Too Bad!

Isaac Asimov

THE THREE LAWS OF ROBOTICS

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2. A robot must obey the orders given it by human beings except where that would conflict with the First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Gregory Arnfeld was not actually dying, but certainly there was a sharp limit to how long he might live. He had inoperable cancer and he had refused, strenuously, all suggestions of chemical treatment or of radiation therapy.

He smiled at his wife as he lay propped up against the pillows and said, “I’m the perfect case. Tertia and Mike will handle it.”

Tertia did not smile. She looked dreadfully concerned. “There are so many things that can be done, Gregory. Surely Mike is a last resort. You may not need it.”

“No, no. By the time they’re done drenching me with chemicals and dowsing me with radiation, I would be so far gone that it wouldn’t be a reasonable test....And please don’t call Mike ‘it.’“

“This is the twenty-second century, Greg. There are so many ways of handling cancer.”

“Yes, but Mike is one of them, and I think the best. This is the twenty-second century, and we know what robots can do. Certainly, I know. I had more to do with Mike than anyone else. You know that.”

“But you can’t want to use him just out of pride of design. Besides, how certain are you of miniaturization? That’s an even newer technique than robotics.”

Arnfeld nodded. “Granted, Tertia. But the miniaturization boys seem confident. They can reduce or restore Planck’s constant in what they say is a reasonably foolproof manner, and the controls that make that possible are built into Mike. He can make himself smaller or larger at win without affecting his surroundings.”

“Reasonably foolproof,” said Tertia with soft bitterness.

“That’s an anyone can ask for, surely. Think of it, Tertia. I am privileged to be part of the experiment. I’ll go down in history as the principal designer of Mike, but that will be secondary. My greatest feat will be that of having been successfully treated by a minirobot—by my own choice, by my own initiative.”

“You know it’s dangerous.”

“There’s danger to everything. Chemicals and radiation have their side effects. They can slow without stopping. They can allow me to live a wearying sort of half-life. And doing nothing win certainly kin me. If Mike does his job properly, I shall be completely healthy, and if it recurs” —Arnfeld smiled joyously—”Mike can recur as well.”

He put out his hand to grasp hers. “Tertia, we’ve known this was coming, you and I. Let’s make something out of this—a glorious experiment. Even if it fails—and it won’t fail—it will be a glorious experiment.”

Louis Secundo, of the miniaturization group, said, “No, Mrs. Arnfeld. We can’t guarantee success. Miniaturization is intimately involved with quantum mechanics, and there is a strong element of the unpredictable there. As MIK-27 reduces his size, there is always the chance that a sudden unplanned reexpansion will take place, naturally killing the—the patient. The greater the reduction in size, the tinier the robot becomes, the greater the chance of reexpansion. And once he starts expanding again, the chance of a sudden accelerated burst is even higher. The reexpansion is the really dangerous part.”

Tertia shook her head. “Do you think it will happen?”

“The chances are it won’t, Mrs. Arnfeld. But the chance is never zero. You must understand that.“

“Does Dr. Arnfeld understand that?”

“Certainly. We have discussed this in detail. He feels that the circumstances warrant the risk. “ He hesitated. “So do we. I know that you’ll see we’re not all running the risk, but a few of us will be, and we nevertheless feel the experiment to be worthwhile. More important, Dr. Arnfeld does.”

“What if Mike makes a mistake or reduces himself too far because of a glitch in the mechanism? Then reexpansion would be certain, wouldn’t it?”

“It never becomes quite certain. It remains statistical. The chances improve if he gets too small. But then the smaller he gets, the less massive he is, and at some critical point, mass will become so insignificant that the least effort on his part will send him flying off at nearly the speed of light.”

“Well, won’t that kill the doctor?”

“No. By that time, Mike would be so small he would slip between the atoms of the doctor’s body without affecting them.”

“But how likely would it be that he would reexpand when he’s that small?”

“When MIK-27 approaches neutrino size, so to speak, his half-life would be in the neighborhood of seconds. That is, the chances are fifty-fifty that he would reexpand within seconds, but by the time he reexpanded, he would be a hundred thousand miles away in outer space and the explosion that resulted would merely produce a small burst of gamma rays for the astronomers to puzzle over. Still, none of that will happen. MIK-27 will have his instructions and he will reduce himself to no smaller than he will need to be to carry out his mission.”

Mrs. Arnfeld knew she would have to face the press one way or another. She had adamantly refused to appear on holovision, and the right-to-privacy provision of the World Charter protected her. On the other hand, she could not refuse to answer questions on a voice-over basis. The right-to-know provision would not allow a blanket blackout.

She sat stiffly, while the young woman facing her said, “ Aside from all that, Mrs. Arnfeld, isn’t it a rather weird coincidence that your husband, chief designer of Mike the Microbot, should also be its first patient?”

“Not at all, Miss Roth,” said Mrs. Arnfeld wearily. “The doctor’s condition is the result of a predisposition. There have been others in his family who have had it. He told me of it when we married, so I was in no way deceived in the matter, and it was for that reason. that we have had no children. It is also for that reason that my husband chose his lifework and labored so assiduously to produce a robot capable of miniaturization. He always felt he would be its patient eventually, you see.”

Mrs. Arnfeld insisted on interviewing Mike and, under the circumstances, that could not be denied. Ben Johannes, who had worked with her husband for five years and whom she know well enough to be on first-name terms with, brought her into the robot’s quarters.

Mrs. Arnfeld had seen Mike soon after his construction, when he was being put through his primary tests, and he remembered her. He said, in his curiously neutral voice, too smoothly average to be quite human, “I am pleased to see you, Mrs. Arnfeld.”

He was not a well-shaped robot. He looked pinheaded and very bottom heavy. He was almost conical, point upward. Mrs. Arnfeld knew that was because his miniaturization mechanism was bulky and abdominal and because his brain had to be abdominal as well in order to increase the speed of response. It was an unnecessary anthropomorphism to insist on a brain behind a tall cranium, her husband had explained. Yet it made Mike seem ridiculous, almost moronic. There were psychological advantages to anthropomorphism, Mrs. Arnfeld thought, uneasily.

“Are you sure you understand your task, Mike?” said Mrs. Arnfeld.

“Completely, Mrs. Arnfeld,” said Mike. “I will see to it that every vestige of cancer is removed.”

Johannes said, “I’m not sure if Gregory explained it, but Mike can easily recognize a cancer cell when he is at the proper size. The difference is unmistakable, and he can quickly destroy the nucleus of any cell that is not normal.”

“I am laser equipped, Mrs. Arnfeld,” said Mike, with an odd air of unexpressed pride.

“Yes, but there are millions of cancer cells all over. It would take how long to get them, one by one?”

“Not quite necessarily one by one, Tertia,” said Johannes. “Even though the cancer is widespread, it exists in clumps. Mike is equipped to burn off and close capillaries leading to the clump, and a million cells could die at a stroke in that fashion. He will only occasionally have to deal with cells on an individual basis.”

“Still, how long would it take?”

Johannes’s youngish face went into a grimace as though it were difficult to decide what to say. “It could take hours, Tertia, if we’re to do a thorough job. I admit that.”

“And every moment of those hours will increase the chance of reexpansion.”

Mike said, “Mrs. Arnfeld, I will labor to prevent reexpansion.”

Mrs. Arnfeld turned to the robot and said earnestly, “Can you, Mike? I mean, is it possible for you to prevent it?”

“Not entirely, Mrs. Arnfeld. By monitoring my size and making an effort to keep it constant, I can minimize the random changes that might lead to a reexpansion. Naturally, it is almost impossible to do this when I am actually reexpanding under controlled conditions.”

“Yes, I know. My husband has told me that reexpansion is the most dangerous time. But you will try, Mike? Please?”

“The laws of robotics ensure that I will, Mrs. Arnfeld,” said Mike solemnly.

As they left, Johannes said in what Mrs. Arnfeld understood to be an attempt at reassurance, “Really, Tertia, we have a holo-sonogram and a detailed cat scan of the area. Mike knows the precise location of every significant cancerous lesion. Most of his time will be spent searching for small lesions undetectable by instruments, but that can’t be helped. We must get them all, if we can, you see, and that takes time. Mike is strictly instructed, however, as to how small to get, and he will get no smaller, you can be sure. A robot must obey orders.”

“And the reexpansion, Ben?”

“There, Tertia, we’re in the lap of the quanta. There is no way of predicting, but there is a more than reasonable chance that he will get out without trouble. Naturally, we will have him reexpand within Gregory’s body as little as possible—just enough to make us reasonably certain we can find and extract him. He will then be rushed to the safe room where the rest of the reexpansion will take place. Please, Tertia, even ordinary medical procedures have their risk.”

Mrs. Arnfeld was in the observation room as the miniaturization of Mike took place. So were the holovision cameras and selected media representatives. The importance of the medical experiment made it impossible to prevent that, but Mrs. Arnfeld was in a niche with only Johannes for company, and it was understood that she was not to be approached for comment, particularly if anything untoward occurred.

Untoward! A full and sudden reexpansion would blow up the entire operating room and kill every person in it. It was not for nothing the observation room was underground and half a mile away from the viewing room.

It gave Mrs. Arnfeld a somewhat grisly sense of assurance that the three miniaturists who were working on the procedure (so calmly, it would seem—so calmly) were condemned to death as firmly as her husband was in case of—anything untoward. Surely, she could rely on them protecting their own lives to the extreme; they would not, therefore, be cavalier in the protection of her husband.

Eventually, of course, if the procedure were successful, ways would be worked out to perform it in automated fashion, and only the patient would be at risk. Then, perhaps, the patient might be more easily sacrificed through carelessness—but not now, not now. Mrs. Arnfeld keenly watched the three, working under imminent sentence of death for any sign of discomposure.

She watched the miniaturization procedure (she had seen it before) and saw Mike grow smaller and disappear. She watched the elaborate procedure that injected him into the proper place in her husband’s body. (It had been explained to her that it would have been prohibitively expensive to inject human beings in a submarine device instead. Mike, at least, needed no life-support system.)

Then matters shifted to the screen, in which the appropriate section of the body was shown in holosonogram. It was a three-dimensional representation, cloudy and unfocused, made imprecise through a combination of the finite size of the sound waves and the effects of Brownian motion. It showed Mike dimly and noiselessly making his way through Gregory Arnfeld’s tissues by way of his bloodstream. It was almost impossible to tell what he was doing, but Johannes described the events to her in a low, satisfied manner, until she could listen to him no more and asked to be led away.

She had been mildly sedated, and she had slept until evening, when Johannes came to see her. She had not been long awake and it took her a moment to gather her faculties. Then she said, in sudden and overwhelming fear, “What has happened?”

Johannes said, hastily, “Success, Tertia. Complete success. Your husband is cured. We can’t stop the cancer from recurring, but for now he is cured.”

She fell back in relief. “Oh, wonderful.”

“Just the same, something unexpected has happened and this will have to be explained to Gregory. We felt that it would be best if you did the explaining. ‘,

“I?” Then, in a renewed access of fear, “What has happened?” Johannes told her.

It was two days before she could see her husband for more than a moment or two. He was sitting up in bed, looking a little pale, but smiling at her.

“A new lease on life, Tertia,” he said buoyantly.

“Indeed, Greg, I was quite wrong. The experiment succeeded and they tell me they can’t find a trace of cancer in you.”

“Well, we can’t be too confident about that. There may be a cancerous cell here and there, but perhaps my immune system will handle it, especially with the proper medication, and if it ever builds up again, which might well take years, we’ll call on Mike again.”

At this point, he frowned and said, “You know, I haven’t seen Mike.”

Mrs. Arnfeld maintained a discreet silence.

Arnfeld said, “They’ve been putting me off.”

“You’ve been weak, dear, and sedated. Mike was poking through your tissues and doing a little necessary destructive work here and there. Even with a successful operation you need time for recovery.”

“If I’ve recovered enough to see you, surely I’ve recovered enough to see Mike, at least long enough to thank him.”

“A robot doesn’t need to receive thanks.”

“Of course not, but I need to give it. Do me a favor, Tertia. Go out there and tell them I want Mike right away.”

Mrs. Arnfeld hesitated, then came to a decision. Waiting would make the task harder for everyone. She said carefully, “ Actually, dear, Mike is not available.”

“Not available! Why not?”

“He had to make a choice, you see. He had cleaned up your tissues marvelously well; he had done a magnificent job, everyone agrees; and then he had to undergo reexpansion. That was the risky part.”

“Yes, but here I am. Why are you making a long story out of it?”

“Mike decided to minimize the risk. “

“Naturally. What did he do?”

“Well, dear, he decided to make himself smaller. “

“What! He couldn’t. He was ordered not to.”

“That was Second Law, Greg. First Law took precedence. He wanted to make certain your life would be saved. He was equipped to control his own size, so he made himself smaller as rapidly as he could, and when he was far less massive than an electron he used his laser beam, which was by then too tiny to hurt anything in your body, and the recoil sent him flying away at nearly the speed of light. He exploded in outer space. The gamma rays were detected.”

Arnfeld stared at her. “You can’t mean it. Are you serious? Mike is dead?”

“That’s what happened. Mike could not refuse to take an action that might keep you from harm.”

“But I didn’t want that. I wanted him safe for further work. He wouldn’t have reexpanded uncontrollably. He would have gotten out safely.”

“He couldn’t be sure. He couldn’t risk your life, so he sacrificed his own.”

“But my life was less important than his.”

“Not to me, dear. Not to those who work with you. Not to anyone. Not even to Mike.” She put out her hand to him.

“Come, Greg, you’re alive. You’re well. That’s all that counts.”

But he pushed her hand aside impatiently. “That’s not all that counts. You don’t understand. Oh, too bad. Too bad!”