

RETRIEF OF THE RED-TAPE MOUNTAIN by Keith Laumer

worlds of **if** *Science Fiction* *may 1962*
35¢K

by Fritz Leiber

The 64-Square Madhouse



The Project Gutenberg eBook of The 64-Square Madhouse

This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

Title: The 64-Square Madhouse

Author: Fritz Leiber

Illustrator: Burns

Release date: January 21, 2020 [eBook #61213]

Most recently updated: October 17, 2024

Language: English

Other information and formats: www.gutenberg.org/ebooks/61213

Credits: Produced by Greg Weeks, Mary Meehan and the Online Distributed Proofreading Team at <http://www.pgdp.net>

*** START OF THE PROJECT GUTENBERG EBOOK THE 64-SQUARE MADHOUSE ***

THE 64-SQUARE MADHOUSE

by FRITZ LEIBER

**The machine was not perfect. It
could be tricked. It could make
mistakes. And—it could learn!**

**[Transcriber's Note: This etext was produced from
Worlds of If Science Fiction, May 1962.
Extensive research did not uncover any evidence that
the U.S. copyright on this publication was renewed.]**

Silently, so as not to shock anyone with illusions about well dressed young women, Sandra Lea Grayling cursed the day she had persuaded the *Chicago Space Mirror* that there would be all sorts of human interest stories to be picked up at the first international grandmaster chess tournament in which an electronic computing machine was entered.

Not that there weren't enough humans around, it was the interest that was in doubt. The large hall was crammed with energetic dark-suited men of whom a disproportionately large number were bald, wore glasses, were faintly untidy and indefinably shabby, had Slavic or Scandinavian features, and talked foreign languages.

They yakked interminably. The only ones who didn't were scurrying individuals with the eager-zombie look of officials.

Chess sets were everywhere—big ones on tables, still bigger diagram-type electric ones on walls, small peg-in sets dragged from side pockets and manipulated rapidly as part of the conversational ritual and still smaller folding sets in which the pieces were the tiny magnetized disks used for playing in free-fall.

There were signs featuring largely mysterious combinations of letters: FIDE, WBM, USCF, USSF, USSR and UNESCO. Sandra felt fairly sure about the last three.

The many clocks, bedside table size, would have struck a familiar note except that they had little red flags and wheels sprinkled over their faces and they were all in pairs, two clocks to a case. That Siamese-twin clocks should be essential to a chess tournament struck Sandra as a particularly maddening circumstance.

Her last assignment had been to interview the pilot pair riding the first American manned circum-lunar satellite—and the five alternate pairs who hadn't made the flight. This tournament hall seemed to Sandra much further out of the world.

Overheard scraps of conversation in reasonably intelligible English were not particularly helpful. Samples:

"They say the Machine has been programmed to play nothing but pure Barcza System and Indian Defenses—and the Dragon Formation if anyone pushes the King Pawn."

"Hah! In that case...."

"The Russians have come with ten trunkfuls of prepared variations and they'll gang up on the Machine at adjournments. What can one New Jersey computer do against four Russian grandmasters?"

"I heard the Russians have been programmed—with hypnotic cramming and somno-briefing. Votbinnik had a nervous breakdown."

"Why, the Machine hasn't even a *Hauptturnier* or an intercollegiate won. It'll over its head be playing."

"Yes, but maybe like Capa at San Sebastian or Morphy or Willie Angler at New York. The Russians will look like potzers."

"Have you studied the scores of the match between Moon Base and Circum-Terra?"

"Not worth the trouble. The play was feeble. Barely Expert Rating."

Sandra's chief difficulty was that she knew absolutely nothing about the game of chess—a point that she had slid over in conferring with the powers at the *Space Mirror*, but that now had begun to weigh on her. How wonderful it would be, she dreamed, to walk out this minute, find a quiet bar and get pie-eyed in an evil, ladylike way.

"Perhaps mademoiselle would welcome a drink?"

"You're durn tootin' she would!" Sandra replied in a rush, and then looked down apprehensively at the person who had read her thoughts.

It was a small sprightly elderly man who looked like a somewhat thinned down Peter Lorre—there was that same impression of the happy Slavic elf. What was left of his white hair was cut very short, making a silvery nap. His pince-nez had quite thick lenses. But in sharp contrast to the somberly clad men around them, he was wearing a pearl-gray suit of almost exactly the same shade as Sandra's—a circumstance that created for her the illusion that they were fellow conspirators.

"Hey, wait a minute," she protested just the same. He had already taken her arm and was piloting her toward the nearest flight of low wide stairs. "How did you know I wanted a drink?"

"I could see that mademoiselle was having difficulty swallowing," he replied, keeping them moving. "Pardon me for feasting my eyes on your lovely throat."

"I didn't suppose they'd serve drinks here."

"But of course." They were already mounting the stairs. "What would chess be without coffee or schnapps?"

"Okay, lead on," Sandra said. "You're the doctor."

"Doctor?" He smiled widely. "You know, I like being called that."

"Then the name is yours as long as you want it—Doc."

Meanwhile the happy little man had edged them into the first of a small cluster of tables, where a dark-suited jabbering trio was just rising. He snapped his fingers and hissed through his teeth. A white-aproned waiter materialized.

"For myself black coffee," he said. "For mademoiselle rhine wine and seltzer?"

"That'd go fine." Sandra leaned back. "Confidentially, Doc, I was having trouble swallowing ... well, just about everything here."

He nodded. "You are not the first to be shocked and horrified by chess," he assured her. "It is a curse of the intellect. It is a game for lunatics—or else it

creates them. But what brings a sane and beautiful young lady to this 64-square madhouse?"

Sandra briefly told him her story and her predicament. By the time they were served, Doc had absorbed the one and assessed the other.

"You have one great advantage," he told her. "You know nothing whatsoever of chess—so you will be able to write about it understandably for your readers." He swallowed half his demitasse and smacked his lips. "As for the Machine—you *do* know, I suppose, that it is not a humanoid metal robot, walking about clanking and squeaking like a late medieval knight in armor?"

"Yes, Doc, but...." Sandra found difficulty in phrasing the question.

"Wait." He lifted a finger. "I think I know what you're going to ask. You want to know why, if the Machine works at all, it doesn't work perfectly, so that it always wins and there is no contest. Right?"

Sandra grinned and nodded. Doc's ability to interpret her mind was as comforting as the bubbly, mildly astringent mixture she was sipping.

He removed his pince-nez, massaged the bridge of his nose and replaced them.

"If you had," he said, "a billion computers all as fast as the Machine, it would take them all the time there ever will be in the universe just to play through all the possible games of chess, not to mention the time needed to classify those games into branching families of wins for White, wins for Black and draws, and the additional time required to trace out chains of key-moves leading always to wins. So the Machine can't play chess like God. What the Machine can do is examine all the likely lines of play for about eight moves ahead—that is, four moves each for White and Black—and then decide which is the best move on the basis of capturing enemy pieces, working toward checkmate, establishing a powerful central position and so on."

"That sounds like the way a man would play a game," Sandra observed. "Look ahead a little way and try to make a plan. You know, like getting out trumps in bridge or setting up a finesse."

"Exactly!" Doc beamed at her approvingly. "The Machine *is* like a man. A rather peculiar and not exactly pleasant man. A man who always abides by sound principles, who is utterly incapable of flights of genius, but who never makes a mistake. You see, you are finding human interest already, even in the Machine."

Sandra nodded. "Does a human chess player—a grandmaster, I mean—ever look eight moves ahead in a game?"

"Most assuredly he does! In crucial situations, say where there's a chance of winning at once by trapping the enemy king, he examines many more moves ahead than that—thirty or forty even. The Machine is probably programmed to recognize such situations and do something of the same sort, though we can't be sure from the information World Business Machines has released. But in most chess positions the possibilities are so very nearly unlimited that even a grandmaster can only look a very few moves ahead and must rely on his judgment and experience and artistry. The equivalent of those in the Machine is the directions fed into it before it plays a game."

"You mean the programming?"

"Indeed yes! The programming is the crux of the problem of the chess-playing computer. The first practical model, reported by Bernstein and Roberts of IBM in 1958 and which looked four moves ahead, was programmed so that it had a greedy worried tendency to grab at enemy pieces and to retreat its own whenever they were attacked. It had a personality like that of a certain kind of chess-playing dub—a dull-brained woodpusher afraid to take the slightest risk of losing material—but a dub who could almost always beat an utter novice. The WBM machine here in the hall operates about a million times as fast. Don't ask me how, I'm no physicist, but it depends on the new transistors and something they call hypervelocity, which in turn depends on keeping parts of the Machine at a temperature near absolute zero. However, the result is that the Machine can see eight moves ahead and is capable of being programmed much more craftily."

"A million times as fast as the first machine, you say, Doc? And yet it only sees twice as many moves ahead?" Sandra objected.

"There is a geometrical progression involved there," he told her with a smile. "Believe me, eight moves ahead is a lot of moves when you remember that the Machine is errorlessly examining every one of thousands of variations. Flesh-and-blood chess masters have lost games by blunders they could have avoided by looking only one or two moves ahead. The Machine will make no such oversights. Once again, you see, you have the human factor, in this case working for the Machine."

"Savilly, I have been looking allplace for you!"

A stocky, bull-faced man with a great bristling shock of black, gray-flecked hair had halted abruptly by their table. He bent over Doc and began to whisper explosively in a guttural foreign tongue.

Sandra's gaze traveled beyond the balustrade. Now that she could look down at it, the central hall seemed less confusedly crowded. In the middle, toward the far end, were five small tables spaced rather widely apart and with a chessboard and men and one of the Siamese clocks set out on each. To either side of the hall were tiers of temporary seats, about half of them occupied. There were at least as many more people still wandering about.

On the far wall was a big electric scoreboard and also, above the corresponding tables, five large dully glassy chessboards, the White squares in light gray, the Black squares in dark.

One of the five wall chessboards was considerably larger than the other four—the one above the Machine.

Sandra looked with quickening interest at the console of the Machine—a bank of keys and some half-dozen panels of rows and rows of tiny telltale lights, all dark at the moment. A thick red velvet cord on little brass standards ran around the Machine at a distance of about ten feet. Inside the cord were only a few gray-smocked men. Two of them had just laid a black cable to the nearest chess table and were attaching it to the Siamese clock.

Sandra tried to think of a being who always checked everything, but only within limits beyond which his thoughts never ventured, and who never made a mistake....

"Miss Grayling! May I present to you Igor Jandorf."

She turned back quickly with a smile and a nod.

"I should tell you, Igor," Doc continued, "that Miss Grayling represents a large and influential Midwestern newspaper. Perhaps you have a message for her readers."

The shock-headed man's eyes flashed. "I most certainly do!" At that moment the waiter arrived with a second coffee and wine-and-seltzer. Jandorf seized Doc's new demitasse, drained it, set it back on the tray with a flourish and drew himself up.

"Tell your readers, Miss Grayling," he proclaimed, fiercely arching his eyebrows at her and actually slapping his chest, "that I, Igor Jandorf, will defeat the Machine by the living force of my human personality! Already I have offered to play it an informal game blindfold—I, who have played 50 blindfold games simultaneously! Its owners refuse me. I have challenged it also to a few games of rapid-transit—an offer no true grandmaster would dare ignore. Again they refuse me. I predict that the Machine will play like a great oaf—at least against *me*. Repeat: I, Igor Jandorf, by the living force of my human personality, will defeat the Machine. Do you have that? You can remember it?"

"Oh yes," Sandra assured him, "but there are some other questions I very much want to ask you, Mr. Jandorf."

"I am sorry, Miss Grayling, but I must clear my mind now. In ten minutes they start the clocks."

While Sandra arranged for an interview with Jandorf after the day's playing session, Doc reordered his coffee.

"One expects it of Jandorf," he explained to Sandra with a philosophic shrug when the shock-headed man was gone. "At least he didn't take your

wine-and-seltzer. Or did he? One tip I have for you: don't call a chess master Mister, call him Master. They all eat it up."

"Gee, Doc, I don't know how to thank you for everything. I hope I haven't offended Mis—Master Jandorf so that he doesn't—"

"Don't worry about that. Wild horses couldn't keep Jandorf away from a press interview. You know, his rapid-transit challenge was cunning. That's a minor variety of chess where each player gets only ten seconds to make a move. Which I don't suppose would give the Machine time to look three moves ahead. Chess players would say that the Machine has a very slow sight of the board. This tournament is being played at the usual international rate of 15 moves an hour, and—"

"Is that why they've got all those crazy clocks?" Sandra interrupted.

"Oh, yes. Chess clocks measure the time each player takes in making his moves. When a player makes a move he presses a button that shuts his clock off and turns his opponent's on. If a player uses too much time, he loses as surely as if he were checkmated. Now since the Machine will almost certainly be programmed to take an equal amount of time on successive moves, a rate of 15 moves an hour means it will have 4 minutes a move—and it will need every second of them! Incidentally it was typical Jandorf bravado to make a point of a blindfold challenge—just as if the Machine weren't playing blindfold itself. Or *is* the Machine blindfold? How do you think of it?"

"Gosh, I don't know. Say, Doc, is it really true that Master Jandorf has played 50 games at once blindfolded? I can't believe that."

"Of course not!" Doc assured her. "It was only 49 and he lost two of those and drew five. Jandorf always exaggerates. It's in his blood."

"He's one of the Russians, isn't he?" Sandra asked. "Igor?"

Doc chuckled. "Not exactly," he said gently. "He is originally a Pole and now he has Argentinian citizenship. You have a program, don't you?"

Sandra started to hunt through her pocketbook, but just then two lists of names lit up on the big electric scoreboard.

THE PLAYERS

William Angler, USA
Bela Grabo, Hungary
Ivan Jal, USSR
Igor Jandorf, Argentina
Dr. S. Krakatower, France
Vassily Lysmov, USSR
The Machine, USA (programmed by Simon Great)
Maxim Serek, USSR
Moses Sherevsky, USA
Mikhail Votbinnik, USSR
Tournament Director: Dr. Jan Vanderhoef

FIRST ROUND PAIRINGS

Sherevsky vs. Serek
Jal vs. Angler
Jandorf vs. Votbinnik
Lysmov vs. Krakatower
Grabo vs. Machine

"Cripes, Doc, they all sound like they were Russians," Sandra said after a bit. "Except this Willie Angler. Oh, he's the boy wonder, isn't he?"

Doc nodded. "Not such a boy any longer, though. He's.... Well, speak of the Devil's children.... Miss Grayling, I have the honor of presenting to you the only grandmaster ever to have been ex-chess-champion of the United States while still technically a minor—Master William Augustus Angler."

A tall, sharply-dressed young man with a hatchet face pressed the old man back into his chair.

"How are you, Savvy, old boy old boy?" he demanded. "Still chasing the girls, I see."

"Please, Willie, get off me."

"Can't take it, huh?" Angler straightened up somewhat. "Hey waiter! Where's that chocolate malt? I don't want it *next* year. About that *ex-*, though. I was swindled, Savvy. I was robbed."

"Willie!" Doc said with some asperity. "Miss Grayling is a journalist. She would like to have a statement from you as to how you will play against the Machine."

Angler grinned and shook his head sadly. "Poor old Machine," he said. "I don't know why they take so much trouble polishing up that pile of tin just so that I can give it a hit in the head. I got a hatful of moves it'll burn out all its tubes trying to answer. And if it gets too fresh, how about you and me giving its low-temperature section the hotfoot, Savvy? The money WBM's putting up is okay, though. That first prize will just fit the big hole in my bank account."

"I know you haven't the time now, Master Angler," Sandra said rapidly, "but if after the playing session you could grant me—"

"Sorry, babe," Angler broke in with a wave of dismissal. "I'm dated up for two months in advance. Waiter! I'm here, not there!" And he went charging off.

Doc and Sandra looked at each other and smiled.

"Chess masters aren't exactly humble people, are they?" she said.

Doc's smile became tinged with sad understanding. "You must excuse them, though," he said. "They really get so little recognition or recompense. This tournament is an exception. And it takes a great deal of ego to play greatly."

"I suppose so. So World Business Machines is responsible for this tournament?"

"Correct. Their advertising department is interested in the prestige. They want to score a point over their great rival."

"But if the Machine plays badly it will be a black eye for them," Sandra pointed out.

"True," Doc agreed thoughtfully. "WBM must feel very sure.... It's the prize money they've put up, of course, that's brought the world's greatest players here. Otherwise half of them would be holding off in the best temperamental-artist style. For chess players the prize money is fabulous—\$35,000, with \$15,000 for first place, and all expenses paid for all players. There's never been anything like it. Soviet Russia is the only country that has ever supported and rewarded her best chess players at all adequately. I think the Russian players are here because UNESCO and FIDE (that's *Federation Internationale des Echecs*—the international chess organization) are also backing the tournament. And perhaps because the Kremlin is hungry for a little prestige now that its space program is sagging."

"But if a Russian doesn't take first place it will be a black eye for them."

Doc frowned. "True, in a sense. *They* must feel very sure.... Here they are now."

Four men were crossing the center of the hall, which was clearing, toward the tables at the other end. Doubtless they just happened to be going two by two in close formation, but it gave Sandra the feeling of a phalanx.

"The first two are Lysmov and Votbinnik," Doc told her. "It isn't often that you see the current champion of the world—Votbinnik—and an ex-champion arm in arm. There are two other persons in the tournament who have held that honor—Jal and Vanderhoef the director, way back."

"Will whoever wins this tournament become champion?"

"Oh no. That's decided by two-player matches—a very long business—after elimination tournaments between leading contenders. This tournament is a round robin: each player plays one game with every other player. That means nine rounds."

"Anyway there *are* an awful lot of Russians in the tournament," Sandra said, consulting her program. "Four out of ten have USSR after them. And Bela Grabo, Hungary—that's a satellite. And Sherevsky and Krakatower are Russian-sounding names."

"The proportion of Soviet to American entries in the tournament represents pretty fairly the general difference in playing strength between the two countries," Doc said judiciously. "Chess mastery moves from land to land with the years. Way back it was the Moslems and the Hindus and Persians. Then Italy and Spain. A little over a hundred years ago it was France and England. Then Germany, Austria and the New World. Now it's Russia—including of course the Russians who have run away from Russia. But don't think there aren't a lot of good Anglo-Saxon types who are masters of the first water. In fact, there are a lot of them here around us, though perhaps you don't think so. It's just that if you play a lot of chess you get to looking Russian. Once it probably made you look Italian. Do you see that short bald-headed man?"

"You mean the one facing the Machine and talking to Jandorf?"

"Yes. Now that's one with a lot of human interest. Moses Sherevsky. Been champion of the United States many times. A very strict Orthodox Jew. Can't play chess on Fridays or on Saturdays before sundown." He chuckled. "Why, there's even a story going around that one rabbi told Sherevsky it would be unlawful for him to play against the Machine because it is technically a *golem*—the clay Frankenstein's monster of Hebrew legend."

Sandra asked, "What about Grabo and Krakatower?"

Doc gave a short scornful laugh. "Krakatower! Don't pay any attention to *him*. A senile has-been, it's a scandal he's been allowed to play in this tournament! He must have pulled all sorts of strings. Told them that his lifelong services to chess had won him the honor and that they had to have a member of the so-called Old Guard. Maybe he even got down on his knees and cried—and all the time his eyes on that expense money and the last-place consolation prize! Yet dreaming schizophrenically of beating them all! Please, don't get me started on Dirty Old Krakatower."

"Take it easy, Doc. He sounds like he would make an interesting article? Can you point him out to me?"

"You can tell him by his long white beard with coffee stains. I don't see it anywhere, though. Perhaps he's shaved it off for the occasion. It would be like that antique womanizer to develop senile delusions of youthfulness."

"And Grabo?" Sandra pressed, suppressing a smile at the intensity of Doc's animosity.

Doc's eyes grew thoughtful. "About Bela Grabo (why are three out of four Hungarians named Bela?) I will tell you only this: That he is a very brilliant player and that the Machine is very lucky to have drawn him as its first opponent."

He would not amplify his statement. Sandra studied the Scoreboard again.

"This Simon Great who's down as programming the Machine. He's a famous physicist, I suppose?"

"By no means. That was the trouble with some of the early chess-playing machines—they were programmed by scientists. No, Simon Great is a psychologist who at one time was a leading contender for the world's chess championship. I think WBM was surprisingly shrewd to pick him for the programming job. Let me tell you—No, better yet—"

Doc shot to his feet, stretched an arm on high and called out sharply, "Simon!"

A man some four tables away waved back and a moment later came over.

"What is it, Savilly?" he asked. "There's hardly any time, you know."

The newcomer was of middle height, compact of figure and feature, with graying hair cut short and combed sharply back.

Doc spoke his piece for Sandra.

Simon Great smiled thinly. "Sorry," he said, "But I am making no predictions and we are giving out no advance information on the programming of the Machine. As you know, I have had to fight the Players' Committee tooth and nail on all sorts of points about that and they have won most of them. I am not permitted to re-program the Machine at

adjournments—only between games (I did insist on that and get it!) And if the Machine breaks down during a game, its clock keeps running on it. My men are permitted to make repairs—if they can work fast enough."

"That makes it very tough on you," Sandra put in. "The Machine isn't allowed any weaknesses."

Great nodded soberly. "And now I must go. They've almost finished the count-down, as one of my technicians keeps on calling it. Very pleased to have met you, Miss Grayling—I'll check with our PR man on that interview. Be seeing you, Savvy."

The tiers of seats were filled now and the central space almost clear. Officials were shooing off a few knots of lingerers. Several of the grandmasters, including all four Russians, were seated at their tables. Press and company cameras were flashing. The four smaller wallboards lit up with the pieces in the opening position—white for White and red for Black. Simon Great stepped over the red velvet cord and more flash bulbs went off.

"You know, Doc," Sandra said, "I'm a dog to suggest this, but what if this whole thing were a big fake? What if Simon Great were really playing the Machine's moves? There would surely be some way for his electricians to rig—"

Doc laughed happily—and so loudly that some people at the adjoining tables frowned.

"Miss Grayling, that is a wonderful idea! I will probably steal it for a short story. I still manage to write and place a few in England. No, I do not think that is at all likely. WBM would never risk such a fraud. Great is completely out of practice for actual tournament play, though not for chess-thinking. The difference in style between a computer and a man would be evident to any expert. Great's own style is remembered and would be recognized—though, come to think of it, his style was often described as being machinelike...." For a moment Doc's eyes became thoughtful. Then he smiled again. "But no, the idea is impossible. Vanderhoef as Tournament Director has played two or three games with the Machine to assure himself that it operates legitimately and has grandmaster skill."

"Did the Machine beat him?" Sandra asked.

Doc shrugged. "The scores weren't released. It was very hush-hush. But about your idea, Miss Grayling—did you ever read about Maelzel's famous chess-playing automaton of the 19th Century? That one too was supposed to work by machinery (cogs and gears, not electricity) but actually it had a man hidden inside it—your Edgar Poe exposed the fraud in a famous article. In *my* story I think the chess robot will break down while it is being demonstrated to a millionaire purchaser and the young inventor will have to win its game for it to cover up and swing the deal. Only the millionaire's daughter, who is really a better player than either of them ... yes, yes! Your Ambrose Bierce too wrote a story about a chess-playing robot of the clickety-clank-grr kind who murdered his creator, crushing him like an iron grizzly bear when the man won a game from him. Tell me, Miss Grayling, do you find yourself imagining this Machine putting out angry tendrils to strangle its opponents, or beaming rays of death and hypnotism at them? I can imagine...."

While Doc chattered happily on about chess-playing robots and chess stories, Sandra found herself thinking about him. A writer of some sort evidently and a terrific chess buff. Perhaps he was an actual medical doctor. She'd read something about two or three coming over with the Russian squad. But Doc certainly didn't sound like a Soviet citizen.

He was older than she'd first assumed. She could see that now that she was listening to him less and looking at him more. Tired, too. Only his dark-circled eyes shone with unquenchable youth. A useful old guy, whoever he was. An hour ago she'd been sure she was going to muff this assignment completely and now she had it laid out cold. For the umpteenth time in her career Sandra shied away from the guilty thought that she wasn't a writer at all or even a reporter, she just used dime-a-dozen female attractiveness to rope a susceptible man (young, old, American, Russian) and pick his brain....

She realized suddenly that the whole hall had become very quiet.

Doc was the only person still talking and people were again looking at them disapprovingly. All five wallboards were lit up and the changed position of a few pieces showed that opening moves had been made on four of them,

including the Machine's. The central space between the tiers of seats was completely clear now, except for one man hurrying across it in their direction with the rapid yet quiet, almost tip-toe walk that seemed to mark all the officials. *Like morticians' assistants*, she thought. He rapidly mounted the stairs and halted at the top to look around searchingly. His gaze lighted on their table, his eyebrows went up, and he made a beeline for Doc. Sandra wondered if she should warn him that he was about to be shushed.

The official laid a hand on Doc's shoulder. "Sir!" he said agitatedly. "Do you realize that they've started your clock, Dr. Krakatower?"

Sandra became aware that Doc was grinning at her. "Yes, it's true enough, Miss Grayling," he said. "I trust you will pardon the deception, though it was hardly one, even technically. Every word I told you about Dirty Old Krakatower is literally true. Except the long white beard—he never wore a beard after he was 35—that part was an out-and-out lie! Yes, yes! I will be along in a moment! Do not worry, the spectators will get their money's worth out of me! And WBM did not with its expense account buy my soul—that belongs to the young lady here."

Doc rose, lifted her hand and kissed it. "Thank you, mademoiselle, for a charming interlude. I hope it will be repeated. Incidentally, I should say that besides.... (Stop pulling at me, man!—there can't be five minutes on my clock yet!) ... that besides being Dirty Old Krakatower, grandmaster emeritus, I am also the special correspondent of the *London Times*. It is always pleasant to chat with a colleague. Please do not hesitate to use in your articles any of the ideas I tossed out, if you find them worthy—I sent in my own first dispatch two hours ago. Yes, yes, I come! Au revoir, mademoiselle!"

He was at the bottom of the stairs when Sandra jumped up and hurried to the balustrade.

"Hey, Doc!" she called.

He turned.

"Good luck!" she shouted and waved.

He kissed his hand to her and went on.

People glared at her then and a horrified official came hurrying. Sandra made big frightened eyes at him, but she couldn't quite hide her grin.

IV

Sitzfleisch (which roughly means endurance—"sitting flesh" or "buttock meat") is the quality needed above all others by tournament chess players—and their audiences.

After Sandra had watched the games (the players' faces, rather—she had a really good pair of zoomer glasses) for a half hour or so, she had gone to her hotel room, written her first article (interview with the famous Dr. Krakatower), sent it in and then come back to the hall to see how the games had turned out.

They were still going on, all five of them.

The press section was full, but two boys and a girl of high-school age obligingly made room for Sandra on the top tier of seats and she tuned in on their whispered conversation. The jargon was recognizably related to that which she'd gotten a dose of on the floor, but gamier. Players did not sacrifice pawns, they sacked them. No one was ever defeated, only busted. Pieces weren't lost but blown. The Ruy Lopez was the Dirty Old *Rooay*—and incidentally a certain set of opening moves named after a long-departed Spanish churchman, she now discovered from Dave, Bill and Judy, whose sympathetic help she won by frequent loans of her zoomer glasses.

The four-hour time control point—two hours and 30 moves for each player—had been passed while she was sending in her article, she learned, and they were well on their way toward the next control point—an hour more and 15 moves for each player—after which unfinished games would be adjourned and continued at a special morning session. Sherevsky had had to make 15 moves in two minutes after taking an hour earlier on just one move. But that was nothing out of the ordinary, Dave had assured her in the

same breath, Sherevsky was always letting himself get into "fantastic time-pressure" and then wriggling out of it brilliantly. He was apparently headed for a win over Serek. *Score one for the USA over the USSR*, Sandra thought proudly.

Votbinnik had Jandorf practically in *Zugzwang* (his pieces all tied up, Bill explained) and the Argentinian would be busted shortly. Through the glasses Sandra could see Jandorf's thick chest rise and fall as he glared murderously at the board in front of him. By contrast Votbinnik looked like a man lost in reverie.

Dr. Krakatower had lost a pawn to Lysmov but was hanging on grimly. However, Dave would not give a plugged nickle for his chances against the former world's champion, because "those old ones always weaken in the sixth hour."

"You for-get the bio-logical mir-acle of Doc-tor Las-ker," Bill and Judy chanted as one.

"Shut up," Dave warned them. An official glared angrily from the floor and shook a finger. Much later Sandra discovered that Dr. Emanuel Lasker was a philosopher-mathematician who, after holding the world's championship for 26 years, had won a very strong tournament (New York 1924) at the age of 56 and later almost won another (Moscow 1935) at the age of 67.

Sandra studied Doc's face carefully through her glasses. He looked terribly tired now, almost a death's head. Something tightened in her chest and she looked away quickly.

The Angler-Jal and Grabo-Machine games were still ding-dong contests, Dave told her. If anything, Grabo had a slight advantage. The Machine was "on the move," meaning that Grabo had just made a move and was waiting the automaton's reply.

The Hungarian was about the most restless "waiter" Sandra could imagine. He twisted his long legs constantly and writhed his shoulders and about every five seconds he ran his hands back through his unkempt tassel of hair.

Once he yawned selfconsciously, straightened himself and sat very compactly. But almost immediately he was writhing again.

The Machine had its own mannerisms, if you could call them that. Its dim, unobtrusive telltale lights were winking on and off in a fairly rapid, random pattern. Sandra got the impression that from time to time Grabo's eyes were trying to follow their blinking, like a man watching fireflies.

Simon Great sat impassively behind a bare table next to the Machine, his five gray-smocked technicians grouped around him.

A flushed-faced, tall, distinguished-looking elderly gentleman was standing by the Machine's console. Dave told Sandra it was Dr. Vanderhoef, the Tournament Director, one-time champion of the world.

"Another old potzer like Krakatower, but with sense enough to know when he's licked," Bill characterized harshly.

"Youth, ah, un-van-quish-able youth," Judy chanted happily by herself. "Flashing like a meteor across the chess fir-ma-ment. Morphy, Angler, Judy Kaplan...."

"Shut up! They really will throw us out," Dave warned her and then explained in whispers to Sandra that Vanderhoef and his assistants had the nervous-making job of feeding into the Machine the moves made by its opponent, "so everyone will know it's on the level, I guess." He added, "It means the Machine loses a few seconds every move, between the time Grabo punches the clock and the time Vanderhoef gets the move fed into the Machine."

Sandra nodded. The players were making it as hard on the Machine as possible, she decided with a small rush of sympathy.

Suddenly there was a tiny movement of the gadget attached from the Machine to the clocks on Grabo's table and a faint *click*. But Grabo almost leapt out of his skin.

Simultaneously a red castle-topped piece (one of the Machine's rooks, Sandra was informed) moved four squares sideways on the big electric

board above the Machine. An official beside Dr. Vanderhoef went over to Grabo's board and carefully moved the corresponding piece. Grabo seemed about to make some complaint, then apparently thought better of it and plunged into brooding cogitation over the board, elbows on the table, both hands holding his head and fiercely massaging his scalp.

The Machine let loose with an unusually rapid flurry of blinking. Grabo straightened up, seemed again about to make a complaint, then once more to repress the impulse. Finally he moved a piece and punched his clock. Dr. Vanderhoef immediately flipped four levers on the Machine's console and Grabo's move appeared on the electric board.

Grabo sprang up, went over to the red velvet cord and motioned agitatedly to Vanderhoef.

There was a short conference, inaudible at the distance, during which Grabo waved his arms and Vanderhoef grew more flushed. Finally the latter went over to Simon Great and said something, apparently with some hesitancy. But Great smiled obligingly, sprang to his feet, and in turn spoke to his technicians, who immediately fetched and unfolded several large screens and set them in front of the Machine, masking the blinking lights. *Blindfolding it*, Sandra found herself thinking.

Dave chuckled. "That's already happened once while you were out," he told Sandra. "I guess seeing the lights blinking makes Grabo nervous. But then *not* seeing them makes him nervous. Just watch."

"The Machine has its own mysterious pow-wow-wers," Judy chanted.

"That's what you think," Bill told her. "Did you know that Willie Angler has hired Evil Eye Bixel out of Brooklyn to put the whammy on the Machine? S'fact."

"... pow-wow-wers unknown to mere mortals of flesh and blood—"

"Shut up!" Dave hissed. "Now you've done it. Here comes old Eagle Eye. Look, I don't know you two. I'm with this lady here."

Bela Grabo was suffering acute tortures. He had a winning attack, he knew it. The Machine was counter-attacking, but unstrategically, desperately, in the style of a Frank Marshall complicating the issue and hoping for a swindle. All Grabo had to do, he knew, was keep his head and *not blunder*—not throw away a queen, say, as he had to old Vanderhoef at Brussels, or overlook a mate in two, as he had against Sherevsky at Tel Aviv. The memory of those unutterably black moments and a dozen more like them returned to haunt him. Never if he lived a thousand years would he be free of them.

For the tenth time in the last two minutes he glanced at his clock. He had fifteen minutes in which to make five moves. He wasn't in time-pressure, he must remember that. He mustn't make a move on impulse, he mustn't let his treacherous hand leap out without waiting for instructions from its guiding brain.

First prize in this tournament meant incredible wealth—transportation money and hotel bills for more than a score of future tournaments. But more than that, it was one more chance to blazon before the world his true superiority rather than the fading reputation of it. "... Bela Grabo, brilliant but erratic...." Perhaps his last chance.

When, in the name of Heaven, was the Machine going to make its next move? Surely it had already taken more than four minutes! But a glance at its clock showed him that hardly half that time had gone by. He decided he had made a mistake in asking again for the screens. It was easier to watch those damned lights blink than have them blink in his imagination.

Oh, if chess could only be played in intergalactic space, in the black privacy of one's thoughts. But there had to be the physical presence of the opponent with his (possibly deliberate) unnerving mannerisms—Lasker and his cigar, Capablanca and his red neck-tie, Nimzowitsch and his nervous contortions (very like Bela Grabo's, though the latter did not see it that way). And now this ghastly flashing, humming, stinking, button-banging metal monster!

Actually, he told himself, he was being asked to play two opponents, the Machine and Simon Great, a sort of consultation team. It wasn't fair!

The Machine hammered its button and rammed its queen across the electric board. In Grabo's imagination it was like an explosion.

Grabo held onto his nerves with an effort and plunged into a maze of calculations.

Once he came to, like a man who has been asleep, to realize that he was wondering whether the lights were still blinking behind the screens while he was making his move. Did the Machine really analyze at such times or were the lights just an empty trick? He forced his mind back to the problems of the game, decided on his move, checked the board twice for any violent move he might have missed, noted on his clock that he'd taken five minutes, checked the board again very rapidly and then put out his hand and made his move—with the fiercely suspicious air of a boss compelled to send an extremely unreliable underling on an all-important errand.

Then he punched his clock, sprang to his feet, and once more waved for Vanderhoef.

Thirty seconds later the Tournament Director, very red-faced now, was saying in a low voice, almost pleadingly, "But Bela, I cannot keep asking them to change the screens. Already they have been up twice and down once to please you. Moving them disturbs the other players and surely isn't good for your own peace of mind. Oh, Bela, my dear Bela—"

Vanderhoef broke off. Grabo knew he had been going to say something improper but from the heart, such as, "For God's sake don't blow this game out of nervousness now that you have a win in sight"—and this sympathy somehow made the Hungarian furious.

"I have other complaints which I will make formally after the game," he said harshly, quivering with rage. "It is a disgrace the way that mechanism punches the time-clock button. It will crack the case! The Machine never stops humming! And it stinks of ozone and hot metal, as if it were about to explode!"

"It *cannot* explode, Bela. Please!"

"No, but it threatens to! And you know a threat is always more effective than an actual attack! As for the screens, they must be taken down at once, I demand it!"

"Very well, Bela, very well, it will be done. Compose yourself."

Grabo did not at once return to his table—he could not have endured to sit still for the moment—but paced along the line of tables, snatching looks at the other games in progress. When he looked back at the big electric board, he saw that the Machine had made a move although he hadn't heard it punch the clock. He rushed back and studied the board without sitting down. Why, the Machine had made a *stupid* move, he saw with a rush of exaltation. At that moment the last screen being folded started to fall over, but one of the gray-smocked men caught it deftly. Grabo flinched and his hand darted out and moved a piece.

He heard someone gasp. Vanderhoef.

It got very quiet. The four soft clicks of the move being fed into the Machine were like the beat of a muffled drum.

There was a buzzing in Grabo's ears. He looked down at the board in horror.

The Machine blinked, blinked once more and then, although barely twenty seconds had elapsed, moved a rook.

On the glassy gray margin above the Machine's electric board, large red words flamed on:

CHECK! AND MATE IN THREE

Up in the stands Dave squeezed Sandra's arm. "He's done it! He's let himself be swindled."

"You mean the Machine has beaten Grabo?" Sandra asked.

"What else?"

"Can you be sure? Just like that?"

"Of cour.... Wait a second.... Yes, I'm sure."

"Mated in three like a potzer," Bill confirmed.

"The poor old boob," Judy sighed.

Down on the floor Bela Grabo sagged. The assistant director moved toward him quickly. But then the Hungarian straightened himself a little.

"I resign," he said softly.

The red words at the top of the board were wiped out and briefly replaced, in white, by:

THANK YOU FOR A GOOD GAME

And then a third statement, also in white, flashed on for a few seconds:

YOU HAD BAD LUCK

Bela Grabo clenched his fists and bit his teeth. Even *the Machine* was being sorry for him!

He stiffly walked out of the hall. It was a long, long walk.

V

Adjournment time neared. Serek, the exchange down but with considerable time on his clock, sealed his forty-sixth move against Sherevsky and handed the envelope to Vanderhoef. It would be opened when the game was resumed at the morning session. Dr. Krakatower studied the position on his board and then quietly tipped over his king. He sat there for a moment as if he hadn't the strength to rise. Then he shook himself a little, smiled, got up, clasped hands briefly with Lysmov and wandered over to watch the Angler-Jal game.

Jandorf had resigned his game to Votbinnik some minutes ago, rather more surlily.

After a while Angler sealed a move, handing it to Vanderhoef with a grin just as the little red flag dropped on his clock, indicating he'd used every second of his time.

Up in the stands Sandra worked her shoulders to get a kink out of her back. She'd noticed several newsmen hurrying off to report in the Machine's first

win. She was thankful that her job was limited to special articles.

"Chess is a pretty intense game," she remarked to Dave.

He nodded. "It's a killer. I don't expect to live beyond forty myself."

"Thirty," Bill said.

"Twenty-five is enough time to be a meteor," said Judy.

Sandra thought to herself: *the Unbeat Generation*.

Next day Sherevsky played the Machine to a dead-level ending. Simon Great offered a draw for the Machine (over an unsuccessful interfering protest from Jandorf that this constituted making a move for the Machine) but Sherevsky refused and sealed his move.

"He wants to have it proved to him that the Machine can play end games," Dave commented to Sandra up in the stands. "I don't blame him."

At the beginning of today's session Sandra had noticed that Bill and Judy were following each game in a very new-looking book they shared jealously between them. *Won't look new for long*, Sandra had thought.

"That's the 'Bible' they got there," Dave had explained. "*MCO-Modern Chess Openings*. It lists all the best open-moves in chess, thousands and thousands of variations. That is, what masters *think* are the best moves. The moves that have won in the past, really. We chipped in together to buy the latest edition—the 13th—just hot off the press," he had finished proudly.

Now with the Machine-Sherevsky ending the center of interest, the kids were consulting another book, one with grimy, dog-eared pages. "That's the 'New Testament'—*Basic Chess Endings*," Dave said when he noticed her looking. "There's so much you must know in endings that it's amazing the Machine can play them at all. I guess as the pieces get fewer it starts to look deeper."

Sandra nodded. She was feeling virtuous. She had got her interview with Jandorf and then this morning one with Grabo ("How it Feels to Have a Machine Out-Think You"). The latter had made her think of herself as a real vulture of the press, circling over the doomed. The Hungarian had seemed in a positively suicidal depression.

One newspaper article made much of the Machine's "psychological tactics," hinting that the blinking lights were designed to hypnotize opponents. The general press coverage was somewhat startling. A game that in America normally rated only a fine-print column in the back sections of a very few Sunday papers was now getting boxes on the front page. The defeat of a man by a machine seemed everywhere to awaken nervous feelings of insecurity, like the launching of the first sputnik.

Sandra had rather hesitantly sought out Dr. Krakatower during the close of the morning session of play, still feeling a little guilty from her interview with Grabo. But Doc had seemed happy to see her and quite recovered from last night's defeat, though when she had addressed him as "Master Krakatower" he had winced and said, "Please, not that!" Another session of coffee and wine-and-seltzer had resulted in her getting an introduction to her first Soviet grandmaster, Serek, who had proved to be unexpectedly charming. He had just managed to draw his game with Sherevsky (to the great amazement of the kibitzers, Sandra learned) and was most obliging about arranging for an interview.

Not to be outdone in gallantry, Doc had insisted on escorting Sandra to her seat in the stands—at the price of once more losing a couple of minutes on his clock. As a result her stock went up considerably with Dave, Bill and Judy. Thereafter they treated anything she had to say with almost annoying deference—Bill especially, probably in penance for his thoughtless cracks at Doc. Sandra later came to suspect that the kids had privately decided that she was Dr. Krakatower's mistress—probably a new one because she was so scandalously ignorant of chess. She did not disillusion them.

Doc lost again in the second round—to Jal.

In the third round Lysmov defeated the Machine in 27 moves. There was a flaring of flashbulbs, a rush of newsmen to the phones, jabbering in the stands and much comment and analysis that was way over Sandra's head—except she got the impression that Lysmov had done something tricky.

The general emotional reaction in America, as reflected by the newspapers, was not too happy. One read between the lines that for the Machine to beat a man was bad, but for a Russian to beat an American machine was worse. A widely-read sports columnist, two football coaches, and several rural politicians announced that chess was a morbid game played only by weirdies. Despite these thick-chested he-man statements, the elusive mood of insecurity deepened.

Besides the excitement of the Lysmov win, a squabble had arisen in connection with the Machine's still-unfinished end game with Sherevsky, which had been continued through one morning session and was now headed for another.

Finally there were rumors that World Business Machines was planning to replace Simon Great with a nationally famous physicist.

Sandra begged Doc to try to explain it all to her in kindergarten language. She was feeling uncertain of herself again and quite subdued after being completely rebuffed in her efforts to get an interview with Lysmov, who had fled her as if she were a threat to his Soviet virtue.

Doc on the other hand was quite vivacious, cheered by his third-round draw with Jandorf.

"Most willingly, my dear," he said. "Have you ever noticed that kindergarten language can be far honester than the adult tongues? Fewer fictions. Well, several of us hashed over the Lysmov game until three o'clock this morning. Lysmov wouldn't, though. Neither would Votbinnik or Jal. You see, I have my communication problems with the Russians too.

"We finally decided that Lysmov had managed to guess with complete accuracy both the depth at which the Machine is analyzing in the opening and middle game (ten moves ahead instead of eight, we think—a prodigious achievement!) and also the main value scale in terms of which the Machine selects its move.

"Having that information, Lysmov managed to play into a combination which would give the Machine a maximum plus value in its value scale (win of Lysmov's queen, it was) after ten moves but a checkmate for Lysmov on his second move *after* the first ten. A human chess master would have seen a trap like that, but the Machine could not, because Lysmov was maneuvering in an area that did not exist for the Machine's perfect but limited mind. Of course the Machine changed its tactics after the first three moves of the ten had been played—it could see the checkmate then—but by that time it was too late for it to avert a disastrous loss of material. It was tricky of Lysmov, but completely fair. After this we'll all be watching for the opportunity to play the same sort of trick on the Machine.

"Lysmov was the first of us to realize fully that *we are not playing against a metal monster but against a certain kind of programming*. If there are any weaknesses we can spot in that programming, we can win. Very much in the same way that we can again and again defeat a flesh-and-blood player when we discover that he consistently attacks without having an advantage in position or is regularly overcautious about launching a counter-attack when he himself is attacked without justification."

Sandra nodded eagerly. "So from now on your chances of beating the Machine should keep improving, shouldn't they? I mean as you find out more and more about the programming."

Doc smiled. "You forget," he said gently, "that Simon Great can change the programming before each new game. Now I see why he fought so hard for that point."

"Oh. Say, Doc, what's this about the Sherevsky end game?"

"You are picking up the language, aren't you?" he observed. "Sherevsky got a little angry when he discovered that Great had the Machine programmed to analyze steadily on the next move after an adjournment until the game was resumed next morning. Sherevsky questioned whether it was fair for the Machine to 'think' all night while its opponent had to get some rest. Vanderhoef decided for the Machine, though Sherevsky may carry the protest to FIDE.

"Bah—I think Great wants us to get heated up over such minor matters, just as he is happy (and oh so obliging!) when we complain about how the Machine blinks or hums or smells. It keeps our minds off the main business of trying to outguess his programming. Incidentally, that is one thing we decided last night—Sherevsky, Willie Angler, Jandorf, Serek, and myself—that we are all going to have to learn to play the Machine without letting it get on our nerves and without asking to be protected from it. As Willie puts it, 'So suppose it sounds like a boiler factory even—okay, you can think in a boiler factory.' Myself, I am not so sure of that, but his spirit is right."

Sandra felt herself perking up as a new article began to shape itself in her mind. She said, "And what about WBM replacing Simon Great?"

Again Doc smiled. "I think, my dear, that you can safely dismiss that as just a rumor. I think that Simon Great has just begun to fight."

VI

Round Four saw the Machine spring the first of its surprises.

It had finally forced a draw against Sherevsky in the morning session, ending the long second-round game, and now was matched against Votbinnik.

The Machine opened Pawn to King Four, Votbinnik replied Pawn to King Three.

"The French Defense, Binny's favorite," Dave muttered and they settled back for the Machine's customary four-minute wait.

Instead the Machine moved at once and punched its clock.

Sandra, studying Votbinnik through her glasses, decided that the Russian grandmaster looked just a trifle startled. Then he made his move.

Once again the Machine responded instantly.

There was a flurry of comment from the stands and a scurrying-about of officials to shush it. Meanwhile the Machine continued to make its moves at

better than rapid-transit speed, although Votbinnik soon began to take rather more time on his.

The upshot was that the Machine made eleven moves before it started to take time to 'think' at all.

Sandra clamored so excitedly to Dave for an explanation that she had two officials waving at her angrily.

As soon as he dared, Dave whispered, "Great must have banked on Votbinnik playing the French—almost always does—and fed all the variations of the French into the Machine's 'memory' from MCO and maybe some other books. So long as Votbinnik stuck to a known variation of the French, why, the Machine could play from memory without analyzing at all. Then when a strange move came along—one that wasn't in its memory—only on the twelfth move yet!—the Machine went back to analyzing, only now it's taking longer and going deeper because it's got more time—six minutes a move, about. The only thing I wonder is why Great didn't have the Machine do it in the first three games. It seems so obvious."

Sandra ticketed that in her mind as a question for Doc. She slipped off to her room to write her "Don't Let a Robot Get Your Goat" article (drawing heavily on Doc's observations) and got back to the stands twenty minutes before the second time-control point. It was becoming a regular routine.

Votbinnik was a knight down—almost certainly busted, Dave explained.

"It got terrifically complicated while you were gone," he said. "A real Votbinnik position."

"Only the Machine out-binniked him," Bill finished.

Judy hummed Beethoven's "Funeral March for the Death of a Hero."

Nevertheless Votbinnik did not resign. The Machine sealed a move. Its board blacked out and Vanderhoef, with one of his assistants standing beside him to witness, privately read the move off a small indicator on the console. Tomorrow he would feed the move back into the Machine when play was resumed at the morning session.

Doc sealed a move too although he was two pawns down in his game against Grabo and looked tired to death.

"They don't give up easily, do they?" Sandra observed to Dave. "They must really love the game. Or do they hate it?"

"When you get to psychology it's all beyond me," Dave replied. "Ask me something else."

Sandra smiled. "Thank you, Dave," she said. "I will."

Come the morning session, Votbinnik played on for a dozen moves then resigned.

A little later Doc managed to draw his game with Grabo by perpetual check. He caught sight of Sandra coming down from the stands and waved to her, then made the motions of drinking.

Now he looks almost like a boy, Sandra thought as she joined him.

"Say, Doc," she asked when they had secured a table, "why is a rook worth more than a bishop?"

He darted a suspicious glance at her. "That is not your kind of question," he said sternly. "Exactly what have you been up to?"

Sandra confessed that she had asked Dave to teach her how to play chess.

"I knew those children would corrupt you," Doc said somberly. "Look, my dear, if you learn to play chess you won't be able to write your clever little articles about it. Besides, as I warned you the first day, chess is a madness. Women are ordinarily immune, but that doesn't justify you taking chances with your sanity."

"But I've kind of gotten interested, watching the tournament," Sandra objected. "At least I'd like to know how the pieces move."

"Stop!" Doc commanded. "You're already in danger. Direct your mind somewhere else. Ask me a sensible, down-to-earth journalist's question—something completely irrational!"

"Okay, why didn't Simon Great have the Machine set to play the openings fast in the first three games?"

"Hah! I think Great plays Lasker-chess in his programming. He hides his strength and tries to win no more easily than he has to, so he will have resources in reserve. The Machine loses to Lysmov and immediately starts playing more strongly—the psychological impression made on the other players by such tactics is formidable."

"But the Machine isn't ahead yet?"

"No, of course not. After four rounds Lysmov is leading the tournament with 3-1/2—1/2, meaning 3-1/2 in the win column and 1/2 in the loss column...."

"How do you half win a game of chess? Or half lose one?" Sandra interrupted.

"By drawing a game—playing to a tie. Lysmov's 3-1/2—1/2 is notational shorthand for three wins and a draw. Understand? My dear, I don't usually have to explain things to you in such detail."

"I just didn't want you to think I was learning too much about chess."

"Ho! Well, to get on with the score after four rounds, Angler and Votbinnik both have 3—1, while the Machine is bracketed at 2-1/2—1-1/2 with Jal. But the Machine has created an impression of strength, as if it were all set to come from behind with a rush." He shook his head. "At the moment, my dear," he said, "I feel very pessimistic about the chances of neurons against relays in this tournament. Relays don't panic and fag. But the oddest thing...."

"Yes?" Sandra prompted.

"Well, the oddest thing is that the Machine doesn't play 'like a machine' at all. It uses dynamic strategy, the kind we sometimes call 'Russian', complicating each position as much as possible and creating maximum tension. But that too is a matter of the programming...."

Doc's foreboding was fulfilled as round followed hard-fought round. In the next five days (there was a weekend recess) the Machine successively

smashed Jandorf, Serek and Jal and after seven rounds was out in front by a full point.

Jandorf, evidently impressed by the Machine's flawless opening play against Votbinnik, chose an inferior line in the Ruy Lopez to get the Machine "out of the books." Perhaps he hoped that the Machine would go on blindly making book moves, but the Machine did not oblige. It immediately slowed its play, "thought hard" and annihilated the Argentinian in 25 moves.

Doc commented, "The Wild Bull of the Pampas tried to use the living force of his human personality to pull a fast one and swindle the Machine. Only the Machine didn't swindle."

Against Jal, the Machine used a new wrinkle. It used a variable amount of time on moves, apparently according to how difficult it "judged" the position to be.

When Serek got a poor pawn-position the Machine simplified the game relentlessly, suddenly discarding its hitherto "Russian" strategy. "It plays like anything but a machine," Doc commented. "We know the reason all too well—Simon Great—but doing something about it is something else again. Great is hitting at our individual weaknesses wonderfully well. Though I think I could play brilliant psychological chess myself if I had a machine to do the detail work." Doc sounded a bit wistful.

The audiences grew in size and in expensiveness of wardrobe, though most of the cafe society types made their visits fleeting ones. Additional stands were erected. A hard-liquor bar was put in and then taken out. The problem of keeping reasonable order and quiet became an unending one for Vanderhoef, who had to ask for more "hushers." The number of scientists and computer men, Navy, Army and Space Force uniforms were more in evidence. Dave and Bill turned up one morning with a three-dimensional chess set of transparent plastic and staggered Sandra by assuring her that most bright young space scientists were moderately adept at this 512-square game.

Sandra heard that WBM had snagged a big order from the War Department. She also heard that a Syndicate man had turned up with a book on the

tournament, taking bets from the more heavily heeled types and that a detective was circulating about, trying to spot him.

The newspapers kept up their front-page reporting, most of the writers personalizing the Machine heavily and rather too cutely. Several of the papers started regular chess columns and "How to Play Chess" features. There was a flurry of pictures of movie starlets and such sitting at chess boards. Hollywood revealed plans for two chess movies: "They Made Her a Black Pawn" and "The Monster From King Rook Square". Chess novelties and costume jewelry appeared. The United States Chess Federation proudly reported a phenomenal rise in membership.

Sandra learned enough chess to be able to blunder through a game with Dave without attempting more than one illegal move in five, to avoid the Scholar's Mate most of the time and to be able to checkmate with two rooks though not with one. Judy had asked her, "Is *he* pleased that you're learning chess?"

Sandra had replied, "No, he thinks it is a madness." The kids had all whooped at that and Dave had said, "How right he is!"

Sandra was scraping the bottom of the barrel for topics for her articles, but then it occurred to her to write about the kids, which worked out nicely, and that led to a humorous article "Chess Is for Brains" about her own efforts to learn the game, and for the nth time in her career she thought of herself as practically a columnist and was accordingly elated.

After his two draws, Doc lost three games in a row and still had the Machine to face and then Sherevsky. His 1—6 score gave him undisputed possession of last place. He grew very depressed. He still made a point of squiring her about before the playing sessions, but she had to make most of the conversation. His rare flashes of humor were rather macabre.

"They have Dirty Old Krakatower locked in the cellar," he muttered just before the start of the next to the last round, "and now they send the robot down to destroy him."

"Just the same, Doc," Sandra told him, "good luck."

Doc shook his head. "Against a man luck might help. But against a Machine?"

"It's not the Machine you're playing, but the programming. Remember?"

"Yes, but it's the Machine that doesn't make the mistake. And a mistake is what I need most of all today. Somebody else's."

Doc must have looked very dispirited and tired when he left Sandra in the stands, for Judy (Dave and Bill not having arrived yet) asked in a confidential, womanly sort of voice, "What do you do for him when he's so unhappy?"

"Oh, I'm especially passionate," Sandra heard herself answer.

"Is that good for him?" Judy demanded doubtfully.

"Sh!" Sandra said, somewhat aghast at her irresponsibility and wondering if *she* were getting tournament-nerves. "Sh, they're starting the clocks."

VII

Krakatower had lost two pawns when the first time-control point arrived and was intending to resign on his 31st move when the Machine broke down. Three of its pieces moved on the electric board at once, then the board went dark and all the lights on the console went out except five which started winking like angry red eyes. The gray-smocked men around Simon Great sprang silently into action, filing around back of the console. It was the first work anyone had seen them do except move screens around and fetch each other coffee. Vanderhoef hovered anxiously. Some flash bulbs went off. Vanderhoef shook his fist at the photographers. Simon Great did nothing. The Machine's clock ticked on. Doc watched for a while and then fell asleep.

When Vanderhoef jogged him awake, the Machine had just made its next move, but the repair-job had taken 50 minutes. As a result the Machine had to make 15 moves in 10 minutes. At 40 seconds a move it played like a dub whose general lack of skill was complicated by a touch of insanity. On his 43rd move Doc shrugged his shoulders apologetically and announced mate in four. There were more flashes. Vanderhoef shook his fist again. The machine flashed:

YOU PLAYED BRILLIANTLY. CONGRATULATIONS!

Afterwards Doc said sourly to Sandra. "And *that* was one big lie—a child could have beat the Machine with that time advantage. Oh, what an ironic glory the gods reserved for Krakatower's dotage—to vanquish a broken-down computer! Only one good thing about it—that it didn't happen while it was playing one of the Russians, or someone would surely have whispered *sabotage*. And that is something of which they do not accuse Dirty Old Krakatower, because they are sure he has not got the brains even to think to sprinkle a little magnetic oxide powder in the Machine's memory box. Bah!"

Just the same he seemed considerably more cheerful.

Sandra said guilelessly, "Winning a game means nothing to you chess players, does it, unless you really do it by your own brilliancy?"

Doc looked solemn for a moment, then he started to chuckle. "You are getting altogether too smart, Miss Sandra Lea Grayling," he said. "Yes, yes—a chess player is happy to win in any barely legitimate way he can, by an earthquake if necessary, or his opponent sickening before he does from the bubonic plague. So—I confess it to you—I was very happy to chalk up my utterly undeserved win over the luckless Machine."

"Which incidentally makes it anybody's tournament again, doesn't it, Doc?"

"Not exactly." Doc gave a wry little headshake. "We can't expect another fluke. After all, the Machine has functioned perfectly seven games out of eight, and you can bet the WBM men will be checking it all night, especially since it has no adjourned games to work on. Tomorrow it plays Willie Angler, but judging from the way it beat Votbinnik and Jal, it should have a definite edge on Willie. If it beats him, then only Votbinnik has a chance for a tie and to do that he must defeat Lysmov. Which will be most difficult."

"Well," Sandra said, "don't you think that Lysmov might just kind of let himself be beaten, to make sure a Russian gets first place or at least ties for

it?"

Doc shook his head emphatically. "There are many things a man, even a chess master, will do to serve his state, but party loyalty doesn't go that deep. Look, here is the standing of the players after eight rounds." He handed Sandra a penciled list.

ONE ROUND TO GO

<i>Player</i>	<i>Wins</i>	<i>Losses</i>
Machine	5-1/2	2-1/2
Votbinnik	5-1/2	2-1/2
Angler	5	3
Jal	4-1/2	3-1/2
Lysmov	4-1/2	3-1/2
Serek	4-1/2	3-1/2
Sherevsky	4	4
Jandorf	2-1/2	5-1/2
Grabo	2	6
Krakatower	2	6

LAST ROUND PAIRINGS

Machine vs. Angler
Votbinnik vs. Lysmov
Jal vs. Serek
Sherevsky vs. Krakatower
Jandorf vs. Grabo

After studying the list for a while, Sandra said, "Hey, even Angler could come out first, couldn't he, if he beat the Machine and Votbinnik lost to Lysmov?"

"Could, could—yes. But I'm afraid that's hoping for too much, barring another breakdown. To tell the truth, dear, the Machine is simply too good for all of us. If it were only a little faster (and these technological improvements always come) it would out-class us completely. We are at that fleeting moment of balance when genius is almost good enough to

equal mechanism. It makes me feel sad, but proud too in a morbid fashion, to think that I am in at the death of grandmaster chess. Oh, I suppose the game will always be played, but it won't ever be quite the same." He blew out a breath and shrugged his shoulders.

"As for Willie, he's a good one and he'll give the Machine a long hard fight, you can depend on it. He might conceivably even draw."

He touched Sandra's arm. "Cheer up, my dear," he said. "You should remind yourself that a victory for the Machine is still a victory for the USA."

Doc's prediction about a long hard fight was decidedly not fulfilled.

Having White, the Machine opened Pawn to King Four and Angler went into the Sicilian Defense. For the first twelve moves on each side both adversaries pushed their pieces and tapped their clocks at such lightning speed (Vanderhoef feeding in Angler's moves swiftly) that up in the stands Bill and Judy were still flipping pages madly in their hunt for the right column in MCO.

The Machine made its thirteenth move, still at blitz tempo.

"Bishop takes Pawn, check, and mate in three!" Willie announced very loudly, made the move, banged his clock and sat back.

There was a collective gasp-and-gabble from the stands.

Dave squeezed Sandra's arm hard. Then for once forgetting that he was Dr. Caution, he demanded loudly of Bill and Judy, "Have you two idiots found that column yet? *The Machine's thirteenth move is a boner!*"

Pinning down the reference with a fingernail, Judy cried, "Yes! Here it is on page 161 in footnote (e) (2) (B). Dave, *that same thirteenth move for White is in the book!* But Black replies Knight to Queen Two, not Bishop takes Pawn, check. And three moves later the book gives White a plus value."

"What the heck, it can't be," Bill asserted.

"But it *is*. Check for yourself. *That boner is in the book.*"

"Shut up, everybody!" Dave ordered, clapping his hands to his face. When he dropped them a moment later his eyes gleamed. "I got it now! Angler figured they were using the latest edition of MCO to program the Machine on openings, he found an editorial error and then he deliberately played the Machine into that variation!"

Dave practically shouted his last words, but that attracted no attention as at that moment the whole hall was the noisiest it had been throughout the tournament. It simmered down somewhat as the Machine flashed a move.

Angler replied instantly.

The Machine replied almost as soon as Angler's move was fed into it.

Angler moved again, his move was fed into the Machine and the Machine flashed:

I AM CHECKMATED. CONGRATULATIONS!

VIII

Next morning Sandra heard Dave's guess confirmed by both Angler and Great. Doc had spotted them having coffee and a malt together and he and Sandra joined them.

Doc was acting jubilant, having just drawn his adjourned game with Sherevsky, which meant, since Jandorf had beaten Grabo, that he was in undisputed possession of Ninth Place. They were all waiting for the finish of the Votbinnik-Lysmov game, which would decide the final standing of the leaders. Willie Angler was complacent and Simon Great was serene and at last a little more talkative.

"You know, Willie," the psychologist said, "I was afraid that one of you boys would figure out something like that. That was the chief reason I didn't have the Machine use the programmed openings until Lysmov's win forced me to. *I* couldn't check every opening line in MCO and the *Archives* and *Shakhmaty*. There wasn't time. As it was, we had a dozen typists and proofreaders busy for weeks preparing that part of the programming and

making sure it was accurate as far as following the books went. Tell the truth now, Willie, how many friends did you have hunting for flaws in the latest edition of MCO?"

Willie grinned. "Your unlucky 13th. Well, that's my secret. Though I've always said that anyone joining the Willie Angler Fan Club ought to expect to have to pay some day for the privilege. They're sharp, those little guys, and I work their tails off."

Simon Great laughed and said to Sandra, "Your young friend Dave was pretty sharp himself to deduce what had happened so quickly. Willie, you ought to have him in the Bleeker Street Irregulars."

Sandra said, "I get the impression he's planning to start a club of his own."

Angler snorted. "That's the one trouble with *my* little guys. They're all waiting to topple me."

Simon Great said, "Well, so long as Willie is passing up Dave, I want to talk to him. It takes real courage in a youngster to question authority."

"How should he get in touch with you?" Sandra asked.

While Great told her, Willie studied them frowningly.

"Si, are you planning to stick in this chess-programming racket?" he demanded.

Simon Great did not answer the question. "You try telling me something, Willie," he said. "Have you been approached the last couple of days by IBM?"

"You mean asking me to take over your job?"

"I said /BM, Willie."

"Oh." Willie's grin became a tight one. "I'm not talking."

There was a flurry of sound and movement around the playing tables. Willie sprang up.

"Lysmov's agreed to a draw!" he informed them a moment later. "The gangster!"

"Gangster because he puts you in equal first place with Votbinnik, both of you ahead of the Machine?" Great inquired gently.

"Ahh, he could have beat Binny, giving me sole first. A Russian gangster!"

Doc shook a finger. "Lysmov could also have *lost* to Votbinnik, Willie, putting you in second place."

"Don't think evil thoughts. So long, pals."

As Angler clattered down the stairs, Simon Great signed the waiter for more coffee, lit a fresh cigarette, took a deep drag and leaned back.

"You know," he said "it's a great relief not to have to impersonate the hyperconfident programmer for awhile. Being a psychologist has spoiled me for that sort of thing. I'm not as good as I once was at beating people over the head with my ego."

"You didn't do too badly," Doc said.

"Thanks. Actually, WBM is very much pleased with the Machine's performance. The Machine's flaws made it seem more real and more newsworthy, especially how it functioned when the going got tough—those repairs the boys made under time pressure in your game, Savilly, will help sell WBM computers or I miss my guess. In fact nobody could have watched the tournament for long without realizing there were nine smart rugged men out there, ready to kill that computer if they could. The Machine passed a real test. And then the whole deal dramatizes what computers are and what they can and can't do. And not just at the popular level. The WBM research boys are learning a lot about computer and programming theory by studying how the Machine and its programmer behave under tournament stress. It's a kind of test unlike that provided by any other computer work. Just this morning, for instance, one of our big mathematicians told me that he is beginning to think that the Theory of Games *does* apply to chess, because you can bluff and counterbluff with your programming. And *I'm* learning about human psychology."

Doc chuckled. "Such as that even human thinking is just a matter of how you program your own mind?—that we're all like the Machine to that

extent?"

"That's one of the big points, Savilly. Yes."

Doc smiled at Sandra. "You wrote a nice little news-story, dear, about how Man conquered the Machine by a palpitating nose and won a victory for international amity.

"Now the story starts to go deeper."

"A lot of things go deeper," Sandra replied, looking at him evenly. "Much deeper than you ever expect at the start."

The big electric Scoreboard lit up.

FINAL STANDING

<i>Player</i>	<i>Wins</i>	<i>Losses</i>
Angler	6	3
Votbinnik	6	3
Jal	5-1/2	3-1/2
Machine	5-1/2	3-1/2
Lysmov	5	4
Serek	4-1/2	4-1/2
Sherevsky	4-1/2	4-1/2
Jandorf	3-1/2	5-1/2
Krakatower	2-1/2	6-1/2
Grabo	2	7

"It was a good tournament," Doc said. "And the Machine has proven itself a grandmaster. It must make you feel good, Simon, after being out of tournament chess for twenty years."

The psychologist nodded.

"Will you go back to psychology now?" Sandra asked him.

Simon Great smiled. "I can answer that question honestly, Miss Grayling, because the news is due for release. No. WBM is pressing for entry of the Machine in the Interzonal Candidates' Tournament. They want a crack at the World's Championship."

Doc raised his eyebrows. "That's news indeed. But look, Simon, with the knowledge you've gained in this tournament won't you be able to make the Machine almost a sure winner in every game?"

"I don't know. Players like Angler and Lysmov may find some more flaws in its functioning and dream up some new stratagems. Besides, there's another solution to the problems raised by having a single computer entered in a grandmaster tournament."

Doc sat up straight. "You mean having more programmer-computer teams than just one?"

"Exactly. The Russians are bound to give their best players computers, considering the prestige the game has in Russia. And I wasn't asking Willie that question about IBM just on a hunch. Chess tournaments are a wonderful way to test rival computers and show them off to the public, just like cross-country races were for the early automobiles. The future grandmaster will inevitably be a programmer-computer team, a man-machine symbiotic partnership, probably with more freedom each way than I was allowed in this tournament—I mean the man taking over the play in some positions, the machine in others."

"You're making my head swim," Sandra said.

"Mine is in the same storm-tossed ocean," Doc assured her. "Simon, that will be very fine for the master who can get themselves computers—either from their governments or from hiring out to big firms. Or in other ways. Jandorf, I'm sure, will be able to interest some Argentinian millionaire in a computer for him. While I... oh, I'm too old... still, when I start to think about it.... But what about the Bela Grabos? Incidentally, did you know that Grabo is contesting Jandorf's win? Claims Jandorf discussed the position with Serek. I think they exchanged about two words."

Simon shrugged, "The Bela Grabos will have to continue to fight their own battles, if necessary satisfying themselves with the lesser tournaments. Believe me, Savilly, from now on grandmaster chess without one or more computers entered will lack sauce."

Dr. Krakatower shook his head and said, "Thinking gets more expensive every year."

From the floor came the harsh voice of Igor Jandorf and the shrill one of Bela Grabo raised in anger. Three words came through clearly: "... I challenge you...."

Sandra said, "Well, there's something you can't build into a machine—ego."

"Oh, I don't know about that," said Simon Great.

[Transcriber's Note: No Section II or III headings in original.]

*** END OF THE PROJECT GUTENBERG EBOOK THE 64-SQUARE
MADHOUSE ***

Updated editions will replace the previous one—the old editions will be renamed.

Creating the works from print editions not protected by U.S. copyright law means that no one owns a United States copyright in these works, so the Foundation (and you!) can copy and distribute it in the United States without permission and without paying copyright royalties. Special rules, set forth in the General Terms of Use part of this license, apply to copying and distributing Project Gutenberg™ electronic works to protect the PROJECT GUTENBERG™ concept and trademark. Project Gutenberg is a registered trademark, and may not be used if you charge for an eBook, except by following the terms of the trademark license, including paying royalties for use of the Project Gutenberg trademark. If you do not charge anything for copies of this eBook, complying with the trademark license is very easy. You may use this eBook for nearly any purpose such as creation of derivative works, reports, performances and research. Project Gutenberg eBooks may be modified and printed and given away—you may do practically ANYTHING in the United States with eBooks not protected by U.S. copyright law. Redistribution is subject to the trademark license, especially commercial redistribution.

START: FULL LICENSE

THE FULL PROJECT GUTENBERG™ LICENSE

PLEASE READ THIS BEFORE YOU DISTRIBUTE OR USE THIS
WORK

To protect the Project Gutenberg™ mission of promoting the free distribution of electronic works, by using or distributing this work (or any other work associated in any way with the phrase “Project Gutenberg”), you agree to comply with all the terms of the Full Project Gutenberg License available with this file or online at www.gutenberg.org/license.

Section 1. General Terms of Use and Redistributing Project Gutenberg electronic works

1.A. By reading or using any part of this Project Gutenberg electronic work, you indicate that you have read, understand, agree to and accept all the terms of this license and intellectual property (trademark/copyright) agreement. If you do not agree to abide by all the terms of this agreement, you must cease using and return or destroy all copies of Project Gutenberg electronic works in your possession. If you paid a fee for obtaining a copy of or access to a Project Gutenberg electronic work and you do not agree to be bound by the terms of this agreement, you may obtain a refund from the person or entity to whom you paid the fee as set forth in paragraph 1.E.8.

1.B. “Project Gutenberg” is a registered trademark. It may only be used on or associated in any way with an electronic work by people who agree to be bound by the terms of this agreement. There are a few things that you can do with most Project Gutenberg electronic works even without complying with the full terms of this agreement. See paragraph 1.C below. There are a lot of things you can do with Project Gutenberg electronic works if you follow the terms of this agreement and help preserve free future access to Project Gutenberg electronic works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation (“the Foundation” or PGLAF), owns a compilation copyright in the collection of Project Gutenberg electronic works. Nearly all the individual works in the collection are in the public domain in the United States. If an individual work is unprotected by copyright law in the United States and you are

located in the United States, we do not claim a right to prevent you from copying, distributing, performing, displaying or creating derivative works based on the work as long as all references to Project Gutenberg are removed. Of course, we hope that you will support the Project Gutenberg mission of promoting free access to electronic works by freely sharing Project Gutenberg works in compliance with the terms of this agreement for keeping the Project Gutenberg name associated with the work. You can easily comply with the terms of this agreement by keeping this work in the same format with its attached full Project Gutenberg License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern what you can do with this work. Copyright laws in most countries are in a constant state of change. If you are outside the United States, check the laws of your country in addition to the terms of this agreement before downloading, copying, displaying, performing, distributing or creating derivative works based on this work or any other Project Gutenberg work. The Foundation makes no representations concerning the copyright status of any work in any country other than the United States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate access to, the full Project Gutenberg License must appear prominently whenever any copy of a Project Gutenberg work (any work on which the phrase “Project Gutenberg” appears, or with which the phrase “Project Gutenberg” is associated) is accessed, displayed, performed, viewed, copied or distributed:

This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg™ License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

1.E.2. If an individual Project Gutenberg electronic work is derived from texts not protected by U.S. copyright law (does not contain a notice indicating that it is posted with permission of the copyright holder), the

work can be copied and distributed to anyone in the United States without paying any fees or charges. If you are redistributing or providing access to a work with the phrase “Project Gutenberg” associated with or appearing on the work, you must comply either with the requirements of paragraphs 1.E.1 through 1.E.7 or obtain permission for the use of the work and the Project Gutenberg trademark as set forth in paragraphs 1.E.8 or 1.E.9.

1.E.3. If an individual Project Gutenberg electronic work is posted with the permission of the copyright holder, your use and distribution must comply with both paragraphs 1.E.1 through 1.E.7 and any additional terms imposed by the copyright holder. Additional terms will be linked to the Project Gutenberg License for all works posted with the permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full Project Gutenberg License terms from this work, or any files containing a part of this work or any other work associated with Project Gutenberg.

1.E.5. Do not copy, display, perform, distribute or redistribute this electronic work, or any part of this electronic work, without prominently displaying the sentence set forth in paragraph 1.E.1 with active links or immediate access to the full terms of the Project Gutenberg License.

1.E.6. You may convert to and distribute this work in any binary, compressed, marked up, nonproprietary or proprietary form, including any word processing or hypertext form. However, if you provide access to or distribute copies of a Project Gutenberg work in a format other than “Plain Vanilla ASCII” or other format used in the official version posted on the official Project Gutenberg website (www.gutenberg.org), you must, at no additional cost, fee or expense to the user, provide a copy, a means of exporting a copy, or a means of obtaining a copy upon request, of the work in its original “Plain Vanilla ASCII” or other form. Any alternate format must include the full Project Gutenberg License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying, performing, copying or distributing any Project Gutenberg works unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing access to or distributing Project Gutenberg electronic works provided that:

- • You pay a royalty fee of 20% of the gross profits you derive from the use of Project Gutenberg works calculated using the method you already use to calculate your applicable taxes. The fee is owed to the owner of the Project Gutenberg trademark, but he has agreed to donate royalties under this paragraph to the Project Gutenberg Literary Archive Foundation. Royalty payments must be paid within 60 days following each date on which you prepare (or are legally required to prepare) your periodic tax returns. Royalty payments should be clearly marked as such and sent to the Project Gutenberg Literary Archive Foundation at the address specified in Section 4, “Information about donations to the Project Gutenberg Literary Archive Foundation.”
- • You provide a full refund of any money paid by a user who notifies you in writing (or by e-mail) within 30 days of receipt that s/he does not agree to the terms of the full Project Gutenberg™ License. You must require such a user to return or destroy all copies of the works possessed in a physical medium and discontinue all use of and all access to other copies of Project Gutenberg™ works.
- • You provide, in accordance with paragraph 1.F.3, a full refund of any money paid for a work or a replacement copy, if a defect in the electronic work is discovered and reported to you within 90 days of receipt of the work.
- • You comply with all other terms of this agreement for free distribution of Project Gutenberg™ works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg™ electronic work or group of works on different terms than are set forth in this agreement, you must obtain permission in writing from the Project Gutenberg Literary Archive Foundation, the manager of the Project Gutenberg™ trademark. Contact the Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable effort to identify, do copyright research on, transcribe and proofread works not protected by U.S. copyright law in creating the Project Gutenberg™ collection. Despite these efforts, Project Gutenberg™ electronic works, and the medium on which they may be stored, may contain “Defects,” such as, but not limited to, incomplete, inaccurate or corrupt data, transcription

errors, a copyright or other intellectual property infringement, a defective or damaged disk or other medium, a computer virus, or computer codes that damage or cannot be read by your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the “Right of Replacement or Refund” described in paragraph 1.F.3, the Project Gutenberg Literary Archive Foundation, the owner of the Project Gutenberg™ trademark, and any other party distributing a Project Gutenberg™ electronic work under this agreement, disclaim all liability to you for damages, costs and expenses, including legal fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE PROVIDED IN PARAGRAPH 1.F.3. YOU AGREE THAT THE FOUNDATION, THE TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a defect in this electronic work within 90 days of receiving it, you can receive a refund of the money (if any) you paid for it by sending a written explanation to the person you received the work from. If you received the work on a physical medium, you must return the medium with your written explanation. The person or entity that provided you with the defective work may elect to provide a replacement copy in lieu of a refund. If you received the work electronically, the person or entity providing it to you may choose to give you a second opportunity to receive the work electronically in lieu of a refund. If the second copy is also defective, you may demand a refund in writing without further opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth in paragraph 1.F.3, this work is provided to you ‘AS-IS’, WITH NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied warranties or the exclusion or limitation of certain types of damages. If any disclaimer or limitation set forth in this agreement violates the law of the state applicable

to this agreement, the agreement shall be interpreted to make the maximum disclaimer or limitation permitted by the applicable state law. The invalidity or unenforceability of any provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the trademark owner, any agent or employee of the Foundation, anyone providing copies of Project Gutenberg™ electronic works in accordance with this agreement, and any volunteers associated with the production, promotion and distribution of Project Gutenberg™ electronic works, harmless from all liability, costs and expenses, including legal fees, that arise directly or indirectly from any of the following which you do or cause to occur: (a) distribution of this or any Project Gutenberg work, (b) alteration, modification, or additions or deletions to any Project Gutenberg work, and (c) any Defect you cause.

Section 2. Information about the Mission of Project Gutenberg

Project Gutenberg is synonymous with the free distribution of electronic works in formats readable by the widest variety of computers including obsolete, old, middle-aged and new computers. It exists because of the efforts of hundreds of volunteers and donations from people in all walks of life.

Volunteers and financial support to provide volunteers with the assistance they need are critical to reaching Project Gutenberg's goals and ensuring that the Project Gutenberg collection will remain freely available for generations to come. In 2001, the Project Gutenberg Literary Archive Foundation was created to provide a secure and permanent future for Project Gutenberg and future generations. To learn more about the Project Gutenberg Literary Archive Foundation and how your efforts and donations can help, see Sections 3 and 4 and the Foundation information page at www.gutenberg.org.

Section 3. Information about the Project Gutenberg Literary Archive Foundation

The Project Gutenberg Literary Archive Foundation is a non-profit 501(c)(3) educational corporation organized under the laws of the state of Mississippi and granted tax exempt status by the Internal Revenue Service. The Foundation's EIN or federal tax identification number is 64-6221541. Contributions to the Project Gutenberg Literary Archive Foundation are tax

deductible to the full extent permitted by U.S. federal laws and your state's laws.

The Foundation's business office is located at 41 Watchung Plaza #516, Montclair NJ 07042, USA, +1 (862) 621-9288. Email contact links and up to date contact information can be found at the Foundation's website and official page at www.gutenberg.org/contact

Section 4. Information about Donations to the Project Gutenberg Literary Archive Foundation

Project Gutenberg™ depends upon and cannot survive without widespread public support and donations to carry out its mission of increasing the number of public domain and licensed works that can be freely distributed in machine-readable form accessible by the widest array of equipment including outdated equipment. Many small donations (\$1 to \$5,000) are particularly important to maintaining tax exempt status with the IRS.

The Foundation is committed to complying with the laws regulating charities and charitable donations in all 50 states of the United States. Compliance requirements are not uniform and it takes a considerable effort, much paperwork and many fees to meet and keep up with these requirements. We do not solicit donations in locations where we have not received written confirmation of compliance. To SEND DONATIONS or determine the status of compliance for any particular state visit

www.gutenberg.org/donate.

While we cannot and do not solicit contributions from states where we have not met the solicitation requirements, we know of no prohibition against accepting unsolicited donations from donors in such states who approach us with offers to donate.

International donations are gratefully accepted, but we cannot make any statements concerning tax treatment of donations received from outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg web pages for current donation methods and addresses. Donations are accepted in a number of other ways including checks, online payments and credit card donations. To donate, please visit: www.gutenberg.org/donate.

Section 5. General Information About Project Gutenberg electronic works
Professor Michael S. Hart was the originator of the Project Gutenberg concept of a library of electronic works that could be freely shared with

anyone. For forty years, he produced and distributed Project Gutenberg eBooks with only a loose network of volunteer support.

Project Gutenberg eBooks are often created from several printed editions, all of which are confirmed as not protected by copyright in the U.S. unless a copyright notice is included. Thus, we do not necessarily keep eBooks in compliance with any particular paper edition.

Most people start at our website which has the main PG search facility:

www.gutenberg.org.

This website includes information about Project Gutenberg, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.