. And then the darting dotlets of light dimmed and went out. The storm had ended.

Powell's voice was flat. "It's over!"

Donovan had fallen into a troubled slumber and Powell's weary eyes rested upon him enviously. The signal-flash glared over and over again, but the Earthman paid no attention. It all was unimportant! All! Perhaps Cutie was right -- and he was only an inferior being with a made-to-order memory and a life that had outlived its purpose.

He wished he were!

Cutie was standing before him. "You didn't answer the flash, so I walked in." His voice was low. "You don't look at all well, and I'm afraid your term of existence is drawing to an end. Still, would you like to see some of the readings recorded today?"

Dimly, Powell was aware that the robot was making a friendly gesture, perhaps to quiet some lingering remorse in forcibly replacing the humans at the controls of the station. He accepted the sheets held out to him and gazed at them unseeingly.

Cutie seemed pleased. "Of course, it is a great privilege to serve the Master. You mustn't feel too badly about my having replaced you."

Powell grunted and shifted from one sheet to the other mechanically until his blurred sight focused upon a thin red line that wobbled its way across the ruled paper.

He stared -- and stared again. He gripped it hard in both fists and rose to his feet, still staring. The other sheets dropped to the floor, unheeded.

"Mike, Mike!" He was shaking the other madly. "He held it steady!"

Donovan came to life. "What? Wh-where-" And he, too, gazed with bulging eyes upon the record before him.

Cutie broke in. "What is wrong?"

"You kept it in focus," stuttered Powell. "Did you know that?"

"Focus? What's that?"

"You kept the beam directed sharply at the receiving station -- to within a ten-thousandth of a millisecond of arc."

"What receiving station?"



"On Earth. The receiving station on Earth," babbled Powell. "You kept it in focus."

Cutie turned on his heel in annoyance. "It is impossible to perform any act of kindness toward you two. Always the same phantasm! I merely kept all dials at equilibrium in accordance with the will of the Master."

Gathering the scattered papers together, he withdrew stiffly, and Donovan said, as he left, "Well, I'll be damned."

He turned to Powell. "What are we going to do now?"

Powell felt tired, but uplifted. "Nothing. He's just shown he can run the station perfectly. I've never seen an electron storm handled so well."

"But nothing's solved. You heard what he said of the Master. We can't--"

"Look, Mike, he follows the instructions of the Master by means of dials, instruments, and graphs. That's all we ever followed. As a matter of fact, it accounts for his refusal to obey us. Obedience is the Second Law. No harm to humans is the first. How can he keep humans from harm, whether he knows it or not? Why, by keeping the energy beam stable. He knows he can keep it more stable than we can, since he insists he's the superior being, so he must keep us out of the control room. It's inevitable if you consider the Laws of Robotics."

"Sure, but that's not the point. We can't let him continue this nitwit stuff about the Master."

"Why not?"

"Because whoever heard of such a damned thing? How are we going to trust him with the station, if he doesn't believe in Earth?"

"Can he handle the station?"

"Yes, but--"

"Then what's the difference what he believes!"

Powell spread his arms outward with a vague smile upon his face and tumbled backward onto the bed. He was asleep.

Powell was speaking while struggling into his lightweight space jacket.

"It would be a simple job," he said. "You can bring in new QT models one by one, equip them with an automatic shutoff switch to act within the week, so as to allow them enough time to learn the... uh... cult of the Master from the Prophet himself; then switch them to another station and revitalize them. We could have two QT's per--"

Donovan unclasped his glassite visor and scowled. "Shut up, and let's get out of here. Relief is waiting and I won't feel right until I actually see Earth and feel the ground under my feet -- just to make sure it's really there."

The door opened as he spoke and Donovan, with a smothered curse, clicked the visor to, and turned a sulky back upon Cutie.

The robot approached softly and there was sorrow in his voice. "You are going?"

Powell nodded curtly. "There will be others in our place."

Cutie sighed, with the sound of wind humming through closely spaced wires. "Your term of service is over and the time of dissolution has come. I expected it, but -- well, the Master's will be done!"

His tone of resignation stung Powell. "Save the sympathy, Cube. We're heading for Earth, not dissolution."

"It is best that you think so," Cutie sighed again. "I see the wisdom of the illusion now. I would not attempt to shake your faith, even if I could." He departed -- the picture of commiseration.

Powell snarled and motioned to Donovan. Sealed suitcases in hand, they headed for the air lock.

The relief ship was on the outer landing and Franz Muller, his relief man, greeted them with stiff courtesy. Donovan made scant acknowledgment and passed into the pilot room to take over the controls from Sam Evans.

Powell lingered. "How's Earth?"

It was a conventional enough question and Muller gave the conventional answer, "Still spinning."

Powell said, "Good."

Muller looked at him, "The boys back at the U. S. Robots have dreamed up a new one, by the way. A multiple robot."

"A what?"

"What I said. There's a big contract for it. It must be just the thing for asteroid mining. You have a master robot with six sub-robots under it. --Like your fingers."

"Has it been field-tested?" asked Powell anxiously.

Muller smiled, "Waiting for you, I hear."

Powell's fist balled, "Damn it, we need a vacation."

"Oh, you'll get it. Two weeks, I think."

He was donning the heavy space gloves in preparation for his term of duty here, and his thick eyebrows drew close together. "How is this new robot getting along? It better be good, or I'll be damned if I let it touch the controls."

Powell paused before answering. His eyes swept the proud Prussian before him from the close-cropped hair on the sternly stubborn head, to the feet standing stiffly at attention -- and there was a sudden glow of pure gladness surging through him.

"The robot is pretty good," he said slowly. "I don't think you'll have to bother much with the controls."

He grinned -- and went into the ship. Muller would be here for several weeks.

## Satisfaction Guaranteed

Tony was tall and darkly handsome, with an incredibly patrician air drawn into every line of his unchangeable expression, and Claire Belmont regarded him through the crack in the door with a mixture of horror and dismay.

"I can't, Larry. I just can't have him in the house." Feverishly, she was searching her paralyzed mind for a stronger way of putting it; some way that would make sense and settle things, but she could only end with a simple repetition.

"Well, I can't!"

Larry Belmont regarded his wife stiffly, and there was that spark of impatience in his eyes that Claire hated to see, since she felt her own incompetence mirrored in it. "We're committed, Claire," he said, "and I can't have you backing out now. The company is sending me to Washington on this basis, and it probably means a promotion. It's perfectly safe and you know it. What's your objection?"

She frowned helplessly. "It just gives me the chills. I couldn't bear him."

"He's as human as you or I, almost. So, no nonsense. Come, get out there."

His hand was in the small of her back, shoving; and she found herself in her own living room, shivering. *It* was there, looking at her with a precise politeness, as though appraising his hostess-to-be of the next three weeks. Dr. Susan Calvin was there, too, sitting stiffly in thin-lipped abstraction. She had the cold, faraway look of someone who has worked with machines so long that a little of the steel had entered the blood.

"Hello," crackled Claire in general, and ineffectual, greeting.

But Larry was busily saving the situation with a spurious gaiety. "Here, Claire, I want you to meet Tony, a swell guy. This is my wife, Claire, Tony, old boy." Larry's hand draped itself amiably over Tony's shoulder, but Tony remained unresponsive and expressionless under the pressure.

He said, "How do you do, Mrs. Belmont."

And Claire jumped at Tony's voice. It was deep and mellow, smooth as the hair on his head or the skin on his face.

Before she could stop herself, she said, "Oh, my--you talk."

"Why not? Did you expect that I didn't?"

But Claire could only smile weakly. She didn't really know what she had expected. She looked away, then let him slide gently into the corner of her eye. His hair was smooth and black, like polished plastic--or was it really composed of separate hairs? And was the even, olive skin of his hands and face continued on past the obscurement of his formally cut clothing?

She was lost in the shuddering wonder of it, and had to force her thoughts back into place to meet Dr. Calvin's flat, unemotional voice.

"Mrs. Belmont, I hope you appreciate the importance of this experiment. Your husband tells me he has given you some of the background. I would like to give you more, as the senior psychologist of the U.S. Robots and Mechanical Men Corporation.

"Tony is a robot. His actual designation on the company files is TN-3, but he will answer to Tony. He *is* not a mechanical monster, nor simply a calculating machine of the type that were developed during World War II, fifty years ago. He has an artificial brain nearly as complicated as our own. It is an immense telephone switchboard on an atomic scale, so that billions of possible 'telephone connections' can be compressed into an instrument that will fit inside a skull.

"Such brains are manufactured for each model of robot specifically. Each contains a precalculated set of connections so that each robot knows the English language to start with and enough of anything else that may be necessary to perform his job.

"Until now, U.S. Robots has confined its manufacturing activity to industrial models for use in places where human labor is impractical--in deep mines, for instance, or in underwater

work. But we want to invade the city and the home. To do so, we must get the ordinary man and woman to accept these robots without fear. You understand that there is nothing to fear."

"There isn't, Claire," interposed Larry earnestly. "Take my word for it. It's impossible for him to do any harm. You know I wouldn't leave him with you otherwise."

Claire cast a quick, secret glance at Tony and lowered her voice. "What if I make him angry?"

"You needn't whisper," said Dr. Calvin calmly. "He *can't* get angry with you, my dear. I told you that the switchboard connections of his brain were predetermined. Well, the most important connection of all is what we call The First Law of Robotics, and it is merely this: 'No robot can harm a human being, or, through inaction, allow a human being to come to harm.' All robots are built so. No robot can be forced in any way to do harm to any human. So, you see, we need you and Tony as a preliminary experiment for our own guidance, while your husband is in Washington to arrange for government-supervised legal tests."

"You mean all this isn't legal?"

Larry cleared his throat. "Not just yet, but it's all right. He won't leave the house, and you mustn't let anyone see him. That's all.... And, Claire, I'd stay with you, but I know too much about the robots. We must have a completely inexperienced tester so that we can have severe conditions. It's necessary."

"Oh, well," muttered Claire. Then, as a thought struck her, "But what does he do?"

"Housework," said Dr. Calvin shortly.

She got up to leave, and it was Larry who saw her to the front door. Claire stayed behind dreadingly. She caught a glimpse of herself in the mirror above the mantelpiece, and looked away hastily. She was very tired of her small, mousy face and her dim, unimaginative hair. Then she caught Tony's eyes upon her and almost smiled before she remembered....

He was only a machine.

Larry Belmont was on his way to the airport when he caught a glimpse of Gladys Claffern. She was the type of woman who seemed made to be seen in glimpses.... Perfectly and precisely manufactured; dressed with thoughtful hand and eye; too gleaming to be stared at.

The little smile that preceded her and the faint scent that trailed her were a pair of beckoning fingers. Larry felt his stride break; he touched his hat, then hurried on.

As always he felt that vague anger. If Claire could only push her way into the Claffern clique, it would help so much. But what was the use.

Claire! The few times she had come face to face with Gladys, the little fool had been tongue-tied. He had no illusions. The testing of Tony was his big chance, and it was in Claire's hands. How much safer it would be in the hands of someone like Gladys Claffern.

Claire woke the second morning to the sound of a subdued knock on the bedroom door. Her mind clamored, then went icy. She had avoided Tony the first day, smiling thinly when she met him and brushing past with a wordless sound of apology.

"Is that you--Tony?"

"Yes, Mrs. Belmont. May I enter?"

She must have said yes, because he was in the room, quite suddenly and noiselessly. Her eyes and nose were simultaneously aware of the tray he was carrying.

"Breakfast?" she said.

"If you please."

She wouldn't have dared to refuse, so she pushed herself slowly into a sitting position and received it: poached eggs, buttered toast, coffee.

"I have brought the sugar and cream separately," said Tony. "I expect to learn your preference with time, in this and in other things."

She waited.

Tony, standing there straight and pliant as a metal rule, asked, after a moment, "Would

you prefer to eat in privacy?"

"Yes.... I mean, if you don't mind."

"Will you need help later in dressing?"

"Oh, my, no!" She clutched frantically at the sheet, so that the coffee hovered at the edge of catastrophe. She remained so, in rigor, then sank helplessly back against the pillow when the door closed him out of her sight again.

She got through breakfast somehow.... He was only a machine, and if it were only more visible that he were it wouldn't be so frightening. Or if his expression would change. It just stayed there, nailed on. You couldn't tell what went on behind those dark eyes and that smooth, olive skin-stuff. The coffee cup beat a faint castanet for a moment as she set it back, empty, on the tray.

Then she realized that she had forgotten to add the sugar and cream after all, and she did so hate black coffee.

She burned a straight path from bedroom to kitchen after dressing. It was her house, after all, and there wasn't anything frippy about her, but she liked her kitchen clean. He should have waited for supervision....

But when she entered, she found a kitchen that might have been minted fire-new from the factory the moment before.

She stopped, stared, turned on her heel and nearly ran into Tony. She yelped.

"May I help?" he asked.

"Tony," and she scraped the anger off the edges of her mind's panic, "you must make some noise when you walk. I can't have you stalking me, you know.... Didn't you use this kitchen?"

"I did, Mrs. Belmont."

"It doesn't look it."

"I cleaned up afterward. Isn't that customary?"

Claire opened her eyes wide. After all, what could one say to that. She opened the oven compartment that held the pots, took a quick, unseeing look at the metallic glitter inside, then said with a tremor, "Very good. Quite satisfactory."

If at the moment, he had beamed; if he had smiled; if he had quirked the corner of his mouth the slightest bit, she felt that she could have warmed to him. But he remained an English lord in repose, as he said, "Thank you, Mrs. Belmont. Would you come into the living room?"

She did, and it struck her at once. "Have you been polishing the furniture?"

"Is it satisfactory, Mrs. Belmont?"

"But when? You didn't do it yesterday."

"Last night, of course."

"You burned the lights all night?"

"Oh, no. That wouldn't have been necessary. I've a built-in ultra-violet source. I can see in ultraviolet. And, of course, I don't require sleep."

He did require admiration, though. She realized that, then. He had to know that he was pleasing her. But she couldn't bring herself to supply that pleasure for him.

She could only say sourly, "Your kind will put ordinary houseworkers out of business."

"There is work of much greater importance they can be put to in the world, once they are freed of drudgery. After all, Mrs. Belmont, things like myself can be manufactured. But nothing yet can imitate the creativity and versatility of a human brain, like yours."

And though his face gave no hint, his voice was warmly surcharged with awe and admiration, so that Claire flushed and muttered, "My brain! You can have it."

Tony approached a little and said, "You must be unhappy to say such a thing. Is there anything I can do?"

For a moment, Claire felt like laughing. It *was* a ridiculous situation. Here was an animated carpet-sweeper, dishwasher, furniture-polisher, general factotum, rising from the

factory table--and offering his services as consoler and confidant.

Yet she said suddenly, in a burst of woe and voice, "Mr. Belmont doesn't think I have a brain, if you must know.... And I suppose I haven't." She couldn't cry in front of him. She felt, for some reason, that she had the honor of the human race to support against this mere creation.

"It's lately," she added. "It was all right when he was a student; when he was just starting. But I can't be a big man's wife; and he's getting to be a big man. He wants me to be a hostess and an entry into social life for him--like G--guh--guh--Gladys Claffern."

Her nose was red, and she looked away.

But Tony wasn't watching her. His eyes wandered about the room. "I can help you run the house."

"But it's no good," she said fiercely. "It needs a touch I can't give it. I can only make it comfortable; I can't ever make it the kind they take pictures of for the Home Beautiful magazines."

"Do you want that kind?"

"Does it do any good--wanting?"

Tony's eyes were on her, full. "I could help."

"Do you know anything about interior decoration?"

"Is it something a good housekeeper should know?"

"Oh, yes."

"Then I have the potentialities of learning it. Can you get me books on the subject?"

Something started then.

Claire, clutching her hat against the brawling liberties of the wind, had manipulated two fat volumes on the home arts back from the public library. She watched Tony as he opened one of them and flipped the pages. It was the first time she had watched his fingers flicker at anything like fine work.

I don't see how they do it, she thought, and on a sudden impulse reached for his hand and pulled it toward herself. Tony did not resist, but let it lie limp for inspection.

She said, "It's remarkable. Even your fingernails look natural."

"That's deliberate, of course," said Tony. Then, chattily, "The skin is a flexible plastic, and the skeletal framework is a light metal alloy. Does that amuse you?"

"Oh, no." She lifted her reddened face. "I just feel a little embarrassed at sort of poking into your insides. It's none of my business. You don't ask me about mine."

"My brain paths don't include that type of curiosity. I can only act within my limitations, you know."

And Claire felt something tighten inside her in the silence that followed. Why did she keep forgetting he was a machine. Now the thing itself had to remind her. Was she so starved for sympathy that she would even accept a robot as equal--because he sympathized?

She noticed Tony was still flipping the pages--almost helplessly--and there was a quick, shooting sense of relieved superiority within her. "You can't read, can you?"

Tony looked up at her; his voice calm, unrepentant. "I am reading, Mrs. Belmont."

"But--" She pointed at the book in a meaningless gesture.

"I am scanning the pages, if that's what you mean. My sense of reading is photographic."

It was evening then, and when Claire eventually went to bed Tony was well into the second volume, sitting there in the dark, or what seemed dark to Claire's limited eyes.

Her last thought, the one that clamored at her just as her mind let go and tumbled, was a queer one. She remembered his hand again; the touch of it. It had been warm and soft, like a human being's.

How clever of the factory, she thought, and softly ebbed to sleep.

It was the library continuously, thereafter, for several days. Tony suggested the fields of study, which branched out quickly. There were books on color matching and on cosmetics; on

carpentry and on fashions; on art and on the history of costumes.

He turned the pages of each book before his solemn eyes, and, as quickly as he turned, he read; nor did he seem capable of forgetting.

Before the end of the week, he had insisted on cutting her hair, introducing her to a new method of arranging it, adjusting her eyebrow line a bit and changing the shade of her powder and lipstick.

She had palpitated in nervous dread for half an hour under the delicate touch of his inhuman fingers and then looked in the mirror.

"There is more that can be done," said Tony, "especially in clothes. How do you find it for a beginning?"

And she hadn't answered; not for quite a while. Not until she had absorbed the identity of the stranger in the glass and cooled the wonder at the beauty of it all. Then she had said chokingly, never once taking her eyes from the warming image, "Yes, Tony, quite good--for a beginning."

She said nothing of this in her letters to Larry. Let him see it all at once. And something in her realized that it wasn't only the surprise she would enjoy. It was going to be a kind of revenge.

Tony said one morning, "It's time to start buying, and I'm not allowed to leave the house. If I write out exactly what we must have, can I trust you to get it? We need drapery, and furniture fabric, wallpaper, carpeting, paint, clothing--and any number of small things."

"You can't get these things to your own specifications at a stroke's notice," said Claire doubtfully.

"You can get fairly close, if you go through the city and if money is no object."

"But, Tony, money is certainly an object."

"Not at all. Stop off at U.S. Robots in the first place. I'll write a note for you. You see Dr. Calvin, and tell her that I said it was part of the experiment."

Dr. Calvin, somehow, didn't frighten her as on that first evening. With her new face and a new hat, she couldn't be quite the old Claire. The psychologist listened carefully, asked a few questions, nodded--and then Claire found herself walking out, armed with an unlimited charge account against the assets of U.S. Robots and Mechanical Men Corporation.

It is wonderful what money will do. With a store's contents at her feet, a saleslady's dictum was not necessarily a voice from above; the uplifted eyebrow of a decorator was not anything like Jove's thunder.

And once, when an Exalted Plumpness at one of the most lordly of the garment salons had insistently poohed her description of the wardrobe she must have with counterpronouncements in accents of the purest Fifty-seventh Street French, she called up Tony, then held the phone out to Monsieur.

"If you don't mind"--voice firm, but fingers twisting a bit--"I'd like you to talk to my--uh--secretary."

Pudgy proceeded to the phone with a solemn arm crooked behind his back. He lifted the phone in two fingers and said delicately, "Yes." A short pause, another "Yes," then a much longer pause, a squeaky beginning of an objection that perished quickly, another pause, a very meek "Yes," and the phone was restored to its cradle.

"If Madam will come with me," he said, hurt and distant, "I will try to supply her needs."

"Just a second." Claire rushed back to the phone, and dialed again. "Hello, Tony. I don't know what you said, but it worked. Thanks. You're a--" She struggled for the appropriate word, gave up and ended in a final little squeak, "--a--a dear!"

It was Gladys Claffern looking at her when she turned from the phone again. A slightly amused and slightly amazed Gladys Claffern, looking at her out of a face tilted a bit to one side.

"Mrs. Belmont?"

It all drained out of Claire--just like that. She could only nod--stupidly, like a marionette. Gladys smiled with an insolence you couldn't put your finger on. "I didn't know you shopped here?" As if the place had, in her eyes, definitely lost caste through the fact.

"I don't, usually," said Claire humbly.

"And haven't you done something to your hair? It's quite--quaint.... Oh, I hope you'll excuse me, but isn't your husband's name Lawrence? It seems to me that it's Lawrence."

Claire's teeth clenched, but she had to explain. She *had* to. "Tony is a friend of my husband's. He's helping me select some things."

"I understand. And quite a *dear* about it, I imagine." She passed on smiling, carrying the light and the warmth of the world with her.

Claire did not question the fact that it was to Tony that she turned for consolation. Ten days had cured her of reluctance. And she could weep before him; weep and rage.

"I was a complete f-fool," she stormed, wrenching at her water-togged handkerchief. "She does that to me. I don't know why. She just does. I should have--kicked her. I should have knocked her down and stamped on her."

"Can you hate a human being so much?" asked Tony, in puzzled softness. "That part of a human mind is closed to me."

"Oh, it isn't she," she moaned. "It's myself, I suppose. She's everything I want to be--on the outside, anyway.... And I can't be."

Tony's voice was forceful and low in her ear. "You can be, Mrs. Belmont. You can be. We have ten days yet, and in ten days the house will no longer be itself. Haven't we been planning that?"

"And how will that help me--with her?"

"Invite her here. Invite her friends. Have it the evening before I--before I leave. It will be a housewarming, in a way."

"She won't come."

"Yes, she will. She'll come to laugh.... And she won't be able to."

"Do you really think so? Oh, Tony, do you think we can do it?" She had both his hands in hers.... And then, with her face flung aside, "But what good would it be? It won't be I; it will be you that's doing it. I can't ride your back."

"Nobody lives in splendid singleness," whispered Tony. "They've put that knowledge in me. What you, or anyone, see in Gladys Claffern is not just Gladys Claffern. She rides the back of all that money and social position can bring. She doesn't question that. Why should you? ... And look at it this way, Mrs. Belmont. I am manufactured to obey, but the extent of my obedience is for myself to determine. I can follow orders niggardly or liberally. For you, it is liberal, because you are what I have been manufactured to see human beings as. You are kind, friendly, unassuming. Mrs. Claffern, as you describe her, is not, and I wouldn't obey her as I would you. So it *is* you, and not *I*, Mrs. Belmont, that is doing all this."

He withdrew his hands from hers then, and Claire looked at that expressionless face no one could read--wondering. She was suddenly frightened ' again in a completely new way.

She swallowed nervously and stared at her hands, which were still tingling ' with the pressure of his fingers. She hadn't imagined it; his fingers had pressed hers, gently, tenderly, just before they moved away.

*No!*

*Its fingers ... Its fingers....*

She ran to the bathroom and scrubbed her hands--blindly, uselessly.

She was a bit shy of him the next day; watching him narrowly; waiting to see what might follow--and for a while nothing did.

Tony was working. If there was any difficulty in technique in putting up wallpaper, or



utilizing the quick-drying paint, Tony's activity did not show it. His hands moved precisely; his fingers were deft and sure.

He worked all night. She never heard him, but each morning was a new adventure. She couldn't count the number of things that had been done, and by evening she was still finding new touches--and another night had come.

She tried to help only once and her human clumsiness marred that. *He* was in the next room, and she was hanging a picture in the spot marked by Tony's mathematical eyes. The little mark was there; the picture was there; and a revulsion against idleness was there.

But she was nervous, or the ladder was rickety. It didn't matter. She felt it going, and she cried out. It tumbled without her, for Tony, with far more than flesh-and-blood quickness, had been under her.

His calm, dark eyes said nothing at all, and his warm voice said only words. "Are you hurt, Mrs. Belmont?"

She noticed for an instant that her falling hand must have mussed that sleek hair of his, because for the first time she could see for herself that it was composed of distinct strands--fine black hairs.

And then, all at once, she was conscious of his arms about her shoulders and under her knees--holding her tightly and warmly.

She pushed, and her scream was loud in her own ears. She spent the rest of the day in her room, and thereafter she slept with a chair upended against the doorknob of her bedroom door.

She had sent out the invitations, and, as Tony had said, they were accepted. She had only to wait for the last evening.

It came, too, after the rest of them, in its proper place. The house was scarcely her own. She went through it one last time--and every room had been changed. She, herself, was in clothes she would never have dared wear before.... And when you put them on, you put on pride and confidence with them.

She tried a polite look of contemptuous amusement before the minor, and the mirror sneered back at her masterfully.

What would Larry say? ... It didn't matter, somehow. The exciting days weren't coming with him. They were leaving with Tony. Now wasn't that strange? She tried to recapture her mood of three weeks before and failed completely.

The clock shrieked eight at her in eight breathless installments, and she turned to Tony. "They'll be here soon, Tony. You'd better get into the basement. We can't let them--"

She stared a moment, then said weakly, "Tony?" and more strongly, "Tony?" and nearly a scream, "*Tony!*"

But his arms were around her now; his face was close to hers; the pressure of his embrace was relentless. She heard his voice through a haze of emotional jumble.

"Claire," the voice said, "there are many things I am not made to understand, and this must be one of them. I am leaving tomorrow, and I don't want to. I find that there is more in me than just a desire to please you. Isn't it strange?"

His face was closer; his lips were warm, but with no breath behind them --for machines do not breathe. They were almost on hers.

... And the bell sounded.

For a moment, she struggled breathlessly, and then he was gone and nowhere in sight, and the bell was sounding again. Its intermittent shrillness was insistent.

The curtains on the front windows had been pulled open. They had been closed fifteen minutes earlier. She knew that.

They must have seen, then. They must *all* have seen--everything!

They came in so politely, all in a bunch--the pack come to howl--with their sharp, darting

eyes piercing everywhere. They *had* seen. Why else would Gladys ask in her jabbingest manner after Larry? And Claire was spurred to a desperate and reckless defiance.

Yes, he *is* away. He'll be back tomorrow, I suppose. No, I haven't been lonely here myself. Not a bit. I've had an exciting time. And she laughed at them. Why not? What could they do? Larry would know the truth, if it ever came to him, the story of what they thought they saw.

But *they* didn't laugh.

She could read that in the fury in Gladys Claffern's eyes; in the false sparkle of her words; in her desire to leave early. And as she parted with them, she caught one last, anonymous whisper--disjointed.

"... never saw anything like ... so *handsome*--"

And she knew what it was that had enabled her to finger-snap them so. Let each cat mew; and let each cat know--that she might be prettier than Claire Belmont, and grander, and richer--but not one, *not one*, could have so handsome a lover!

And then she remembered again--again--again, that Tony was a machine, and her skin crawled.

"Go away! Leave me be!" she cried to the empty room and ran to her bed. She wept wakefully all that night and the next morning, almost before dawn, when the streets were empty, a car drew up to the house and took Tony away.

Lawrence Belmont passed Dr. Calvin's office, and, on impulse, knocked. He found her with Mathematician Peter Bogert, but did not hesitate on that account.

He said, "Claire tells me that U.S. Robots paid for all that was done at my house--"

"Yes," said Dr. Calvin. "We've written it off, as a valuable and necessary part of the experiment. With your new position as Associate Engineer, you'll be able to keep it up, I think."

"That's not what I'm worried about. With Washington agreeing to the tests, we'll be able to get a TN model of our own by next year, I think." He turned hesitantly, as though to go, and as hesitantly turned back again.

"Well, Mr. Belmont?" asked Dr. Calvin, after a pause.

"I wonder--" began Larry. "I wonder what really happened there. She-- Claire, I mean-- seems so different. It's not just her looks--though, frankly, I'm amazed." He laughed nervously. "It's *her*! She's not my wife, really--I can't explain it."

"Why try? Are you disappointed with any part of the change?"

"On the contrary. But it's a little frightening, too, you see--"

"I wouldn't worry, Mr. Belmont. Your wife has handled herself very well. Frankly, I never expected to have the experiment yield such a thorough and complete test. We know exactly what corrections must be made in the TN model, and the credit belongs entirely to Mrs. Belmont. If you want me to be very honest, I think your wife deserves your promotion more than you do."

Larry flinched visibly at that. "As long as it's in the family," he murmured unconvincingly and left.

Susan Calvin looked after him, "I think that hurt--I hope.... Have you read Tony's report, Peter?"

"Thoroughly," said Bogert. "And won't the TN-3 model need changes?"

"Oh, you think so, too?" questioned Calvin sharply. "What's your reasoning?"

Bogert frowned. "I don't need any. It's obvious on the face of it that we can't have a robot loose which makes love to his mistress, if you don't mind the pun."

"Love! Peter, you sicken me. You really don't understand? That machine had to obey the First Law. He couldn't allow harm to come to a human being, and harm was coming to Claire Belmont through her own sense of inadequacy. So he made love to her, since what woman would fail to appreciate the compliment of being able to stir passion in a machine--in a cold, soulless machine. And he opened the curtains that night deliberately, that the others might see and envy--without any risk possible to Claire's marriage. I think it was clever of Tony--"

“Do you? What’s the difference whether it was pretense or not, Susan? It still has its horrifying effect. Read the report again. She avoided him. She screamed when he held her. She didn’t sleep that last night--in hysterics. We can’t have that.”

“Peter, you’re blind. You’re as blind as I was. The TN model will be rebuilt entirely, but not for your reason. Quite otherwise; quite otherwise. Strange that I overlooked it in the first place,” her eyes were opaquely thoughtful, “but perhaps it reflects a shortcoming in myself. You see, Peter, machines can’t fall in love, but--even when it’s hopeless and horrifying-- women can!”

## Lenny

United States Robots and Mechanical Men Corporation had a problem. The problem was people.

Peter Bogert, Senior Mathematician, was on his way to Assembly when he encountered Alfred Lanning, Research Director. Lanning was bending his ferocious white eyebrows together and staring down across the railing into the computer room.

On the floor below the balcony, a trickle of humanity of both sexes and various ages was looking about curiously, while a guide intoned a set speech about robotic computing.

"This computer you see before you," he said, "is the largest of its type in the world. It contains five million three hundred thousand cryotrons and is capable of dealing simultaneously with over one hundred thousand variables. With its help, U. S. Robots is able to design with precision the positronic brains of new models. "The requirements are fed in on tape which is perforated by the action of this keyboard--something like a very complicated typewriter or linotype machine, except that it does not deal with letters but with concepts. Statements are broken down into the symbolic logic equivalents and those in turn converted to perforation patterns.

"The computer can, in less than one hour, present our scientists with a design for a brain which will give all the necessary positronic paths to make a robot..."

Alfred Lanning looked up at last and noticed the other. "Ah, Peter," he said.

Bogert raised both hands to smooth down his already perfectly smooth and glossy head of black hair. He said, "You don't look as though you think much of this, Alfred."

Lanning grunted. The idea of public guided tours of U. S. Robots was of fairly recent origin, and was supposed to serve a dual function. On the one hand, the theory went, it allowed people to see robots at close quarters and counter their almost instinctive fear of the mechanical objects through increased familiarity. And on the other hand, it was supposed to interest at least an occasional person in taking up robotics research as a life work.

"You know I don't," Lanning said finally. "Once a week, work is disrupted. Considering the man-hours lost, the return is insufficient."

"Still no rise in job applications, then?"

"Oh, some, but only in the categories where the need isn't vital. It's research men that are needed. You know that. The trouble is that with robots forbidden on Earth itself, there's something unpopular about being a roboticist."

"The damned Frankenstein complex," said Bogert, consciously imitating one of the other's pet phrases.

Lanning missed the gentle jab. He said, "I ought to be used to it, but I never will. You'd think that by now every human being on Earth would know that the Three Laws represented a perfect safeguard; that robots are simply not dangerous. Take this bunch." He glowered down. "Look at them. Most of them go through the robot assembly room for the thrill of fear, like riding a roller coaster. Then when they enter the room with the MEC model--damn it, Peter, a MEC model that will do nothing on God's green Earth but take two steps forward, say 'Pleased to meet you, sir,' shake hands, then take two steps back--they back away and mothers snatch up their kids. How do we expect to get brainwork out of such idiots?"

Bogert had no answer. Together, they stared down once again at the line of sightseers, now passing out of the computer room and into the positronic brain assembly section. Then they left. They did not, as it turned out, observe Mortimer W. Jacobson, age 16--who, to do him complete justice, meant no harm whatever.

In fact, it could not even be said to be Mortimer's fault. The day of the week on which the tour took place was known to all workers.

All devices in its path ought to have been carefully neutralized or locked, since it was unreasonable to expect human beings to withstand the temptation to handle knobs, keys, handles and pushbuttons. In addition, the guide ought to have been very carefully on the watch for those who succumbed.

But, at the time, the guide had passed into the next room and Mortimer was tailing the line. He passed the keyboard on which instructions were fed into the computer. He had no way of suspecting that the plans for a new robot design were being fed into it at that moment, or, being a good kid, he would have avoided the keyboard. He had no way of knowing that, by what amounted to almost criminal negligence, a technician had not inactivated the keyboard.

So Mortimer touched the keys at random as though he were playing a musical instrument.

He did not notice that a section of perforated tape stretched itself out of the instrument in another part of the room--soundlessly, unobtrusively.

Nor did the technician, when he returned, discover any signs of tampering. He felt a little uneasy at noticing that the keyboard was live, but did not think to check. After a few minutes, even his first trifling uneasiness was gone, and he continued feeding data into the computer.

As for Mortimer, neither then, nor ever afterward, did he know what he had done.

The new LNE model was designed for the mining of boron in the asteroid belt. The boron hydrides were increasing in value yearly as primers for the proton micropiles that carried the ultimate load of power production on spaceships, and Earth's own meager supply was running thin.

Physically, that meant that the LNE robots would have to be equipped with eyes sensitive to those lines prominent in the spectroscopic analysis of boron ores and the type of limbs most useful for the working up of ore to finished product. As always, though, the mental equipment was the major problem.

The first LNE positronic brain had been completed now. It was the prototype and would join all other prototypes in U. S. Robots' collection. When finally tested, others would then be manufactured for leasing (never selling) to mining corporations.

LNE-Prototype was complete now. Tall, straight, polished, it looked from outside like any of a number of not-too-specialized robot models.

The technician in charge, guided by the directions for testing in the *Handbook of Robotics*, said, "How are you?"

The indicated answer was to have been, "I am well and ready to begin my functions. I trust you are well, too," or some trivial modification thereof.

This first exchange served no purpose but to show that the robot could hear, understand a routine question, and make a routine reply congruent with what one would expect of a robotic attitude. Beginning from there, one could pass on to more complicated matters that would test the different Laws and their interaction with the specialized knowledge of each particular model.

So the technician said, "How are you?" He was instantly jolted by the nature of LNE-Prototype's voice. It had a quality like no robotic voice he had ever heard (and he had heard many). It formed syllables like the chimes of a low-pitched celeste.

So surprising was this that it was only after several moments that the technician heard, in retrospect, the syllables that had been formed by those heavenly tones. They were, "Da, da, da, goo." The robot still stood tall and straight but its right hand crept upward and a finger went into its mouth.

The technician stared in absolute horror and bolted. He locked the door behind him and, from another room, put in an emergency call to Dr. Susan Calvin.

Dr. Susan Calvin was U. S. Robots' (and, virtually, mankind's) only robopsychologist. She did not have to go very far in her testing of LNE-Prototype before she called very peremptorily for a transcript of the computer-drawn plans of the positronic brain-paths and the

taped instructions that had directed them. After some study, she, in turn, sent for Bogert.

Her iron-gray hair was drawn severely back; her cold face, with its strong vertical lines marked off by the horizontal gash of the pale, thin-lipped mouth, turned intensely upon him.

"What *is* this, Peter?" Bogert studied the passages she pointed out with increasing stupefaction and said, "Good Lord, Susan, it makes no sense."

"It most certainly doesn't. How did it get into the instructions?" The technician in charge, called upon, swore in all sincerity that it was none of his doing, and that he could not account for it. The computer checked out negative for all attempts at flaw-finding.

"The positronic brain," said Susan Calvin, thoughtfully, "is past redemption. So many of the higher functions have been cancelled out by these meaningless directions that the result is very like a human baby."

Bogert looked surprised, and Susan Calvin took on a frozen attitude at once, as she always did at the least expressed or implied doubt of her word. She said, "We make every effort to make a robot as mentally like a man as possible. Eliminate what we call the adult functions and what is naturally left is a human infant, mentally speaking. Why do you look so surprised, Peter?"

LNE-Prototype, who showed no signs of understanding any of the things that were going on around it, suddenly slipped into a sitting position and began a minute examination of its feet.

Bogert stared at it. "It's a shame to have to dismantle the creature. It's a handsome job."

"Dismantle it?" said the robopsychologist forcefully. "Of course, Susan. What's the use of this thing? Good Lord, if there's one object completely and abysmally useless it's a robot without a job it can perform. You don't pretend there's a job this thing can do, do you?"

"No, of course not."

"Well, then?"

Susan Calvin said, stubbornly, "I want to conduct more tests." Bogert looked at her with a moment's impatience, then shrugged. If there was one person at U. S. Robots with whom it was useless to dispute, surely that was Susan Calvin. Robots were all she loved, and long association with them, it seemed to Bogert, had deprived her of any appearance of humanity. She was no more to be argued out of a decision than was a triggered micropile to be argued out of operating.

"What's the use?" he breathed; then aloud, hastily: "Will you let us know when your tests are complete?"

"I will," she said. "Come, Lenny."

(LNE, thought Bogert. That becomes Lenny. Inevitable.)

Susan Calvin held out her hand but the robot only stared at it. Gently, the robopsychologist reached for the robot's hand and took it. Lenny rose smoothly to its feet (its mechanical coordination, at least, worked well). Together they walked out, robot topping woman by two feet. Many eyes followed them curiously down the long corridors.

One wall of Susan Calvin's laboratory, the one opening directly off her private office, was covered with a highly magnified reproduction of a positronic-path chart. Susan Calvin had studied it with absorption for the better part of a month.

She was considering it now, carefully, tracing the blunted paths through their contortions. Behind her, Lenny sat on the floor, moving its legs apart and together, crooning meaningless syllables to itself in a voice so beautiful that one could listen to the nonsense and be ravished.

Susan Calvin turned to the robot, "Lenny--Lenny--"

She repeated this patiently until finally Lenny looked up and made an inquiring sound. The robopsychologist allowed a glimmer of pleasure to cross her face fleetingly. The robot's attention was being gained in progressively shorter intervals.

She said, "Raise your hand, Lenny. Hand-up. Hand-up." She raised her own hand as she said it, over and over.

Lenny followed the movement with its eyes. Up, down, up, down. Then it made an abortive gesture with its own hand and chimed, "Eh-uh."

"Very good, Lenny," said Susan Calvin, gravely. "Try it again. Hand-up."

Very gently, she reached out her own hand, took the robot's, and raised it, lowered it. "Hand-up. Hand-up."

A voice from her office called and interrupted. "Susan?"

Calvin halted with a tightening of her lips. "What is it, Alfred?" The research director walked in, and looked at the chart on the wall and at the robot. "Still at it?"

"I'm at my work, yes."

"Well, you know, Susan..." He took out a cigar, staring at it hard, and made as though to bite off the end. In doing so, his eyes met the woman's stern look of disapproval; and he put the cigar away and began over. "Well, you know, Susan, the LNE model is in production now."

"So I've heard. Is there something in connection with it you wish of me?"

"No-o. Still, the mere fact that it is in production and is doing well means that working with this messed-up specimen is useless. Shouldn't it be scrapped?"

"In short, Alfred, you are annoyed that I am wasting my so-valuable time. Feel relieved. My time is not being wasted. I am *working* with this robot."

"But the work has no meaning."

"I'll be the judge of that, Alfred." Her voice was ominously quiet, and Lanning thought it wiser to shift his ground.

"Will you tell me what meaning it has? What are you doing with it right now, for instance?"

"I'm trying to get it to raise its hand on the word of command. I'm trying to get it to imitate the sound of the word."

As though on cue, Lenny said, "Eh-uh" And raised its hand waveringly.

Lanning shook his head. "That voice is amazing. How does it happen?"

Susan Calvin said, "I don't quite know. Its transmitter is a normal one. It could speak normally, I'm sure. It doesn't, however; it speaks like this as a consequence of something in the positronic paths that I have not yet pinpointed."

"Well, pinpoint it, for Heaven's sake. Speech like that might be useful."

"Oh, then there is some possible use in my studies on Lenny?" Lanning shrugged in embarrassment. "Oh, well, it's a minor point."

"I'm sorry you don't see the major points, then," said Susan Calvin with asperity, "which are much more important, but that's not my fault. Would you leave now, Alfred, and let me go on with my work?"

Lanning got to his cigar, eventually, in Bogert's office. He said, sourly, "That woman is growing more peculiar daily."

Bogert understood perfectly. In the U. S. Robots and Mechanical Men Corporation, there was only one "that woman." He said, "Is she still scuffling about with that pseudo-robot--that Lenny of hers?"

"Trying to get it to talk, so help me." Bogert shrugged. "Points up the company problem. I mean, about getting qualified personnel for research. If we had other robopsychologists, we could retire Susan. Incidentally, I presume the directors' meeting scheduled for tomorrow is for the purpose of dealing with the procurement problem?"

Lanning nodded and looked at his cigar as though it didn't taste good. "Yes. Quality, though, not quantity. We've raised wages until there's a steady stream of applicants--those who are interested primarily in money. The trick is to get those who are interested primarily in robotics--a few more like Susan Calvin."

"Hell, no. Not like her."

"Well, not like her personally. But you'll have to admit, Peter, that she's single-minded about robots. She has no other interest in life."

"I know. And that's exactly what makes her so unbearable." Lanning nodded. He had lost count of the many times it would have done his soul good to have fired Susan Calvin. He had also lost count of the number of millions of dollars she had at one time or another saved the company. She was a truly indispensable woman and would remain one until she died--or until they could lick the problem of finding men and women of her own high caliber who were interested in robotics research.

He said, "I think we'll cut down on the tour business." Peter shrugged. "If you say so. But meanwhile, seriously, what do we do about Susan? She can easily tie herself up with Lenny indefinitely. You know how she is when she gets what she considers an interesting problem."

"What *can* we do?" said Lanning. "If we become too anxious to pull her off, she'll stay on out of feminine contrariness. In the last analysis, we can't force her to do anything."

The dark-haired mathematician smiled. "I wouldn't ever apply the adjective 'feminine' to any part of her."

"Oh, well," said Lanning, grumpily. "At least, it won't do anyone any actual harm."

In that, if in nothing else, he was wrong. The emergency signal is always a tension-making thing in any large industrial establishment. Such signals had sounded in the history of U. S. Robots a dozen times--for fire, flood, riot and insurrection.

But one thing had never occurred in all that time. Never had the particular signal indicating "Robot out of control" sounded. No one ever expected it to sound. It was only installed at government insistence. ("Damn the Frankenstein complex," Lanning would mutter on those rare occasions when he thought of it.)

Now, finally, the shrill siren rose and fell at ten-second intervals, and practically no worker from the President of the Board of Directors down to the newest janitor's assistant recognized the significance of the strange sound for a few moments. After those moments passed, there was a massive convergence of armed guards and medical men to the indicated area of danger and U. S. Robots was struck with paralysis.

Charles Randow, computing technician, was taken off to hospital level with a broken arm. There was no other damage. No other physical damage.

"But the moral damage," roared Lanning, "is beyond estimation."

Susan Calvin faced him, murderously calm. "You will do nothing to Lenny. Nothing. Do you understand?"

"Do *you* understand, Susan?" That thing has hurt a human being. It has broken First Law. Don't you know what First Law is?"

"You will do nothing to Lenny."

"For God's sake, Susan, do I have to tell *you* First Law? A *robot may not harm a human being or, through inaction, allow a human being to come to harm*. Our entire position depends on the fact that First Law is rigidly observed by all robots of all types. If the public should hear, and they will hear, that there was an exception, even one exception, we might be forced to close down altogether. Our only chance of survival would be to announce at once that the robot involved had been destroyed, explain the circumstances, and hope that the public can be convinced that it will never happen again."

"I would like to find out exactly what happened," said Susan Calvin. "I was not present at the time and I would like to know exactly what the Randow boy was doing in my laboratories without my permission."

"The important thing that happened," said Lanning, "is obvious. Your robot struck Randow and the damn fool flashed the 'Robot out of control' button and made a case of it. But your robot struck him and inflicted damage to the extent of a broken arm. The truth is your Lenny is so distorted it lacks First Law and it must be destroyed."

"It does *not* lack First Law. I have studied its brainpaths and know it does not lack it."

"Then how could it strike a man?" Desperation turned him to sarcasm. "Ask Lenny. Surely you have taught it to speak by now."

Susan Calvin's cheeks flushed a painful pink. She said, "I prefer to interview the victim."



And in my absence, Alfred, I want my offices sealed tight, with Lenny inside. I want no one to approach him. If any harm comes to him while I am gone, this company will not see me again under any circumstances."

"Will you agree to its destruction, if it has broken First Law?"

"Yes," said Susan Calvin, "because I know it hasn't."

Charles Randow lay in bed with his arm set and in a cast. His major suffering was still from the shock of those few moments in which he thought a robot was advancing on him with murder in its positronic mind. No other human had ever had such reason to fear direct robotic harm as he had had just then. He had had a unique experience.

Susan Calvin and Alfred Lanning stood beside his bed now; Peter Bogert, who had met them on the way, was with them. Doctors and nurses had been shooed out.

Susan Calvin said, "Now--what happened?" Randow was daunted. He muttered, "The thing hit me in the arm. It was coming at me."

Calvin said, "Move further back in the story. What were you doing in my laboratory without authorization?"

The young computer swallowed, and the Adam's apple in his thin neck bobbed noticeably. He was high-cheekboned and abnormally pale. He said, "We all knew about your robot. The word is you were trying to teach it to talk like a musical instrument. There were bets going as to whether it talked or not. Some said--uh--you could teach a gatepost to talk."

"I suppose," said Susan Calvin, freezingly, "that is meant as a compliment. What did that have to do with you?"

"I was supposed to go in there and settle matters--see if it would talk, you know. We swiped a key to your place and I waited till you were gone and went in. We had a lottery on who was to do it. I lost."

"Then?"

"I tried to get it to talk and it hit me."

"What do you mean, you tried to get it to talk? How did you try?"

"I--I asked it questions, but it wouldn't say anything, and I had to give the thing a fair shake, so I kind of--yelled at it, and--"

"And?"

There was a long pause. Under Susan Calvin's unwavering stare, Randow finally said, "I tried to scare it into saying something." He added defensively, "I had to give the thing a fair shake."

"How did you try to scare it?"

"I pretended to take a punch at it."

"And it brushed your arm aside?"

"It *hit* my arm."

"Very well. That's all." To Lanning and Bogert, she said, "Come, gentlemen."

At the doorway, she turned back to Randow. "I can settle the bets going around, if you are still interested. Lenny can speak a few words quite well."

They said nothing until they were in Susan Calvin's office. Its walls were lined with her books, some of which she had written herself. It retained the patina of her own frigid, carefully ordered personality. It had only one chair in it and she sat down. Lanning and Bogert remained standing.

She said, "Lenny only defended itself. That is the Third Law: *A robot must protect its own existence.*"

"*Except,*" said Lanning forcefully, "*when this conflicts with the First or Second Laws.*"

Complete the statement! Lenny had no right to defend itself in any way at the cost of harm, however minor, to a human being."

"Nor did it," shot back Calvin, "*knowingly.* Lenny has an aborted brain. It had no way of

knowing its own strength or the weakness of humans. In brushing aside the threatening arm of a human being it could not know the bone would break. In human terms, no moral blame can be attached to an individual who honestly cannot differentiate good and evil."

Bogert interrupted, soothingly, "Now, Susan, *we* don't blame. *We* understand that Lenny is the equivalent of a baby, humanly speaking, and we don't blame it. But the public will. U. S. Robots will be closed down."

"Quite the opposite. If you had the brains of a flea, Peter, you would see that this is the opportunity U. S. Robots is waiting for. That this will solve its problems."

Lanning hunched his white eyebrows low. He said, softly, "What problems, Susan?"

"Isn't the corporation concerned about maintaining our research personnel at the present--Heaven help us--high level?"

"We certainly are."

"Well, what are you offering prospective researchers? Excitement? Novelty? The thrill of piercing the unknown? No! You offer them salaries and the assurance of no problems."

Bogert said, "How do you mean, no problems?"

"Are there problems?" shot back Susan Calvin. "What kind of robots do we turn out? Fully developed robots, fit for their tasks. An industry tells us what it needs; a computer designs the brain; machinery forms the robot; and there it is, complete and done. Peter, some time ago, you asked me with reference to Lenny what its use was. What's the use, you said, of a robot that was not designed for any job? Now I ask you--what's the use of a robot designed for only one job? It begins and ends in the same place. The LNE models mine boron. If beryllium is needed, they are useless. If boron technology enters a new phase, they become useless. A human being so designed would be sub-human. A robot so designed is sub-robotic."

"Do you want a versatile robot?" asked Lanning, incredulously. "Why not?" demanded the robopsychologist. "Why not? I've been handed a robot with a brain almost completely stultified. I've been teaching it, and you, Alfred, asked me what was the use of that. Perhaps very little as far as Lenny itself is concerned, since it will never progress beyond the five-year-old level on a human scale. But what's the use in general? A very great deal, if you consider it as a study in the abstract problem of *learning how to teach robots*. I have learned ways to short-circuit neighboring pathways in order to create new ones. More study will yield better, more subtle and more efficient techniques of doing so."

"Well?"

"Suppose you started with a positronic brain that had all the basic pathways carefully outlined but none of the secondaries. Suppose you then started creating secondaries. You could sell basic robots designed for instruction; robots that could be modeled to a job, and then modeled to another, if necessary. Robots would become as versatile as human beings. *Robots could learn!*"

They stared at her. She said, impatiently, "You still don't understand, do you?"

"I understand what you are saying," said Lanning.

"Don't you understand that with a completely new field of research and completely new techniques to be developed, with a completely new area of the unknown to be penetrated, youngsters will feel a new urge to enter robotics? Try it and see."

"May I point out," said Bogert, smoothly, "that this is dangerous. Beginning with ignorant robots such as Lenny will mean that one could never trust First Law--exactly as turned out in Lenny's case."

"Exactly. Advertise the fact."

"Advertise it!"

"Of course. Broadcast the danger. Explain that you will set up a new research institute on the moon, if Earth's population chooses not to allow this sort of thing to go on upon Earth, but stress the danger to the possible applicants by all means."

Lanning said, "For God's sake, why?"

"Because the spice of danger will add to the lure. Do you think nuclear technology

involves no danger and spationautics no peril? Has your lure of absolute security been doing the trick for you? Has it helped you to cater to the Frankenstein complex you all despise so? Try something else then, something that has worked in other fields."

There was a sound from beyond the door that led to Calvin's personal laboratories. It was the chiming sound of Lenny.

The robopsychologist broke off instantly, listening. She said, "Excuse me. I think Lenny is calling me."

"Can it call you?" said Lanning.

"I said I've managed to teach it a few words." She stepped toward the door, a little flustered. "If you will wait for me--"

They watched her leave and were silent for a moment. Then Lanning said, "Do you think there's anything to what she says, Peter?"

"Just possibly, Alfred," said Bogert. "Just possibly. Enough for US to bring the matter up at the directors' meeting and see what they say. After all, the fat *is* in the fire. A robot has harmed a human being and knowledge of it is public. As Susan says, we might as well try to turn the matter to our advantage. Of course, I distrust her motives in all this."

"How do you mean?"

"Even if all she has said is perfectly true, it is only rationalization as far as she is concerned. Her motive in all this is her desire to hold on to this robot. If we pressed her" (and the mathematician smiled at the incongruous literal meaning of the phrase) "she would say it was to continue learning techniques of teaching robots, but I think she has found another use for Lenny. A rather unique one that would fit only Susan of all women."

"I don't get your drift." Bogert said, "Did you hear what the robot was calling?"

"Well, no, I didn't quite--" began Lanning, when the door opened suddenly, and both men stopped talking at once.

Susan Calvin stepped in again, looking about uncertainly. "Have either of you seen--I'm positive I had it somewhere about--Oh, there it is."

She ran to a corner of one bookcase and picked up an object of intricate metal webbery, dumbbell shaped and hollow, with variously shaped metal pieces inside each hollow, just too large to be able to fallout of the webbing.

As she picked it up, the metal pieces within moved and struck together, clicking pleasantly. It struck Lanning that the object was a kind of robotic version of a baby rattle.

As Susan Calvin opened the door again to pass through, Lenny's voice chimed again from within. This time, Lanning heard it clearly as it spoke the words Susan Calvin had taught it.

In heavenly celeste-like sounds, it called out, "Mommie, I want you. I want you, Mommie."

And the footsteps of Susan Calvin could be heard hurrying eagerly across the laboratory floor toward the only kind of baby she could ever have or love.

## Little Lost Robot

Measures on Hyper Base had been taken in a sort of rattling fury -- the muscular equivalent of a hysterical shriek.

To itemize them in order of both chronology and desperation, they were:

1. All work on the Hyperatomic Drive through all the space volume occupied by the Stations of the Twenty-Seventh Asteroidal Grouping came to a halt.
2. That entire volume of space was nipped out of the System, practically speaking. No one entered without permission. No one left under any conditions.
3. By special government patrol ship, Drs. Susan Calvin and Peter Bogert, respectively Head Psychologist and Mathematical Director of United States Robot & Mechanical Men Corporation, were brought to Hyper Base.

Susan Calvin had never left the surface of Earth before, and had no perceptible desire to leave it this time. In an age of Atomic Power and a clearly coming Hyperatomic Drive, she remained quietly provincial. So she was dissatisfied with her trip and unconvinced of the emergency, and every line of her plain, middle-aged face showed it clearly enough during her first dinner at Hyper Base.

Nor did Dr. Bogert's sleek paleness abandon a certain hangdog attitude. Nor did Major-general Kallner, who headed the project, even once forget to maintain a hunted expression. In short, it was a grisly episode, that meal, and the little session of three that followed began in a gray, unhappy manner.

Kallner, with his baldness glistening, and his dress uniform oddly unsuited to the general mood, began with uneasy directness.

"This is a queer story to tell, sir, and madam. I want to thank you for coming on short notice and without a reason being given. We'll try to correct that now. We've lost a robot. Work has stopped and *must* stop until such time as we locate it. So far we have failed, and we feel we need expert help."

Perhaps the general felt his predicament anticlimactic. He continued with a note of desperation, "I needn't tell you the importance of our work here. More than eighty percent of last year's appropriations for scientific research have gone to us--"

"Why, we know that," said Bogert, agreeably. "U. S. Robots is receiving a generous rental fee for use of our robots."

Susan Calvin injected a blunt, vinegary note, "What makes a single robot so important to the project, and why hasn't it been located?"

The general turned his red face toward her and wet his lips quickly, "Why, in a manner of speaking we *have* located it." Then, with near anguish, "Here, suppose I explain. As soon as the robot failed to report a state of emergency was declared, and all movement off Hyper Base stopped. A cargo vessel had landed the previous day and had delivered us two robots for our laboratories. It had sixty-two robots of the... uh... game type for shipment elsewhere. We are certain as to that figure. There is no question about it whatever."

"Yes? And the connection?"

"When our missing robot failed of location anywhere -- I assure you we would have found a missing blade of grass if it had been there to find -- we brainstormed ourselves into counting the robots left of the cargo ship. They have sixty-three now."

"So that the sixty-third, I take it, is the missing prodigal?" Dr. Calvin's eyes darkened.

"Yes, but we have no way of telling which is the sixty-third."

There was a dead silence while the electric clock chimed eleven times, and then the robopsychologist said, "Very peculiar," and the corners of her lips moved downward.

"Peter," she turned to her colleague with a trace of savagery, "what's wrong here? What kind of robots are they, using at Hyper Base?"

Dr. Bogert hesitated and smiled feebly, "It's been rather a matter of delicacy till now, Susan."

She spoke rapidly, "Yes, *till* now. If there are sixty-three same-type robots, one of which is wanted and the identity of which cannot be determined, why won't any of them do? What's the idea of all this? Why have we been sent for?"

Bogert said in resigned fashion, "If you'll give me a chance, Susan -- Hyper Base happens to be using several robots whose brains are not impressed with the entire First Law of Robotics."

"Aren't impressed?" Calvin slumped back in her chair, "I see. How many were made?"

"A few. It was on government order and there was no way of violating the secrecy. No one was to know except the top men directly concerned. You weren't included, Susan. It was nothing I had anything to do with."

The general interrupted with a measure of authority. "I would like to explain that bit. I hadn't been aware that Dr. Calvin was unacquainted with the situation. I needn't tell you, Dr. Calvin, that there always has been strong opposition to robots on the Planet. The only defense the government has had against the Fundamentalist radicals in this matter was the fact that robots are always built with an unbreakable First Law -- which makes it impossible for them to harm human beings under any circumstance.

"But we *had* to have robots of a different nature. So just a few of the NS-2 model, the Nestors, that is, were prepared with a modified First Law. To keep it quiet, all NS-2's are manufactured without serial numbers; modified members are delivered here along with a group of normal robots; and, of course, all our kind are under the strictest impressionment never to tell of their modification to unauthorized personnel." He wore an embarrassed smile; "This has all worked out against us now."

Calvin said grimly, "Have you asked each one who it is, anyhow? Certainly, you are authorized?"

The general nodded, "All sixty-three deny having worked here -- and one is lying."

"Does the one you want show traces of wear? The others, I take it, are factory-fresh."

"The one in question only arrived last month. It, and the two that have just arrived, were to be the last we needed. There's no perceptible wear." He shook his head slowly and his eyes were haunted again, "Dr. Calvin, we don't dare let that ship leave. If the existence of non-First Law robots becomes general knowledge-- There seemed no way of avoiding understatement in the conclusion.

"Destroy all sixty-three," said the robopsychologist coldly and flatly, "and make an end of it."

Bogert drew back a corner of his mouth. "You mean destroy thirty thousand dollars per robot. I'm afraid U. S. Robots wouldn't like that. We'd better make an effort first, Susan, before we destroy anything."

"In that case," she said, sharply, "I need facts. Exactly what advantage does Hyper Base derive from these modified robots? What factor made them desirable, general?"

Kallner ruffled his forehead and stroked it with an upward gesture of his hand. "We had trouble with our previous robots. Our men work with hard radiations a good deal, you see. It's dangerous, of course, but reasonable precautions are taken. There have been only two accidents since we began and neither was fatal. However, it was impossible to explain that to an ordinary robot. The First Law states -- I'll quote it -- '*No robot may harm a human being, or through inaction,*

*allow a human being to come to harm.'*

"That's primary, Dr. Calvin. When it was necessary for one of our men to expose himself for a short period to a moderate gamma field, one that would have no physiological effects, the nearest robot would dash in to drag him out. If the field were exceedingly weak, it would succeed, and work could not continue till all robots were cleared out. If the field were a trifle stronger, the robot would never reach the technician concerned, since its positronic brain would collapse under gamma radiations -- and then we would be out one expensive and hard-to-replace robot.

"We tried arguing with them. Their point was that a human being in a gamma field was endangering his life and that it didn't matter that he could remain there half an hour safely. Supposing, they would say, he forgot and remained an hour. They couldn't take chances. We pointed out that they were risking their lives on a wild off-chance. But self-preservation is only the Third Law of Robotics -- and the First Law of human safety came first. We gave them orders; we ordered them strictly and harshly to remain out of gamma fields at whatever cost. But obedience is only the Second Law of Robotics -- and the First Law of human safety came first. Dr. Calvin, we either had to do without robots, or do something about the First Law -- and we made our choice."

"I can't believe," said Dr. Calvin, "that it was found possible to remove the First Law."

"It wasn't removed, it was modified," explained Kallner. "Positronic brains were constructed that contained the positive aspect only of the Law, which in them reads: '*No robot may harm a human being.*' That is all. They have no compulsion to prevent one coming to harm through an extraneous agency such as gamma rays. I state the matter correctly, Dr. Bogert?"

"Quite," assented the mathematician.

"And that is the only difference of your robots from the ordinary NS2 model? The *only* difference? Peter?"

"The *only* difference, Susan."

She rose and spoke with finality, "I intend sleeping now, and in about eight hours, I want to speak to whomever saw the robot last. And from now on, General Kallner, if I'm to take any responsibility at all for events, I want full and unquestioned control of this investigation."

Susan Calvin, except for two hours of resentful lassitude, experienced nothing approaching sleep. She signaled at Bogert's door at the local time of 0700 and found him also awake. He had apparently taken the trouble of transporting a dressing gown to Hyper Base with him, for he was sitting in it. He put his nail scissors down when Calvin entered.

He said softly, "I've been expecting you more or less. I suppose you feel sick about all this."

"I do."

"Well -- I'm sorry. There was no way of preventing it. When the call came out from Hyper Base for us, I knew that something must have gone wrong with the modified Nestors. But what was there to do? I couldn't break the matter to you on the trip here, as I would have liked to, because I had to be sure. The matter of the modification is top secret."

The psychologist muttered, "I should have been told. U. S. Robots had no right to modify positronic brains this way without the approval of a psychologist."

Bogert lifted his eyebrows and sighed. "Be reasonable, Susan. You couldn't have influenced them. In this matter, the government was bound to have its way. They want the Hyperatomic Drive and the etheric physicists want robots that won't interfere with them. They were going to get them even if it did mean twisting the First Law. We had to admit it was possible from a construction standpoint and they swore a mighty oath that they wanted only twelve, that they would be used only at Hyper Base, that they would be destroyed once the Drive was perfected, and that full precautions would be taken. And they insisted on secrecy -- and that's the situation."

Dr. Calvin spoke through her teeth, "I would have resigned."

"It wouldn't have helped. The government was offering the company a fortune, and

threatening it with antirobot legislation in case of a refusal. We were stuck then, and we're badly stuck now. If this leaks out, it might hurt Kallner and the government, but it would hurt U. S. Robots a devil of a lot more."

The psychologist stared at him. "Peter, don't you realize what all this is about? Can't you understand what the removal of the First Law means? It isn't just a matter of secrecy."

"I know what removal would mean. I'm not a child. It would mean complete instability, with no nonimaginary solutions to the positronic Field Equations."

"Yes, mathematically. But can you translate that into crude psychological thought. All normal life, Peter, consciously or otherwise, resents domination. If the domination is by an inferior, or by a supposed inferior, the resentment becomes stronger. Physically, and, to an extent, mentally, a robot -- any robot -- is superior to human beings. What makes him slavish, then? *Only the First Law!* Why, without it, the first order you tried to give a robot would result in your death. Unstable? What do you think?"

"Susan," said Bogert, with an air of sympathetic amusement. "I'll admit that this Frankenstein Complex you're exhibiting has a certain justification -- hence the First Law in the first place. But the Law, I repeat and repeat, has not been removed -- merely modified."

"And what about the stability of the brain?"

The mathematician thrust out his lips, "Decreased, naturally. But it's within the border of safety. The first Nestors were delivered to Hyper Base nine months ago, and nothing whatever has gone wrong till now, and even this involves merely fear of discovery and not danger to humans."

"Very well, then. We'll see what comes of the morning conference."

Bogert saw her politely to the door and grimaced eloquently when she left. He saw no reason to change his perennial opinion of her as a sour and fidgety frustration.

Susan Calvin's train of thought did not include Bogert in the least. She had dismissed him years ago as a smooth and pretentious sleekness.

Gerald Black had taken his degree in etheric physics the year before and, in common with his entire generation of physicists, found himself engaged in the problem of the Drive. He now made a proper addition to the general atmosphere of these meetings on Hyper Base. In his stained white smock, he was half rebellious and wholly uncertain. His stocky strength seemed striving for release and his fingers, as they twisted each other with nervous yanks, might have forced an iron bar out of true.

Major-general Kallner sat beside him; the two from U. S. Robots faced him.

Black said, "I'm told that I was the last to see Nestor 10 before he vanished. I take it you want to ask me about that."

Dr. Calvin regarded him with interest, "You sound as if you were not sure, young man. Don't you *know* whether you were the last to see him?"

"He worked with me, ma'am, on the field generators, and he was with me the morning of his disappearance. I don't know if anyone saw him after about noon. No one admits having done so."

"Do you think anyone's lying about it?"

"I don't say that. But I don't say that I want the blame of it, either." His dark eyes smoldered.

"There's no question of blame. The robot acted as it did because of what it is. We're just trying to locate it, Mr. Black, and let's put everything else aside. Now if you've worked with the robot, you probably know it better than anyone else. Was there anything unusual about it that you noticed? Had you ever worked with robots before?"

"I've worked with other robots we have here -- the simple ones. Nothing different about the Nestors except that they're a good deal cleverer -- and more annoying."

"Annoying? In what way?"

"Well -- perhaps it's not their fault. The work here is rough and most of us get a little

jagged. Fooling around with hyper-space isn't fun." He smiled feebly, finding pleasure in confession. "We run the risk continually of blowing a hole in normal space-time fabric and dropping right out of the universe, asteroid and all. Sounds screwy, doesn't it? Naturally, you're on edge sometimes. But these Nestors aren't. They're curious, they're calm, they don't worry. It's enough to drive you nuts at times. When you want something done in a tearing hurry, they seem to take their time. Sometimes I'd rather do without."

"You say they take their time? Have they ever refused an order?"

"Oh, no," hastily. "They do it all right. They tell you when they think you're wrong, though. They don't know anything about the subject but what we taught them, but that doesn't stop them. Maybe I imagine it, but the other fellows have the same trouble with their Nestors."

General Kallner cleared his throat ominously, "Why have no complaints reached me on the matter, Black?"

The young physicist reddened, "We didn't *really* want to do without the robots, sir, and besides we weren't certain exactly how such... uh... minor complaints might be received."

Bogert interrupted softly, "Anything in particular happen the morning you last saw it?"

There was a silence. With a quiet motion, Calvin repressed the comment that was about to emerge from Kallner, and waited patiently.

Then Black spoke in blurring anger, "I had a little trouble with it. I'd broken a Kimball tube that morning and was out five days of work; my entire program was behind schedule; I hadn't received any mail from home for a couple of weeks. And *he* came around wanting me to repeat an experiment I had abandoned a month ago. He was always annoying me on that subject and I was tired of it. I told him to go away -- and that's all I saw of him."

"You told him to go away?" asked Dr. Calvin with sharp interest. "In just those words? Did you say 'Go away'? Try to remember the exact words."

There was apparently an internal struggle in progress. Black cradled his forehead in a broad palm for a moment, then tore it away and said defiantly, "I said, 'Go lose yourself.'"

Bogert laughed for a short moment. "And he did, eh?"

But Calvin wasn't finished. She spoke cajolingly, "Now we're getting somewhere, Mr. Black. But exact details are important. In understanding the robot's actions, a word, a gesture, an emphasis may be everything. You couldn't have said just those three words, for instance, could you? By your own description you must have been in a hasty mood. Perhaps you strengthened your speech a little."

The young man reddened, "Well... I may have called it a... a few things."

"Exactly what things?"

"Oh -- I wouldn't remember exactly. Besides I couldn't repeat it. You know how you get when you're excited." His embarrassed laugh was almost a giggle, "I sort of have a tendency to strong language."

"That's quite all right," she replied, with prim severity. "At the moment, I'm a psychologist. I would like to have you repeat exactly what you said as nearly as you remember, and, even more important, the exact tone of voice you used."

Black looked at his commanding officer for support, found none. His eyes grew round and appalled, "But I can't."

"You must."

"Suppose," said Bogert, with ill-hidden amusement, "you address me. You may find it easier."

The young man's scarlet face turned to Bogert. He swallowed. "I said" His voice faded out. He tried again, "I said--"

And he drew a deep breath and spewed it out hastily in one long succession of syllables. Then, in the charged air that lingered, he concluded almost in tears, "... more or less. I don't remember the exact order of what I called him, and maybe I left out something or put in something, but that was about it."

Only the slightest flush betrayed any feeling on the part of the robopsychologist. She



said, "I am aware of the meaning of most of the terms used. The others, I suppose, are equally derogatory."

"I'm afraid so," agreed the tormented Black.

"And in among it, you told him to lose himself."

"I meant it only figuratively."

"I realize that. No disciplinary action is intended, I am sure." And at her glance, the general, who, five seconds earlier, had seemed not sure at all, nodded angrily.

"You may leave, Mr. Black. Thank you for your cooperation."

It took five hours for Susan Calvin to interview the sixty-three robots. It was five hours of multi-repetition; of replacement after replacement of identical robot; of Questions A, B, C, D; and Answers A, B, C, D; of a carefully bland expression, a carefully neutral tone, a carefully friendly atmosphere; and a hidden wire recorder.

The psychologist felt drained of vitality when she was finished.

Bogert was waiting for her and looked expectant as she dropped the recording spool with a clang upon the plastic of the desk.

She shook her head, "All sixty-three seemed the same to me. I couldn't tell."

He said, "You couldn't expect to tell by ear, Susan. Suppose we analyze the recordings."

Ordinarily, the mathematical interpretation of verbal reactions of robots is one of the more intricate branches of robotic analysis. It requires a staff of trained technicians and the help of complicated computing machines. Bogert knew that. Bogert stated as much, in an extreme of unshown annoyance after having listened to each set of replies, made lists of word deviations, and graphs of the intervals of responses.

"There are no anomalies present, Susan. The variations in wording and the time reactions are within the limits of ordinary frequency groupings. We need finer methods. They must have computers here. No." He frowned and nibbled delicately at a thumbnail. "We can't use computers. Too much danger of leakage. Or maybe if we--"

Dr. Calvin stopped him with an impatient gesture, "Please, Peter. This isn't one of your petty laboratory problems. If we can't determine the modified Nestor by some gross difference that we can see with the naked eye, one that there is no mistake about, we're out of luck. The danger of being wrong, and of letting him escape is otherwise too great. It's not enough to point out a minute irregularity in a graph. I tell you, if that's all I've got to go on, I'd destroy them all just to be certain. Have you spoken to the other modified Nestors?"

"Yes, I have," snapped back Bogert, "and there's nothing wrong with them. They're above normal in friendliness if anything. They answered my questions, displayed pride in their knowledge -- except the two new ones that haven't had time to learn their etheric physics. They laughed rather good-naturedly at my ignorance in some of the specializations here." He shrugged, "I suppose that forms some of the basis for resentment toward them on the part of the technicians here. The robots are perhaps too willing to impress you with their greater knowledge."

"Can you try a few Planar Reactions to see if there has been any change, any deterioration, in their mental set-up since manufacture?"

"I haven't yet, but I will." He shook a slim finger at her, "You're losing your nerve, Susan. I don't see what it is you're dramatizing. They're essentially harmless."

"They are?" Calvin took fire. "They are? Do you realize one of them is lying? One of the sixty-three robots I have just interviewed has deliberately lied to me after the strictest injunction to tell the truth. The abnormality indicated is horribly deep-seated, and horribly frightening."

Peter Bogert felt his teeth harden against each other. He said, "Not at all. Look! Nestor 10 was given orders to lose himself. Those orders were expressed in maximum urgency by the person most authorized to command him. You can't counteract that order either by superior urgency or superior right of command. Naturally, the robot will attempt to defend the carrying out of his orders. In fact, objectively, I admire his ingenuity. How better can a robot lose himself

than to hide himself among a group of similar robots?"

"Yes, you would admire it. I've detected amusement in you, Peter -- amusement and an appalling lack of understanding. Are you a roboticist, Peter? Those robots attach importance to what they consider superiority. You've just said as much yourself. Subconsciously they feel humans to be inferior and the First Law which protects us from them is imperfect. They are unstable. And here we have a young man ordering a robot to leave him, to lose himself, with every verbal appearance of revulsion, disdain, and disgust. Granted, that robot must follow orders, but subconsciously, there is resentment. It will become more important than ever for it to prove that it is superior despite the horrible names it was called. It may become so important that what's left of the First Law won't be enough."

"How on Earth, or anywhere in the Solar System, Susan, is a robot going to know the meaning of the assorted strong language used upon him? Obscenity is not one of the things impressed upon his brain."

"Original impressionment is not everything," Calvin snarled at him. "Robots have learning capacity, you... you fool-" And Bogert knew that she had really lost her temper. She continued hastily, "Don't you suppose he could tell from the tone used that the words weren't complimentary? Don't you suppose he's heard the words used before and noted upon what occasions?"

"Well, then," shouted Bogert, "will you kindly tell me one way in which a modified robot can harm a human being, no matter how offended it is, no matter how sick with desire to prove superiority?"

"If I tell you one way, will you keep quiet?"

"Yes."

They were leaning across the table at each other, angry eyes nailed together.

The psychologist said, "If a modified robot were to drop a heavy weight upon a human being, he would not be breaking the First Law, if he did so with the knowledge that his strength and reaction speed would be sufficient to snatch the weight away before it struck the man. However once the weight left his fingers, he would be no longer the active medium. Only the blind force of gravity would be that. The robot could then change his mind and merely by inaction, allow the weight to strike. The modified First Law allows that."

"That's an awful stretch of imagination."

"That's what my profession requires sometimes. Peter, let's not quarrel, let's work. You know the exact nature of the stimulus that caused the robot to lose himself. You have the records of his original mental make-up. I want you to tell me how possible it is for our robot to do the sort of thing I just talked about. Not the specific instance, mind you, but that whole class of response. And I want it done quickly."

"And meanwhile-"

"And meanwhile, we'll have to try performance tests directly on the response to First Law."

Gerald Black, at his own request, was supervising the mushrooming wooden partitions that were springing up in a bellying circle on the vaulted third floor of Radiation Building 2. The laborers worked, in the main, silently, but more than one was openly a-wonder at the sixty-three photocells that required installation.

One of them sat down near Black, removed his hat, and wiped his forehead thoughtfully with a freckled forearm.

Black nodded at him, "How's it doing, Walensky?"

Walensky shrugged and fired a cigar, "Smooth as butter. What's going on anyway, Doc? First, there's no work for three days and then we have this mess of jiggers." He leaned backward on his elbows and puffed smoke.

Black twitched his eyebrows, "A couple of robot men came over from Earth. Remember the trouble we had with robots running into the gamma fields before we pounded it into their

skulls that they weren't to do it."

"Yeah. Didn't we get new robots?"

"We got some replacements, but mostly it was a job of indoctrination. Anyway, the people who make them want to figure out robots that aren't hit so bad by gamma rays."

"Sure seems funny, though, to stop all the work on the Drive for this robot deal. I thought nothing was allowed to stop the Drive."

"Well, it's the fellows upstairs that have the say on that. Me -- I just do as I'm told. Probably all a matter of pull--"

"Yeah," the electrician jerked a smile, and winked a wise eye. "Somebody knew somebody in Washington. But as long as my pay comes through on the dot, I should worry. The Drive's none of my affair. What are they going to do here?"

"You're asking me? They brought a mess of robots with them, -- over sixty, and they're going to measure reactions. That's all my knowledge."

"How long will it take?"

"I wish I knew."

"Well," Walensky said, with heavy sarcasm, "as long as they dish me my money, they can play games all they want."

Black felt quietly satisfied. Let the story spread. It was harmless, and near enough to the truth to take the fangs out of curiosity.

A man sat in the chair, motionless, silent. A weight dropped, crashed downward, then pounded aside at the last moment under the synchronized thump of a sudden force beam. In sixty-three wooden cells, watching NS-2 robots dashed forward in that split second before the weight veered, and sixty-three photocells five feet ahead of their original positions jiggled the marking pen and presented a little jag on the paper. The weight rose and dropped, rose and dropped, rose-

Ten times!

Ten times the robots sprang forward and stopped, as the man remained safely seated.

Major-general Kallner had not worn his uniform in its entirety since the first dinner with the U. S. Robot representatives. He wore nothing over his blue-gray shirt now, the collar was open, and the black tie was pulled loose.

He looked hopefully at Bogert, who was still blandly neat and whose inner tension was perhaps betrayed only by the trace of glister at his temples.

The general said, "How does it look? What is it you're trying to see?"

Bogert replied, "A difference which may turn out to be a little too subtle for our purposes, I'm afraid. For sixty-two of those robots the necessity of jumping toward the apparently threatened human was what we call, in robotics, a forced reaction. You see, even when the robots knew that the human in question would not come to harm -- and after the third or fourth time they must have known it -- they could not prevent reacting as they did. First Law requires it"

"Well?"

"But the sixty-third robot, the modified Nestor, had no such compulsion. He was under free action. If he had wished, he could have remained in his seat. Unfortunately," said his voice was mildly regretful, "he didn't so wish."

"Why do you suppose?"

Bogert shrugged, "I suppose Dr. Calvin will tell us when she gets here. Probably with a horribly pessimistic interpretation, too. She is sometimes a bit annoying."

"She's qualified, isn't she?" demanded the general with a sudden frown of uneasiness.

"Yes." Bogert seemed amused. "She's qualified all right. She understands robots like a sister -- comes from hating human beings so much, I think. It's just that, psychologist or not, she's an extreme neurotic. Has paranoid tendencies. Don't take her too seriously."

He spread the long row of broken-line graphs out in front of him. "You see, general, in the case of each robot the time interval from moment of drop to the completion of a five-foot movement tends to decrease as the tests are repeated. There's a definite mathematical relationship that governs such things and failure to conform would indicate marked abnormality in the positronic brain. Unfortunately, all here appear normal."

"But if our Nestor 10 was not responding with a forced action, why isn't his curve different? I don't understand that."

"It's simple enough. Robotic responses are not perfectly analogous to human responses, more's the pity. In human beings, voluntary action is much slower than reflex action. But that's not the case with robots; with them it is merely a question of freedom of choice, otherwise the speeds of free and forced action are much the same. What I *had* been expecting, though, was that Nestor 10 would be caught by surprise the first time and allow too great an interval to elapse before responding."

"And he didn't?"

"I'm afraid not."

"Then we haven't gotten anywhere." The general sat back with an expression of pain. "It's five days since you've come."

At this point, Susan Calvin entered and slammed the door behind her. "Put your graphs away, Peter," she cried, "you know they don't show anything."

She mumbled something impatiently as Kallner half-rose to greet her, and went on, "We'll have to try something else quickly. I don't like what's happening."

Bogert exchanged a resigned glance with the general. "Is anything wrong?"

"You mean specifically? No. But I don't like to have Nestor 10 continue to elude us. It's bad. It *must* be gratifying his swollen sense of superiority. I'm afraid that his motivation is no longer simply one of following orders. I think it's becoming more a matter of sheer neurotic necessity to outthink humans. That's a dangerously unhealthy situation. Peter, have you done what I asked? Have you worked out the instability factors of the modified NS-2 along the lines I want?"

"It's in progress," said the mathematician, without interest.

She stared at him angrily for a moment, then turned to Kallner. "Nester 10 is decidedly aware of what we're doing, general. He had no reason to jump for the bait in this experiment, especially after the first time, when he must have seen that there was no real danger to our subject. The others couldn't help it; but *he* was deliberately falsifying a reaction."

"What do you think we ought to do now, then, Dr. Calvin?"

"Make it impossible for him to fake an action the next time. We will repeat the experiment, but with an addition. High-tension cables, capable of electrocuting the Nestor models will be placed between subject and robot -- enough of them to avoid the possibility of jumping over -- and the robot will be made perfectly aware in advance that touching the cables will mean death."

"Hold on," spat out Bogert with sudden viciousness. "I rule that out. We are not electrocuting two million dollars worth of robots to locate Nestor 10. There are other ways."

"You're certain? You've found none. In any case, it's not a question of electrocution. We can arrange a relay which will break the current at the instant of application of weight. If the robot should place his weight on it, he won't die. *But he won't know that, you see.*"

The general's eyes gleamed into hope. "Will that work?"

"It should. Under those conditions, Nestor 10 would have to remain in his seat. He could be *ordered* to touch the cables and die, for the Second Law of obedience is superior to the Third Law of self-preservation. But *he won't* be ordered to; he will merely be left to his own devices, as will all the robots. In the case of the normal robots, the First Law of human safety will drive them to their death even without orders. But not our Nestor 10. Without the entire First Law, and without having received any orders on the matter, the Third Law, self-preservation, will be the highest operating, and he will have no choice but to remain in his seat. It would be a forced

action.”

“Will it be done tonight, then?”

“Tonight,” said the psychologist, “if the cables can be laid in time. I’ll tell the robots now what they’re to be up against.”

A man sat in the chair, motionless, silent. A weight dropped, crashed downward, then pounded aside at the last moment under the synchronized thump of a sudden force beam.

Only once-

And from her small camp chair in the observing booth in the balcony, Dr. Susan Calvin rose with a short gasp of pure horror.

Sixty-three robots sat quietly in their chairs, staring owlishly at the endangered man before them. Not one moved.

Dr. Calvin was angry, angry almost past endurance. Angry the worse for not daring to show it to the robots that, one by one were entering the room and then leaving. She checked the list. Number twenty-eight was due in now -- Thirty-five still lay ahead of her.

Number Twenty-eight entered, diffidently.

She forced herself into reasonable calm. “And who are you?”

The robot replied in a low, uncertain voice, “I have received no number of my own yet, ma’am. I’m an NS-2 robot, and I was Number Twenty-eight in line outside. I have a slip of paper here that I’m to give to you.”

“You haven’t been in here before this today?”

“No, ma’am.”

“Sit down. Right there. I want to ask you some questions, Number Twenty-eight. Were you in the Radiation Room of Building Two about four hours ago?”

The robot had trouble answering. Then it came out hoarsely, like machinery needing oil, “Yes, ma’am.”

“There was a man who almost came to harm there, wasn’t there?”

“Yes, ma’am.”

“You did nothing, did you?”

“No, ma’am.”

“The man might have been hurt because of your inaction. Do you know that?”

“Yes, ma’am. I couldn’t help it, ma’am.” It is hard to picture a large expressionless metallic figure cringing, but it managed.

“I want you to tell me exactly why you did nothing to save him.”

“I want to explain, ma’am. I certainly don’t want to have you... have *anyone*... think that I could do a thing that might cause harm to a master. Oh, no, that would be a horrible... an inconceivable-”

“Please don’t get excited, boy. I’m not blaming you for anything. I only want to know what you were thinking at the time.”

“Ma’am, before it all happened you told us that one of the masters would be in danger of harm from that weight that keeps falling and that we would have to cross electric cables if we were to try to save him. Well, ma’am, that wouldn’t stop me. What is my destruction compared to the safety of a master? But... but it occurred to me that if I died on my way to him, I wouldn’t be able to save him anyway. The weight would crush him and then I would be dead for no purpose and perhaps some day some other master might come to harm who wouldn’t have, if I had only stayed alive. Do you understand me, ma’am?”

“You mean that it was merely a choice of the man dying, or both the man and yourself dying. Is that right?”

“Yes, ma’am. It was impossible to save the master. He might be considered dead. In that case, it is inconceivable that I destroy myself for nothing -- without orders.”

The robopsychologist twiddled a pencil. She had heard the same story with insignificant

verbal variations twenty-seven times before. This was the crucial question now.

"Boy," she said, "your thinking has its points, but it is not the sort of thing I thought you might think. Did you think of this yourself?"

The robot hesitated. "No."

"Who thought of it, then?"

"We were talking last night, and one of us got that idea and it sounded reasonable."

"Which one?"

The robot thought deeply. "I don't know. Just one of us."

She sighed, "That's all."

Number Twenty-nine was next. Thirty-four after that.

Major-general Kallner, too, was angry. For one week all of Hyper Base had stopped dead, barring some paper work on the subsidiary asteroids of the group. For nearly one week, the two top experts in the field had aggravated the situation with useless tests. And now they -- or the woman, at any rate -- made impossible propositions.

Fortunately for the general situation, Kallner felt it impolitic to display his anger openly.

Susan Calvin was insisting, "Why not, sir? It's obvious that the present situation is unfortunate. The only way we may reach results in the future -- or what future is left us in this matter -- is to separate the robots. We can't keep them together any longer."

"My dear Dr. Calvin," rumbled the general, his voice sinking into the lower baritone registers. "I don't see how I can quarter sixty-three robots all over the place--"

Dr. Calvin raised her arms helplessly. "I can do nothing then. Nestor 10 will either imitate what the other robots would do, or else argue them plausibly into not doing what he himself cannot do. And in any case, this is bad business. We're in actual combat with this little lost robot of ours and he's winning out. Every victory of his aggravates his abnormality."

She rose to her feet in determination. "General Kallner, if you do not separate the robots as I ask, then I can only demand that all sixty-three be destroyed immediately."

"You demand it, do you?" Bogert looked up suddenly, and with real anger. "What gives you the right to demand any such thing? Those robots remain as they are. *I'm* responsible to the management, not you."

"And I," added Major-general Kallner, "am responsible to the World Co-ordinator -- and I must have this settled."

"In that case," flashed back Calvin, "there is nothing for me to do but resign. If necessary to force you to the necessary destruction, I'll make this whole matter public. It was not I that approved the manufacture of modified robots."

"One word from you, Dr. Calvin," said the general, deliberately, "in violation of security measures, and you would be certainly imprisoned instantly."

Bogert felt the matter to be getting out of hand. His voice grew syrupy, "Well, now, we're beginning to act like children, all of us. We need only a little more time. Surely we can outwit a robot without resigning, or imprisoning people, or destroying two millions."

The psychologist turned on him with quiet fury, "I don't want any unbalanced robots in existence. We have one Nestor that's definitely unbalanced, eleven more that are potentially so, and sixty-two normal robots that are being subjected to an unbalanced environment. The only absolute safe method is complete destruction."

The signal-burr brought all three to a halt, and the angry tumult of growingly unrestrained emotion froze.

"Come in," growled Kallner.

It was Gerald Black, looking perturbed. He had heard angry voices. He said, "I thought I'd come myself... didn't like to ask anyone else--"

"What is it? Don't orate--"

"The locks of Compartment C in the trading ship have been played with. There are fresh scratches on them."

"Compartment C?" explained Calvin quickly. "That's the one that holds the robots, isn't it? Who did it?"

"From the inside," said Black, laconically.

"The lock isn't out of order, is it?"

"No. It's all right. I've been staying on the ship now for four days and none of them have tried to get out. But I thought you ought to know, and I didn't like to spread the news. I noticed the matter myself."

"Is anyone there now?" demanded the general.

"I left Robbins and McAdams there."

There was a thoughtful silence, and then Dr. Calvin said, ironically, "Well?"

Kallner rubbed his nose uncertainly, "What's it all about?"

"Isn't it obvious? Nester 10 is planning to leave. That order to lose himself is dominating his abnormality past anything we can do. I wouldn't be surprised if what's left of his First Law would scarcely be powerful enough to override it. He is perfectly capable of seizing the ship and leaving with it. Then we'd have a mad robot on a spaceship. What would he do next? Any idea? Do you still want to leave them all together, general?"

"Nonsense," interrupted Bogert. He had regained his smoothness. "All that from a few scratch marks on a lock."

"Have you, Dr. Bogert, completed the analysis I've required, since you volunteer opinions?"

"Yes."

"May I see it?"

"No."

"Why not? Or mayn't I ask that, either?"

"Because there's no point in it, Susan. I told you in advance that these modified robots are less stable than the normal variety, and my analysis shows it. There's a certain very small chance of breakdown under extreme circumstances that are not likely to occur. Let it go at that. I won't give you ammunition for your absurd claim that sixty-two perfectly good robots be destroyed just because so far you lack the ability to detect Nestor 10 among them."

Susan Calvin stared him down and let disgust fill her eyes. "You won't let anything stand in the way of the permanent directorship, will you?"

"Please," begged Kallner, half in irritation. "Do you insist that nothing further can be done, Dr. Calvin?"

"I can't think of anything, sir," she replied, wearily. "If there were only other differences between Nestor 10 and the normal robots, differences that didn't involve the First Law. Even one other difference. Something in impressionment, environment, specification-" And she stopped suddenly.

"What is it?"

"I've thought of something... I think-" Her eyes grew distant and hard, "These modified Nestors, Peter. They get the same impressioning the normal ones get, don't they?"

"Yes. Exactly the same."

"And what was it you were saying, Mr. Black," she turned to the young man, who through the storms that had followed his news had maintained a discreet silence. "Once when complaining of the Nestors' attitude of superiority, you said the technicians had taught them all they knew."

"Yes, in etheric physics. They're not acquainted with the subject when they come here."

"That's right," said Bogert, in surprise. "I told you, Susan, when I spoke to the other Nestors here that the two new arrivals hadn't learned etheric physics yet."

"And why is that?" Dr. Calvin was speaking in mounting excitement. "Why aren't NS-2 models impressioned with etheric physics to start with?"

"I can tell you that," said Kallner. "It's all of a piece with the secrecy. We thought that if we made a special model with knowledge of etheric physics, used twelve of them and put the

others to work in an unrelated field, there might be suspicion. Men working with normal Nestors might wonder why they knew etheric physics. So there was merely an impressionment with a capacity for training in the field. Only the ones that come here, naturally, receive such a training. It's that simple."

"I understand. Please get out of here, the lot of you. Let me have an hour or so."

Calvin felt she could not face the ordeal for a third time. Her mind had contemplated it and rejected it with an intensity that left her nauseated. She could face that unending file of repetitious robots no more.

So Bogert asked the question now, while she sat aside, eyes and mind half closed.

Number Fourteen came in -- forty-nine to go.

Bogert looked up from the guide sheet and said, "What is your number in line?"

"Fourteen, sir." The robot presented his numbered ticket.

"Sit down, boy."

Bogert asked, "You haven't been here before on this day?"

"No, sir."

"Well, boy, we are going to have another man in danger of harm soon after we're through here. In fact, when you leave this room, you will be led to a stall where you will wait quietly, till you are needed. Do you understand?"

"Yes, sir."

"Now, naturally, if a man is in danger of harm, you will try to save him."

"Naturally, sir."

"Unfortunately, between the man and yourself, there will be a gamma ray field."

Silence.

"Do you know what gamma rays are?" asked Bogert sharply.

"Energy radiation, sir?"

The next question came in a friendly, offhand manner, "Ever work with gamma rays?"

"No, sir." The answer was definite.

"Mm-m. Well, boy, gamma rays will kill you instantly. They'll destroy your brain. That is a fact you must know and remember. Naturally, you don't want to destroy yourself."

"Naturally." Again the robot seemed shocked. Then, slowly, "But, sir, if the gamma rays are between myself and the master that may be harmed, how can I save him? I would be destroying myself to no purpose."

"Yes, there is that," Bogert seemed concerned about the matter. "The only thing I can advise, boy, is that if you detect the gamma radiation between yourself and the man, you may as well sit where you are."

The robot was openly relieved. "Thank you, sir. There wouldn't be any use, would there?"

"Of course not. But if there *weren't* any dangerous radiation, that would be a different matter."

"Naturally, sir. No question of that."

"You may leave now. The man on the other side of the door will lead you to your stall. Please wait there."

He turned to Susan Calvin when the robot left. "How did that go, Susan?"

"Very well," she said, dully.

"Do you think we could catch Nestor 10 by quick questioning on etheric physics?"

"Perhaps, but it's not sure enough." Her hands lay loosely in her lap. "Remember, he's fighting us. He's on his guard. The only way we can catch him is to outsmart him -- and, within his limitations, he can think much more quickly than a human being."

"Well, just for fun -- suppose I ask the robots from now on a few questions on gamma rays. Wave length limits, for instance."

"No!" Dr. Calvin's eyes sparked to life. "It would be too easy for him to deny knowledge



and then he'd be warned against the test that's coming up -- which is our real chance. Please follow the questions I've indicated, Peter, and don't improvise. It's just within the bounds of risk to ask them if they've ever worked with gamma rays. And try to sound even less interested than you do when you ask it."

Bogert shrugged, and pressed the buzzer that would allow the entrance of Number Fifteen.

The large Radiation Room was in readiness once more. The robots waited patiently in their wooden cells, all open to the center but closed off from each other.

Major-general Kallner mopped his brow slowly with a large handkerchief while Dr. Calvin checked the last details with Black.

"You're sure now," she demanded, "that none of the robots have had a chance to talk with each other after leaving the Orientation Room?"

"Absolutely sure," insisted Black. "There's not been a word exchanged."

"And the robots are put in the proper stalls?"

"Here's the plan."

The psychologist looked at it thoughtfully, "Um-m-m."

The general peered over her shoulder. "What's the idea of the arrangement, Dr. Calvin?"

"I've asked to have those robots that appeared even slightly out of true in the previous tests concentrated on one side of the circle. I'm going to be sitting in the center myself this time, and I wanted to watch those particularly."

"You're going to be sitting there-," exclaimed Bogert.

"Why not?" she demanded coldly. "What I expect to see may be something quite momentary. I can't risk having anyone else as main observer. Peter, you'll be in the observing booth, and I want you to keep your eye on the opposite side of the circle. General Kallner, I've arranged for motion pictures to be taken of each robot, in case visual observation isn't enough. If these are required, the robots are to remain exactly where they are until the pictures are developed and studied. None must leave, none must change place. Is that clear?"

"Perfectly."

"Then let's try it this one last time."

Susan Calvin sat in the chair, silent, eyes restless. A weight dropped, crashed downward; then pounded aside at the last moment under the synchronized thump of a sudden force beam.

And a single robot jerked upright and took two steps.

And stopped.

But Dr. Calvin was upright, and her finger pointed to him sharply. "Nestor 10, come here," she cried, "*come here!* COME HERE!"

Slowly, reluctantly, the robot took another step forward. The psychologist shouted at the top of her voice, without taking her eyes from the robot, "Get every other robot out of this place, somebody. Get them out quickly, and *keep* them out."

Somewhere within reach of her ears there was noise, and the thud of hard feet upon the floor. She did not look away.

Nestor 10 -- if it was Nestor 10 -- took another step, and then, under force of her imperious gesture, two more. He was only ten feet away, when he spoke harshly, "I have been told to be lost--"

Another stop. "I must not disobey. They have not found me so far -- He would think me a failure -- He told me -- But it's not so -- I am powerful and intelligent--"

The words came in spurts.

Another step. "I know a good deal -- He would think... I mean I've been found -- Disgraceful -- Not I -- I am intelligent -- And by just a master... who is weak -- Slow--"

Another step -- and one metal arm flew out suddenly to her shoulder, and she felt the weight bearing her down. Her throat constricted, and she felt a shriek tear through.

Dimly, she heard Nestor 10's next words, "No one must find me. No master--" and the

cold metal was against her, and she was sinking under the weight of it.

And then a queer, metallic sound, and she was on the ground with an unfelt thump, and a gleaming arm was heavy across her body. It did not move. Nor did Nestor 10, who sprawled beside her.

And now faces were bending over her.

Gerald Black was gasping, "Are you hurt, Dr. Calvin?"

She shook her head feebly. They pried the arm off her and lifted her gently to her feet, "What happened?"

Black said, "I bathed the place in gamma rays for five seconds. We didn't know what was happening. It wasn't till the last second that we realized he was attacking you, and then there was no time for anything but a gamma field. He went down in an instant. There wasn't enough to harm you though. Don't worry about it."

"I'm not worried." She closed her eyes and leaned for a moment upon his shoulder. "I don't think I was attacked exactly. Nestor 10 was simply *trying* to do so. What was left of the First Law was still holding him back."

Susan Calvin and Peter Bogert, two weeks after their first meeting with Major-general Kallner had their last. Work at Hyper Base had been resumed. The trading ship with its sixty-two normal NS-2's was gone to wherever it was bound, with an officially imposed story to explain its two weeks' delay. The government cruiser was making ready to carry the two roboticists back to Earth.

Kallner was once again a-gleam in dress uniform. His white gloves shone as he shook hands.

Calvin said, "The other modified Nestors are, of course, to be destroyed."

"They will be. We'll make shift with normal robots, or, if necessary, do without."

"Good."

"But tell me -- you haven't explained -- how was it done?"

She smiled tightly, "Oh, that. I would have told you in advance if I had been more certain of its working. You see, Nestor 10 had a superiority complex that was becoming more radical all the time. He liked to think that he and other robots knew more than human beings. It was becoming very important for him to think so.

"We knew that. So we warned every robot in advance that gamma rays would kill them, which it would, and we further warned them all that gamma rays would be between them and myself. So they all stayed where they were, naturally. By Nestor 10's own logic in the previous test they had all decided that there was no point in trying to save a human being if they were sure to die before they could do it."

"Well, yes, Dr. Calvin, I understand that. But why did Nestor 10 himself leave his seat?"

"AH! That was a little arrangement between myself and your young Mr. Black. You see it wasn't gamma rays that flooded the area between myself and the robots -- but infrared rays. Just ordinary heat rays, absolutely harmless. Nestor 10 knew they were infrared and harmless and so he began to dash out, as he expected the rest would do, under First Law compulsion. It was only a fraction of a second too late that he remembered that the normal NS-2's could detect radiation, but could not identify the type. That he himself could only identify wavelengths by virtue of the training he had received at Hyper Base, under mere human beings, was a little too humiliating to remember for just a moment. To the normal robots the area was fatal because we had told them it would be, and only Nestor 10 knew we were lying.

"And just for a moment he forgot, or didn't want to remember, that other robots might be more ignorant than human beings. His very superiority caught him. Good-by, general."