

THE LIFE AND TIMES OF MULTIVAC

Isaac Asimov



Isaac Asimov's body of work is part of the essential corpus of hard science fiction. As a teenager in the 1930s he was one of the first generation of science fiction fans who became a science fiction writer. He was a leading light of Campbell's *Astounding* in the forties with his robot stories, embodying his famous "Three Laws," collected in 1950 as *I, Robot*, as well as his *Foundation* series, later published in the 1960s as *The Foundation Trilogy*. All the while he was progressing through college and graduate school, finally attaining his Ph.D. in biochemistry and a tenured teaching position at Boston University School of Medicine. At the height of his powers and popularity in sf, he turned to writing popular science essays and books in the late fifties and became the greatest living writer in that field of the second half of the twentieth century. Immensely prolific, he had published more than 400 books, most of them nonfiction, before his death in 1992.

Asimov was a rationalist and a true believer in science as a way of knowing, and that attitude permeated his writing and emanated from his personal affect. He was an indefatigable public figure in the science fiction world throughout his adult life, a charismatic center of attention. A protégé of John W. Campbell (whom at least until the 1950s he used to visit weekly whenever possible for editorial sessions), Asimov was devoted to hard science fiction, generous in his praise of other hard science fiction writers, and always careful to distinguish hard sf from other varieties.

Over several decades, Asimov wrote a number of stories about supercomputers (not always the same one) named Multivac. "The Machine That Won the War" (1961), for instance, is a clever Asimovian retelling of the folktale of John Henry and the steam drill, the legend of the man who beat the machine. It is a hard-science allegory of thinking men and thinking machines that underscores the limits of technology without undermining the basic technological optimism of sf. It is also an interesting counterpoint to Asimov's "The Last Question," an earlier Multivac story, and a more serious (and uncharacteristically metaphysical) consideration of humanity's relation to machines. As is this story.

"The Life and Times of Multivac" was written in 1973 at the request of *The New York Times Magazine* for a science fiction story about humans and machines. Asimov constructed a provocative intellectual situation using conventional materials and raised the stakes by invoking free will versus determinism, achieving in the end both a solved problem and another, posed, problem. It is interesting to note that Asimov's original title for the story was "Mathematical Games." It is in one sense a rethinking of "The Machine That Won the War," but with significantly less technological optimism and more sophisticated execution.

But no matter how intellectual and abstract the problem, an individual human can take action using knowledge of science (and math) in the external world to solve it. This is the belief which was integral to Asimov's life and writing, the faith of hard sf.

The whole world was interested. The whole world could watch. If anyone wanted to know how many did watch, Multivac could have told them. The great computer Multivac kept track—as it did of everything.

Multivac was the judge in this particular case, so coldly objective and purely upright that there was no need of prosecution or defense. There was only the accused, Simon Hines, and the evidence, which consisted, in part, of Ronald Bakst.

Bakst watched, of course. In his case, it was compulsory. He would rather it were not. In his tenth decade, he was showing signs of age and his ruffled hair was distinctly gray.

Noreen was not watching. She had said at the door, "If we had a friend left—" She paused, then added, "Which I doubt!" and left.

Bakst wondered if she would come back at all, but at the moment, it didn't matter.

Hines had been an incredible idiot to attempt actual action, as though one could think of walking up to a Multivac outlet and smashing it—as though he didn't know a world-girdling computer, the world-girdling Computer (capital letter, please) with millions of robots at its command, couldn't protect itself. And even if the outlet had been smashed, what would that have accomplished?

And Hines did it in Bakst's physical presence, too!

He was called, precisely on schedule—"Ronald Bakst will give evidence now."

Multivac's voice was beautiful, with a beauty that never quite vanished no matter how often it was heard. Its timbre was neither quite male nor, for that matter, female, and it spoke in whatever language its hearer understood best.

"I am ready to give evidence," Bakst said.

There was no way to say anything but what he had to say. Hines could not avoid conviction. In the days when Hines would have had to face his fellow human beings, he would have been convicted more quickly and less fairly—and would have been punished more cruelly.

Fifteen days passed, days during which Bakst was quite alone. Physical aloneness was not a difficult thing to envisage in the world of Multivac. Hordes had died in the days of the great catastrophes and it had been the computers that had saved what was left and directed the recovery—and improved their own designs till all were merged into Multivac—and the five million human beings were left on Earth to live in perfect comfort.

But those five million were scattered and the chances of one seeing another outside the immediate circle, except by design, was not great. No one was designing to see Bakst, not even by television.

For the time, Bakst could endure the isolation. He buried himself in his chosen way—which happened to be, these last twenty-three years, the designing of mathematical games. Every man and woman on Earth could develop a way of life to self-suit, provided always that Multivac, weighing all of human affairs with perfect skill, did not judge the chosen way to be subtractive to human happiness.

But what could be subtractive in mathematical games? It was purely abstract—pleased Bakst—harmed no one else.

He did not expect the isolation to continue. The Congress would not isolate him permanently without a trial—a different kind of trial from that which Hines had experienced, of course, one without Multivac's tyranny of absolute justice.

Still, he was relieved when it ended, and pleased that it was Noreen coming back that ended it. She came trudging over the hill toward him and he started toward her, smiling. It had been a successful five-year period during which they

had been together. Even the occasional meetings with her two children and two grandchildren had been pleasant.

He said, "Thank you for being back."

She said, "I'm not back." She looked tired. Her brown hair was windblown, her prominent cheeks a trifle rough and sunburned.

Bakst pressed the combination for a light lunch and coffee. He knew what she liked. She didn't stop him, and though she hesitated for a moment, she ate.

She said, "I've come to talk to you. The Congress sent me."

"The Congress!" he said. "Fifteen men and women—counting me. Self-appointed and helpless."

"You didn't think so when you were a member."

"I've grown older. I've learned."

"At least you've learned to betray your friends."

"There was no betrayal. Hines tried to damage Multivac; a foolish, impossible thing for him to try."

"You accused him."

"I had to. Multivac knew the facts without my accusation, and without my accusation, I would have been an accessory. Hines would not have gained, but I would have lost."

"Without a human witness, Multivac would have suspended sentence."

"Not in the case of an anti-Multivac act. This wasn't a case of illegal parenthood or life-work without permission. I couldn't take the chance."

"So you let Simon be deprived of all work permits for two years."

"He deserved it."

"A consoling thought. You may have lost the confidence of the Congress, but you have gained the confidence of Multivac."

"The confidence of Multivac is important in the world as it is," said Bakst seriously. He was suddenly conscious of not being as tall as Noreen.

She looked angry enough to strike him; her lips pressed whitely together. But then she had passed her eightieth birthday—no longer young—the habit of non-violence was too ingrained. . . . Except for fools like Hines.

"Is that all you have to say, then?" she said.

"There could be a great deal to say. Have you forgotten? Have you all forgotten? Do you remember how it once was? Do you remember the Twentieth Century? We live long now; we live securely now; we live happily now."

"We live worthlessly now."

"Do you want to go back to what the world was like once?"

Noreen shook her head violently. "Demon tales to frighten us. We have learned our lesson. With the help of Multivac we have come through—but we don't need that help any longer. Further help will soften us to death. Without Multivac, we will run the robots, we will direct the farms and mines and factories."

"How well?"

"Well enough. Better, with practice. We need the stimulation of it in any case or we will all die."

Bakst said, "We have our work, Noreen; whatever work we choose."

"Whatever we choose, as long as it's unimportant, and even that can be taken away at will—as with Hines. And what's your work, Ron? Mathematical games? Drawing lines on paper? Choosing number combinations?"

Bakst's hand reached out to her, almost pleadingly. "That can be important. It is not nonsense. Don't underestimate—" He paused, yearning to explain but not quite knowing how he could, safely. He said, "I'm working on some deep problems in combinatorial analysis based on gene patterns that can be used to—"

"To amuse you and a few others. Yes, I've heard you talk about your games. You will decide how to move from A to B in a minimum number of steps and that will teach you how to go from womb to grave in a minimum number of risks and we will all thank Multivac as we do so."

She stood up. "Ron, you will be tried. I'm sure of it. Our trial. And you will be dropped. Multivac will protect you against physical harm, but you know it will not force us to see you, speak to you, or have anything to do with you. You will find that without the stimulation of human interaction, you will not be able to think—or to play your games. Goodbye."

"Noreen! Wait!"

She turned at the door. "Of course, you will have Multivac. You can talk to Multivac, Ron."

He watched her dwindle as she walked down the road through the parklands kept green, and ecologically healthy, by the unobtrusive labors of quiet, single-minded robots one scarcely ever saw.

He thought: Yes, I will have to talk to Multivac.

Multivac had no particular home any longer. It was a global presence knit together by wire, optical fiber, and microwave. It had a brain divided into a hundred subsidiaries but acting as one. It had its outlets everywhere and no human being of the five million was far from one.

There was time for all of them, since Multivac could speak to all individually at the same time and not lift its mind from the greater problems that concerned it.

Bakst had no illusions as to its strength. What was its incredible intricacy but a mathematical game that Bakst had come to understand over a decade ago? He knew the manner in which the connecting links ran from continent to continent in a huge network whose analysis could form the basis of a fascinating game. How do you arrange the network so that the flow of information never jams? How do you arrange the switching points? Prove that no matter what the arrangement, there is always at least one point which, on disconnection—

Once Bakst had learned the game, he had dropped out of the Congress. What could they do but talk and of what use was that? Multivac indifferently permitted talk of any kind and in any depth precisely because it was unimportant. It was only acts that Multivac prevented, diverted, or punished.

And it was Hines's act that was bringing on the crisis; and before Bakst was ready for it, too.

Bakst had to hasten now, and he applied for an interview with Multivac without any degree of confidence in the outcome.

Questions could be asked of Multivac at any time. There were nearly a million outlets of the type that had withstood Hines's sudden attack into which, or near which, one could speak. Multivac would answer.

An interview was another matter. It required time; it required privacy; most of all it required Multivac's judgment that it was necessary. Although Multivac had capacities that not all the world's problems consumed, it had grown chary, somehow, of its time. Perhaps that was the result of its ever-continuing self-improvement. It was becoming constantly more aware of its own worth and less likely to bear trivialities with patience.

Bakst had to depend on Multivac's good will. His leaving of the Congress, all his actions since, even the bearing of evidence against Hines, had been to gain that good will. Surely it was the key to success in this world.

He would have to assume the good will. Having made the application, he at once traveled to the nearest substation by air. Nor did he merely send his image.

He wanted to be there in person; somehow he felt his contact with Multivac would be closer in that way.

The room was almost as it might be if there were to be a human conference planned over closed multivision. For one flash-by moment, Bakst thought Multivac might assume an imaged human form and join him—the brain made flesh.

It did not, of course. There was the soft, whispering chuckle of Multivac's unceasing operations; something always and forever present in Multivac's presence; and over it, now, Multivac's voice.

It was not the usual voice of Multivac. It was a still, small voice, beautiful and insinuating, almost in his ear.

"Good day, Bakst. You are welcome. Your fellow human beings disapprove of you."

Multivac always comes to the point, thought Bakst. He said, "It does not matter, Multivac. What counts is that I accept your decisions as for the good of the human species. You were designed to do so in the primitive versions of yourself and—"

"And my self-designs have continued this basic approach. If you understand this, why do so many human beings fail to understand it? I have not yet completed the analysis of that phenomenon."

"I have come to you with a problem," said Bakst.

Multivac said, "What is it?"

Bakst said, "I have spent a great deal of time on mathematical problems inspired by the study of genes and their combinations. I cannot find the necessary answers and home-computerization is of no help."

There was an odd clicking and Bakst could not repress a slight shiver at the sudden thought that Multivac might be avoiding a laugh. It was a touch of the human beyond what even he was ready to accept. The voice was in his other ear and Multivac said:

"There are thousands of different genes in the human cell. Each gene has an average of perhaps fifty variations in existence and uncounted numbers that have never been in existence. If we were to attempt to calculate all possible combinations, the mere listing of them at my fastest speed, if steadily continued, would, in the longest possible lifetime of the Universe, achieve but an infinitesimal fraction of the total."

Bakst said, "A complete listing is not needed. That is the point of my game. Some combinations are more probable than others and by building probability upon probability, we can cut the task enormously. It is the manner of achieving this building of probability upon probability that I ask you to help me with."

"It would still take a great deal of my time. How could I justify this to myself?"

Bakst hesitated. No use in trying a complicated selling job. With Multivac, a straight line was the shortest distance between two points.

He said, "An appropriate gene combination might produce a human being more content to leave decisions to you, more willing to believe in your resolve to make men happy, more anxious to be happy. I cannot find the proper combination, but you might, and with guided genetic engineering—"

"I see what you mean. It is—good. I will devote some time to it."

Bakst found it difficult to hitch into Noreen's private wavelength. Three times the connection broke away. He was not surprised. In the last two months, there had been an increasing tendency for technology to slip in minor ways—never for long, never seriously—and he greeted each occasion with a somber pleasure.

This time it held. Noreen's face showed, holographically three-dimensional. It flickered a moment, but it held.

"I'm returning your call," said Bakst, dully impersonal.

"For a while it seemed impossible to get you," said Noreen. "Where have you been?"

"Not hiding. I'm here, in Denver."

"Why in Denver?"

"The world is my oyster, Noreen. I may go where I please."

Her face twitched a little. "And perhaps find it empty everywhere. We are going to try you, Ron."

"Now?"

"Now!"

"And here?"

"And here!"

Volumes of space flickered into different glitters on either side of Noreen, and further away, and behind. Bakst looked from side to side, counting. There were fourteen, six men, eight women. He knew every one of them. They had been good friends once, not so long ago.

To either side and beyond the simulacra was the wild background of Colorado on a pleasant summer day that was heading toward its end. There had been a city here once named Denver. The site still bore the name though it had been cleared, as most of the city sites had been. . . . He could count ten robots in sight, doing whatever it was robots did.

They were maintaining the ecology, he supposed. He knew no details, but Multivac did, and it kept fifty million robots all over the Earth in efficient order.

Behind Bakst was one of the converging grids of Multivac, almost like a small fortress of self-defense.

"Why now?" he asked. "And why here?"

Automatically he turned to Eldred. She was the oldest of them and the one with authority—if a human being could be said to have authority.

Eldred's dark-brown face looked a little weary. The years showed, all sixscore of them, but her voice was firm and incisive. "Because we have the final fact now. Let Noreen tell you. She knows best."

Bakst's eyes shifted to Noreen. "Of what crime am I accused?"

"Let us play no games, Ron. There are no crimes under Multivac except to strike for freedom and it is your human crime that you have committed no crime under Multivac. For that we will judge whether any human being alive wants your company any longer, wants to hear your voice, be aware of your presence, or respond to you in any way."

"Why am I threatened with isolation then?"

"You have betrayed all human beings."

"How?"

"Do you deny that you seek to breed mankind into subservience to Multivac?"

"Ah!" Bakst folded his arms across his chest. "You found out quickly, but then you had only to ask Multivac."

Noreen said, "Do you deny that you asked for help in the genetic engineering of a strain of humanity designed to accept slavery under Multivac without question?"

"I suggested the breeding of a more contented humanity. Is this a betrayal?"

Eldred intervened. She said, "We don't want your sophistry, Ron. We know it by heart. Don't tell us once again that Multivac cannot be withstood, that there is no use in struggling, that we have gained security. What you call security, the rest of us call slavery."

Bakst said, "Do you proceed now to judgment, or am I allowed a defense?"

"You heard Eldred," said Noreen. "We know your defense."

"We all heard Eldred," said Bakst, "but no one has heard me. What she says is my defense is not my defense."

There was a silence as the images glanced right and left at each other. Eldred said, "Speak!"

Bakst said, "I asked Multivac to help me solve a problem in the field of mathematical games. To gain his interest, I pointed out that it was modeled on gene combinations and that a solution might help in designing a gene combination that would leave man no worse off than he is now in any respect and yet breed into him a cheerful acceptance of Multivac's direction, and acquiescence in his decisions."

"So we have said," said Eldred.

"It was only on those terms that Multivac would have accepted the task. Such a new breed is clearly desirable for mankind by Multivac's standards, and by Multivac's standards he must labor toward it. And the desirability of the end will lure him on to examine greater and greater complications of a problem whose endlessness is beyond what even he can handle. You all witness that."

Noreen said, "Witness what?"

"Haven't you had trouble reaching me? In the last two months, hasn't each of you noticed small troubles in what has always gone smoothly? . . . You are silent. May I accept that as an affirmative?"

"If so, what then?"

Bakst said, "Multivac has been placing all his spare circuits on the problem. He has been slowly pushing the running of the world toward rather a skimpy minimum of his efforts, since nothing, by his own sense of ethics, must stand in the way of human happiness and there can be no greater increase in that happiness than to accept Multivac."

Noreen said, "What does all this mean? There is still enough in Multivac to run the world—and us—and if this is done at less than full efficiency, that would only add temporary discomfort to our slavery. Only temporary, because it won't last long. Sooner or later, Multivac will decide the problem is insoluble, or will solve it, and in either case, his distraction will end. In the latter case, slavery will become permanent and irrevocable."

"But for now he is distracted," said Bakst, "and we can even talk like this—most dangerously—without his noticing. Yet I dare not risk doing so for long, so please understand me quickly."

"I have another mathematical game—the setting up of networks on the model of Multivac. I have been able to demonstrate that no matter how complicated and redundant the network is, there must be at least one place into which all the currents can funnel under particular circumstances. There will always be the fatal apopleptic stroke if that one place is interfered with, since it will induce overloading elsewhere which will break down and induce overloading elsewhere—and so on indefinitely till all breaks down."

"Well?"

"And this is the point. Why else have I come to Denver? And Multivac knows it, too, and this point is guarded electronically and robotically to the extent that it cannot be penetrated."

"Well?"

"But Multivac is distracted, and Multivac trusts me. I have labored hard to gain that trust, at the cost of losing all of you, since only with trust is there the possibility of betrayal. If any of you tried to approach this point, Multivac might rouse himself

even out of his present distraction. If Multivac were not distracted, he would not allow even me to approach. But he is distracted, and it is I!"

Bakst was moving toward the converging grid in a calm saunter, and the fourteen images, keyed to him, moved along as well. The soft susurrations of a busy Multivac center were all about them.

Bakst said, "Why attack an invulnerable opponent? Make him vulnerable first, and then—"

Bakst fought to stay calm, but it all depended on this now. Everything! With a sharp yank, he uncoupled a joint. (If he had only had still more time to make more certain.)

He was not stopped—and as he held his breath, he became aware of the ceasing of noise, the ending of whisper, the closing down of Multivac. If, in a moment, that soft noise did not return, then he had had the right key point, and no recovery would be possible. If he were not quickly the focus of approaching robots—

He turned in the continuing silence. The robots in the distance were working still. None were approaching.

Before him, the images of the fourteen men and women of the Congress were still there and each seemed to be stupefied at the sudden enormous thing that had happened.

Bakst said, "Multivac is shut down, burnt out. It can't be rebuilt." He felt almost drunk at the sound of what he was saying. "I have worked toward this since I left you. When Hines attacked, I feared there might be other such efforts, that Multivac would double his guard, that even I—I had to work quickly—I wasn't sure—" He was gasping, but forced himself steady, and said solemnly, "I have given us our freedom."

And he paused, aware at last of the gathering weight of the silence. Fourteen images stared at him, without any of them offering a word in response.

Bakst said sharply, "You have talked of freedom. You have it!"

Then, uncertainly, he said, "Isn't that what you want?"