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# THE FATAL EQUATION

By ARTHUR G. STANGLAND

● "But listen, George," pleaded the voice on the other end, "it's the damndest tangle of calculus and physics and murder you've ever seen. It's all just a crazy jumble to me—sheets and sheets of 'math' all over the desk in front of him and also one of those integrator machines. He's sitting there like a guy gone to sleep in his chair. You've got to come out and give me a hand—how do I know it's murder? Because Dr. Friede is too young and healthy a man to die from heart attack, and—don't laugh: there's something in the atmosphere here that just 'smells' of murder. In other words, it all looks pretty fishy, but what part of it is fishy is for you to find out. Will you come?"

It was a tired, wan-faced George Funkhouser who answered: "Yes, I'll come, Kip, but you certainly don't give me any rest, do you? I just got in from the East. See you in a few minutes."

In ten minutes George was fully refreshed from a shower and a change of clean clothes. All sign of sleep had vanished from his intense brown eyes. If the nervous energy pulsing in his lean form drove him to long hours at hard work, it likewise drove him to long hours of hard play, for George Funkhouser never took half measures in anything. A new light was glowing in his sensitive emotional face. Being friend to Kip had not been without its exciting moments, for the police detective had long since recognized a valuable counterpart in the shrewd young mathematician.

As he sped out along the main boulevard toward Mt. Tabor, Funkhouser mulled over the surprising news. He didn't know Dr. Jan Friede personally, but he did know that he was one of the foremost mathematical physicists in the country. He had no known enemies, was not a man of wealth, and preferred to live in quiet simplicity. Maybe Kip was just imagining things. Still there was the matter of his hunch, despite the hilarious absurdity of a hunch lodging in him of all people for he ordinarily pooh-poohed others of finer sensibilities.

Friede's residence was a two-story English manor style of house, and as Funkhouser drew up to it, it was a blaze of lights. He returned the familiar greeting of the officer at the door and then entered.

"Well, Old Man Punctuality himself!"

Coming toward him was a man dressed in a dull gray suit. He was one big grin, so that his deep set eyes almost disappeared in the transformation. He shot out a strong capable looking hand which George grasped with genuine affection. Kip led the way upstairs.

"Friede's study is upstairs," he was saying, "and I've

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● Plato once said that our lives are like the flickering shadows of events cast upon cavern walls. We no more experience reality than a fly does. As it crawls across a wall it sees specks on the wall, it cannot see or know the wall as a whole.

According to our author we are imprisoned in little cells limited by time and space. Only if we were released from this imprisonment could we know what Reality is. How can we escape, our author asks? For this answer he goes to mathematics—not in a dry lecture but in a scientific detective story filled with the aroma of murder, as strange and bizarre as man could conceive.

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left everything just as we found it. The coroner is still here waiting for you."

They entered a room lined with shelves of books and old tapestries. French windows opened upon a little balcony, but at the moment they were closed and curtained. It was a softly quiet room, the respectful stillness of death cloaking it, for in the middle of it all George saw the slumped figure of Dr. Jan Friede in a chair. Before him on a desk was an electric integrator, a complicated machine with numerous keys and lever bars for solving intricate equations of the calculus.

Scattered around it were many sheets of paper covered with mysterious looking strings of abstruse equations—the hieroglyphic language of the physicist. George stood opposite the dead man, looking at him across the desk. A man drowsing in his library could not have looked more natural. The eyes were almost closed. The smooth, half youthful face was relaxed in peace. The slender hands had dropped into his lap.

George turned to the coroner. "What did you find out, Dr. Bauer?"

"Well, it's a strange thing to say for a man Dr. Friede's age—he's only about forty—but his heart just stopped working, that's all. A natural death is my opinion."

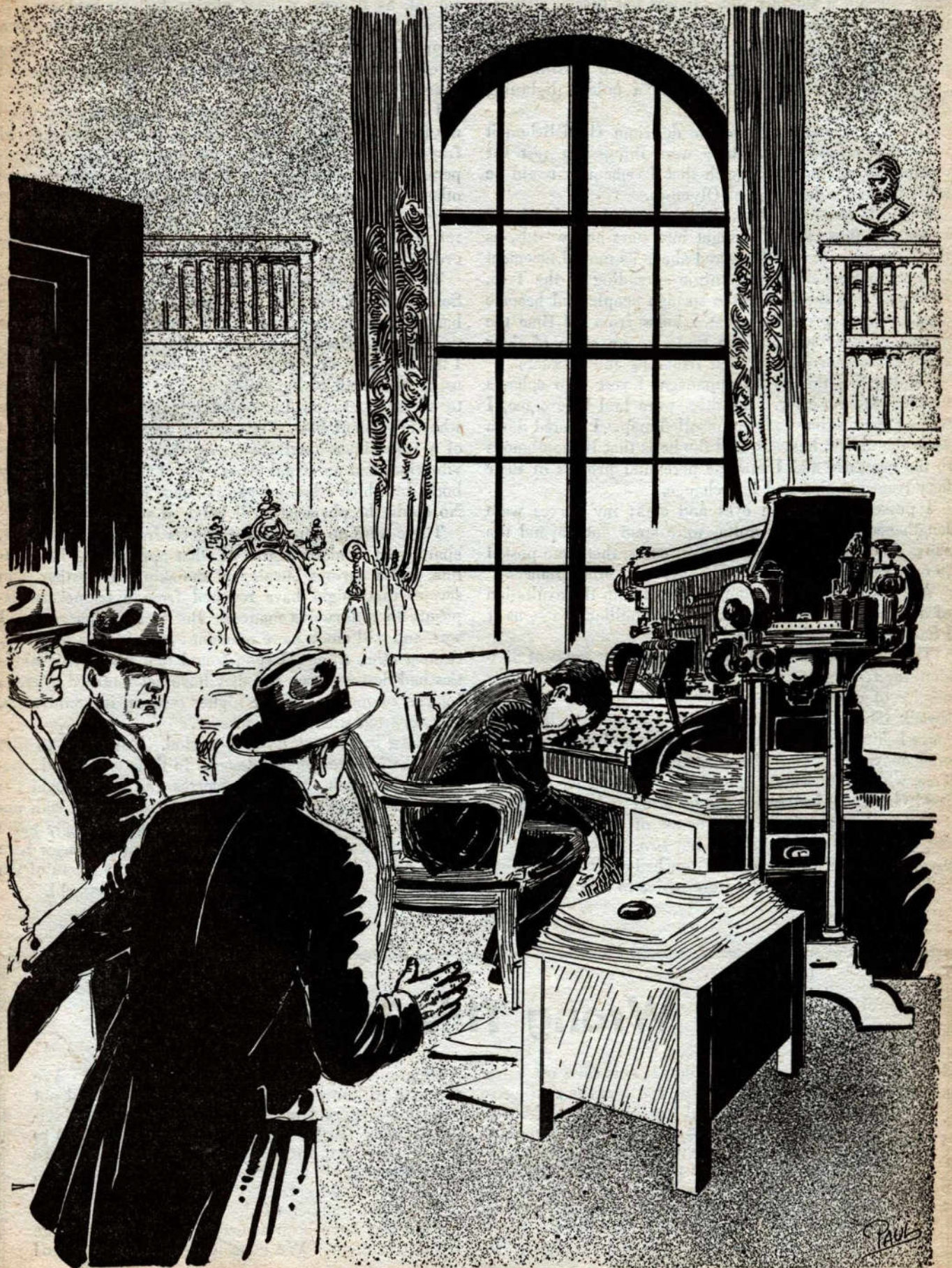
Dr. Bauer began packing away his instruments in leather cases with deft, expert movements. He was a small man, keenly alive to life.

"Find anything else?"

"No. I took a careful look with the X-ray and penetrating-spectroscope, thinking I might find poison in his system, but he's okay in that respect."

"I see. All right, doctor, that's all I want to know."

Attendants removed the body now in charge of Dr. Bauer. George began inspecting the various sheets of calculations scattered over the desk as soon as the coroner was gone.



They saw the slumped figure of Dr. Jan Friede. Before him was the electric integrator. Scattered around were many sheets of paper with mysterious equations.

"Have you made photostats of these yet?" he asked.

"No, but I had the photographer take pictures of the room as is, though."

"Better get him to take photostats of these sheets of equations and especially this last one that he apparently was working on when he died which he calls '20b.'"

● Kip nodded. That was a precaution he had overlooked.

"By the way, George, I'm waiting for a call from Murphey. I sent him over on Division street where Friede's secretary lives. He might be able to tell us something interesting."

"His secretary, eh! What's his name?"

"Lonsdale."

"Know much about him?"

"Just what I learned from Friede's housekeeper, Mrs. James. I'll have her brought up for you."

The young mathematician's dark eyes lighted up like a blood-hound's upon finding fresh trail. An officer brought in the poor frightened soul. Funkhouser smothered a grin. The woman presented herself in helpless agitation, ravelling and unravelling her apron over a rotund mid-section. Her hair was pyramided in diminishing doughnuts flat atop her head. Her light colored eyes stared wide behind silver-rimmed spectacles, and as she walked she planted her feet solidly, almost ponderously.

"Did Mrs. James find Dr. Friede?" asked Funkhouser, turning to Kip.

"Oh, er—er yes, sir, I did!" answered the woman quickly. "It was about 'alf past five, sir, when I come up with 'is tea—and 'im a-sittin' there—dead!"

"Well, Mrs. James," interrupted George, "what I really want you to do is tell me what you know of the doctor's secretary."

"Oh—Mr. Lonsdale? I cahn't tell you much, sir. 'E always seemed such a nice young gentleman to me. 'E doesn't stay 'ere but comes in of a mornin' to 'elp Dr. Friede. This mornin' 'e left around noon an' I 'eard the doctor s'y somethin' about 'im comin' back this evenin'."

George looked at Kip significantly.

"All right, Mrs. James, that's all." When she had gone, George looked at Kip. "Somehow or other Lonsdale is mixed up in this, Kip."

"How?"

"I don't know, but it's just as you said: there's something fishy here. Friede's death appears almost too natural. It's a rigamarole all right."

George turned to delving into various drawers of Friede's desk, glancing perfunctorily through numerous letters and papers. Presently, he found a thick black book. It was a personal journal or diary in a distinctive, individual hand. He sat down in a chair and began to read through it. Mainly, it consisted of the famous scientist's thoughts and ideas for mathematical treatises. The last several entries proved most interesting.

"March 25th . . . . . And what of our Universe? Must we always go on groping blindly, being content after all with the mere 'shadows on our cave walls,' as Plato is constrained to observe? The earlier 20th century trend of thought was a mixture of a mechanical and an ever-increasing or expanding Universe, somewhat of the nature of a soap bubble. But I wonder if after all we cannot throw our Theory of Quanta to the winds with its negation of causation, and assume—logically enough—that the Beginning rests in a Mathematical Mind?"

"I shall even go a step further and suggest that pure thought is the 'real essence of substance,' for although we still do not know the true nature of light, we can express its reality in objective equations. The same with the electron—we can still

express its attributes of behavior in formulae regardless of whether it is a ring of Heisenberg's 'probability waves' or not. I think it would be startling to investigate this idea mathematically. Had a discussion with MacMillan, but he pooh-pooh's the whole idea—the old chauvinistic diehard!"

"April 4th. I have been wandering off into weird realms of hyper-mathematics lately. And as a result it is being profoundly impressed upon me that what we are dealing with in mathematical physics as 'realities' are but the shadows of the real truths projected from higher dimensions into our realm of length, breadth and thickness. A beetle seeing no farther than his two dimensions might ponder upon the probabilities of sporadic wet spots on the ground, while we, extending up into a third dimension, would be able to predict with certainty the coming of rain, having such necessary data at our hands.

"Almost inexorably it seems, Time is welded upon our three dimensions as a fourth dimension. In our progress through space, Time is always the ordinate and Space is the abscissa. To me it appears that Time, as we understand the experience of the phenomenon, is but a mechanism for contacting our imperfect consciousness with a part of the whole at consecutive intervals, just as a revolving wheel is in contact with the road at only one point. It seems to be merely a difference between a concept of dynamic Time and static Time. Could we but discard Time, I wonder if the whole panorama of life would unfold before our eyes along the world-line of the abscissa axis? And then might we not come face to face with Ultimate Reality!"

"April 12th. I almost tremble as I write here. I am on the verge of a vast discovery of a magnitude that matches all space. Starting with a tensor borrowed from an Einsteinian-Reimann space, I have arrived at a comparatively simple mathematical statement in which Time as a function of space cancels out on both sides of the equality sign, being substituted by a static alternative. In other words, I've discarded Time altogether as a part of Space! The conclusions I am to draw from this discovery overawe me. MacMillan still is patronizing toward me though I haven't shown him my analyses yet."

● George sat in a meditative silence after laying the journal aside. Dynamic Time. . . . static Time. . . . the veils drawn across ultimate reality! What manner of sane-minded man would toy with such a ungodly fantastic idea as this? Was there really anything to his ideas? Had he actually gone blundering out to the frontiers of human consciousness and lifted a corner of the veil for a fascinated moment? Maybe his death was caused by some such unguided attempt to peer into the Beyond. Hell!

Funkhouser swore under his breath, such mental ramblings would send anyone mad—himself included. He was quite tempted to call Friede a sadly demented man and let it go at that. Yet he knew it was too easy a way out of a perplexing case. There must be some homely solution to his death, something uncontaminated by weird theories of peeking behind the curtain like some errant schoolboy.

"Well, what do you make of it?" Kip broke in upon his reflections.

He was silent a moment. "Listen, old tube, I'm a mathematician, but I'm no wizard. I have a feeling that somehow or other Friede's death is connected with his work. Why should he die just before his mathematical treatise is completed? We need help in wading through this maze of theory and hyper-mathematics, because therein lies the motive, I'm sure. Now there's only one person who can help us unravel this Gordian knot, and that's Dr. MacMillan—as fine and sane a man of mathematics as ever lived. He's from the University, and I can vouch for him because he taught me much of what I know."

"Anything you say. Call in all the technical help you need. It looks like a hopeless mess to me."

Dr. MacMillan was immediately reached by phone. After Funkhouser's explanations the professor was only too glad to be of help. He would be over right away, he said.

In a short time the venerable old professor of mathematics arrived. His white hair and slightly ponderous

figure belied his physical age, but the bright, intelligent gleam in his eyes spoke mutely of youthful reservoirs of energy.

"Hell, George," he greeted, then he paused. "My, my what a sad thing this is," he lamented, looking around the room.

"Glad to see you again, Dr. MacMillan, though it's unfortunate it has to be under such circumstances." Funkhouser turned to Kip. "Doctor, this is Detective Wagner in charge of the case."

Following the introduction, George wasted no time, launching forthright into the midst of his problem.

"I tell you, MacMillan, this man was murdered, but how, I do not know. That's why I've sent for you," explained George, picking up several sheets of Friede's computations. "Somewhere in this mass of figures lies the key to his death."

"But how are you so sure of that?" queried the older man, leaning forward with interest.

Funkhouser's eyes strayed to Kip momentarily. "Well, it's just a hunch—and yet something more."

"Something more?" repeated the professor, "and what do you mean by that?"

George regarded MacMillan with shrewd eyes.

"Dr. Friede passed away at his desk right in the midst of completing his amazing mathematical treatise!"

"I shouldn't call it 'amazing,' George, with all due respect to the memory of my deceased friend. Rather, it was an idea which would cause anyone to question the sanity of its creator!"

"You were intimate with Dr. Friede, MacMillan, more so than anyone else, according to his diary. Explain in ordinary terms what he was attempting to do."

After a pensive moment, the professor began: "Jan had an idea that the Universe is the product of a Mathematical Mind, that all matter right down to the infinitesimal spinning vortex of the electron is steeped in an all-pervading aura of Thought, even deriving its genesis from such a source. And every time I called on him here he elaborated on it with growing enthusiasm. At last he even conceived the idea that Time could be divorced from Matter and that all Eternity might be revealed to us up through magnificent realms of hyper-dimensions. The poor man was mad with his weird theories!"

## CHAPTER II Into the Vortex

● Slowly, George paced the floor, a puzzled frown on his face as he listened to MacMillan. He stopped in front of the electric integrator deep in thought.

"Dr. MacMillan," he declared decisively, picking up several sheets of papers, "read off those equations to me, beginning with (9a) up to (20b). I'm going to run through them the same as Friede did."

Dr. MacMillan received the sheets of equations wonderingly, looking up at George with a penetrating, questioning gaze. But the younger mathematician sat down in the same chair that Friede had used, waiting for the old professor to begin. An indefinable tension sprang up in the room like a cold wave of air. Kip stirred uneasily and then crossed to his friend.

"Listen, Funkie, I don't like this idea of yours," he complained.

"Why—what's wrong with it?" the other countered.

"Well, I don't know exactly. I just feel that all's not well—Friede died in this chair!" the detective reminded him.

"Don't be an old woman all your life, Kip. Come on, MacMillan, let's go!"

In a calm voice the professor began reading from the sheets of computations. Each equation George set up on the keyboard of the integrator. For the process of solving he was merely obliged to trip a small lever and the machine whirred into action with a clicking of many small wheels and keys, continuing so for a full minute, whereupon the answer would appear on a sheet of paper fed from a cartridge roll. Rapidly yet easily George worked out each equation, checking as accurately as a precision machine with Friede's results. At last they came to the final equation (20b). Kip stood nervously tense near Funkhouser watching every move he made with the intentness of a watchdog. Friede had died just before he solved (20b). Would George suffer the same insidious fate?

"The 'fatal equation'!" murmured Funkhouser, as MacMillan read it out.

The young mathematician sat bent over the machine, the keys clicking slowly under his fingers, weaving a mathematical pattern that had ended in a mysterious death for its creator. The intricate differential tensor at last was set up. All that remained was to trip the small metal lever that sent the machine into solving the equation. Death had struck from out of the unknown just before that operation. Every eye in the room was on Funkhouser. He put out a hand and tripped the starting lever. Nothing startling happened. The machine whirred softly, clucking inside its magnificently accurate metal brain. An audible sigh of relief automatically escaped everyone.

Suddenly a telephone buzzed quietly on the table, startling the tensed onlookers. It was Kip who answered in a harsh voice.

"Oh, you Murphey. What's that—Lonsdale hasn't been there all day! All right, stay right there. We'll be over in half a shake!"

Kip glanced down at Funkhouser. "So, he's skipped out on us, eh. He's the guy we want. Say, once I lay hands on a picture of him, we'll have every patrol car on the lookout for him."

"Don't be too optimistic," warned Funkhouser. "Apprehending Lonsdale won't settle the case. We still haven't proved it's murder. The most we can hope for is some clue to establish that it is murder."

"Dr. MacMillan, can you give us anything of a descriptive nature that will aid us in picking up Lonsdale?"

"Why, that's a strange thing to hear of his disappearance," murmured the old professor, "seems to me there must be some explanation for it. As to a description of him, I must confess there's nothing very distinctive about his person. He is a medium-sized man about one hundred fifty pounds in weight, has light blue eyes and light hair. He walks with a quick springy step. But the best thing would be a photograph of him."

"First of all let's get over to his apartments and search the place," suggested George, "then we might have something more definite to give police radio central. Come along, MacMillan."

There was nothing pretentious about the exterior of Lonsdale's quarters. It was an unassuming, simple edifice on a quiet street, catering only to a conservative clientele. Funkhouser's observant shrewd eyes were alive to the

locale. Through his mind was running an old saw: "As a man liveth so is he judged." Certainly Lonsdale's character was to be read in every part of his neat, clean room. Nothing was out of place, each article of furniture occupying a definite position in methodical relation to the rest of the room and its contents. His desk was a paragon of system and neatness. Here, thought Funkhouser, resides the owner of a mathematical mind.

Murphey explained how he had quizzed the janitor and several of the apartment guests only to discover that Lonsdale had not been in since morning.

While the officer held forth in ponderous exposition, George combed the room for anything of value, some clue that might give an inkling of motive to the enigmatic problem confronting them. In a dresser drawer he came upon a picture of a solemn-faced light haired young man.

"Hm." He turned to the professor. "Is this Lonsdale?"

"Yes, that's Lonsdale all right."

Kip literally pounced upon the find. "Good! Now we'll get somewhere with this search for that guy." He turned to the policeman. "Murphey, take this photograph down to the car and send it in to Max—and this written description I'm writing out. Hurry!"

● Murphey was not a hand to trace clever fugitives, but he was an expert telephotographer. Down in the patrol car he got busy with the photograph, wrapping it deftly on a revolving cylinder and focusing a small exciter beam on it. With each revolution was builded a pattern of a wanted man in police radio central, a signal which would set into operation an inexorable machine that would comb the streets of the city with the accuracy of a selective photoelectric cell.

Systematically, George went through every drawer in the room he could find, yet leaving things as he found them. Kip was more rough-shod, taking his spite out on Lonsdale objectively, by leaving clothing, papers and various personal articles where they fell on the floor. It was beginning to appear as if their search would be in vain.

Kip stood up in the middle of the mess he had left in his cyclonic fury: "Damn that guy, Funkie, he knows something or else he wouldn't have left in such a hurry. When we bring 'im in, I'll 'sweat' 'im the way my granddad used to handle 'em! None of these new-fangled mental tests."

However, George made no answer, being bent over a fresh carbon paper that he had brought forth from a desk drawer. Dr. MacMillan eyed the young mathematician with interest.

"Get a mirror, Kip," said George in a calm tone of voice that startled the detective into wondering compliance.

"What've you got there?"

"It's a short note Lonsdale's written," returned the other, placing the mirror so as to read the message. "He must have kept the carbon copy on himself."

The three men read the carbon in the mirror:

"You must be more patient, Dr. Bishop. I can't get the final equations yet; he might suspect me if I hang around too much. I've copied equations (7c) to (15a) which I enclose for you with this note. As Andre will tell you, he and I shall meet at 4 p. m. tomorrow at the usual place. Thanks for the \$500."

Kip let out a snort: "There's our clue, Funkhouser! This Lonsdale guy has been copying Friede's work and selling it to a Dr. Bishop—whoever he is. This morning

Friede caught 'im at it and Lonsdale killed 'im. There's the whole case in a peanut tube."

"You think so?" was George's dry retort. "How did he kill him without a visible trace of the method?"

"Well," hesitated Kip, "we'll get that out of him when he's brought in."

"Which just goes to show the case isn't solved yet. We have two more unknowns in the equation now. Who are André and Dr. Bishop?" Funkhouser looked to MacMillan. "Ever hear of them?"

"Never. André might possibly be Bishop's secretary however," offered the white-haired professor.

George was silent for a long moment, then he regarded Kip with a smile.

"I think I'll let your police force do a little work for a while now because I'm going home for a few hours sleep. If Lonsdale shows up call me there."

"All right, Funkie. What did you do with the sheets of equations?"

"I have those down in my car. I got the photostats of them also from the photographer just before we came over here."

Dr. MacMillan shifted anxiously from one foot to the other, and then took out a watch.

"Do you need me any more this evening, George? You see, I must catch a plane for 'Frisco in several hours."

"Oh, I'm sorry, MacMillan. Thanks a lot for your help."

"It wasn't much."

"Well, you never can tell."

On the way home George switched on his private televisor that the police department had assigned to his car at the request of Detective Kip Wagner. As the ground glass screen came to life, a familiar picture was being shown—that of Lonsdale. A voice was saying:

"Attention all patrol units: this is a picture of a man named Anson Lonsdale, wanted in connection with the mysterious death of Dr. Jan Friede. He is blue-eyed, blonde, and weighs about one hundred fifty pounds. Walks with a springy step. Cut in telephoto wave band for general broadcast of this picture. . . ."

Moving deftly in and out of traffic swarms crossing Burnside Bridge to the West Side, George's eyes automatically piloted the car, but his mind was full of equations—the human kind, and murder. He was almost ready to believe Kip's accusation of Lonsdale, but now the human equation was more involved than ever by the addition of the unknown quantities of André and Dr. Bishop. Who were these men and where did they live? Just how did they affect the solution of this problem? It would take more than the calculus to solve this complicated equation!

Thankfully, he at last came in view of his apartment building. It was on a quiet street and few people were about. With an adroit swing of the wheel he entered the apartment garage elevators which would automatically store his vehicle for the night. As he was leaving the driving compartment of his machine, two well-dressed men appeared from out of nowhere on either side of him.

"Back in the buggy, old boy, an' no squawking!"

● George looked up in vast surprise. Hard eyes bored into him from out of bleak faces. Thin-lipped and narrow-faced, they were of the gentry who take courage behind the muzzles of hair trigger automatics.

"Well, get in there—don't waste our time!"

Funkhouser made no move. "Who are you?"

"Say—get goin'. . . or do we have to lay you out?" growled the one with the heavy square chin. "Chick, grab his brief case, an' hang on to it. . . or we don't get the dough."

Timing their movements with a swift, calculating eye, George suddenly dived into the car slamming the bullet-proof glass door behind him. The man, Chick, closest to him made a wild grab for the case but missed. In furious haste Funkhouser snapped on the starter. Still in gear, the heavy car lurched ahead on to the elevator. A steel-jacketed bullet flattened against the thick glass panel, but the young mathematician ignored it with a sense of safety. He found the switch on the control board with groping fingers, and a special police siren let out a whoop and a screech that pierced the ears painfully. Taking a parting pot shot at the car, the hard-faced strangers ducked out into the street and were swallowed up in the mystery of night. Curious, wide-eyed mid-nighters gathered from nowhere, and yet, as usual, no one had seen two jauntily dressed men hurrying from the apartment building. Funkhouser made no report to the police; it would be useless.

Instead, he went up to his apartment, extremely conscious of the brief case in his right hand. Someone wanted that case and its contents, someone who had been shadowing his every move. Deeply impressed by the almost successful robbery and its possible significance in relation to Friede's mysterious death, George was too disturbed to sleep. At his desk he took out the sheaf of calculations and the diary, laying them before him where he sat in brooding silence, eyeing the objects.

It seemed almost inevitable upon reflection that Lonsdale was the man wanted for murder—if murder it were. What other reason could account for it but robbery, as Kip had suggested? Still that didn't satisfactorily explain away the attempted robbery by men hired by some one else. George spread the papers out on the desk, regarding them speculatively. What was there about these documents that made them especially desirable to the strangers? His meditative glance was more idle than observant. Slowly the pensive look in his eyes crystallized into a sharp, intense gaze. Quickly he started examining the equations on the table before him. He sat up rigidly in his chair, shifting the sheets in white faced awe.

"God—just a plus sign, yet the clue was there in 20b all the time!"

Queer, unbelievable thoughts crowded into the center of Funkhouser's electrified consciousness. Thoughts that flitted in from a fantastic hinterland first hinted at in Friede's weird diary—static and dynamic Time. . . . vortices of matter steeped in an aura of Cosmic Mind. . . . realms of majestic reality in hyper-space. None of it made sense—neither did the murder. Grave doubts rose in impressive array to assail him.

Still, there was no mistaking the indictment of 20b. He looked up from the calculations with almost a fear in his intensive brown eyes. More involved than ever the human equation was becoming. Like a lost soul he waded into Friede's fantastic, alien world seeking an answer. Why? Why? Yet, concrete enough was the realization that Friede's integrator must be examined immediately. Thereby hung the entire proof.

But it would take an expert. Time was precious. Immediately he called an acquaintance working in the engineering offices of the Integrator Machine Company.

"Sorry to bother you at such a hellish hour as this, Jules, but I've got to have your help on some important work—no, wait a minute man, I'm not joking, I'm serious. I want you to examine Dr. Jan Friede's integrator tonight. . . . Yes, I'll be right over for you."

This time before he went out, Funkhouser slipped a small gun into his pocket. Small—but it could kill a man ten times before he dropped. Holding grimly on to the brief case with his left hand and the gun in his pocket with his right, George descended to the garage level and brought out his car. In a moment he was rolling smoothly, effortlessly toward midtown—Jules stayed at a hotel. With difficulty he suppressed the impatient nervousness that filled him. He would soon know definitely whether it was murder or not, and time meant everything. . . . Time! His racing thoughts lingered over the word with vague dread. Equation 20b. . . . the "fatal equation." It had eliminated Time as a concept in the new evaluation of Ultimate Reality. Had some uncanny force from outside reached down and plucked Friede from Life through a human agency, to remove his prying genius of intellect? The whole thing was a nightmare of reality, opening up new vistas that he dared not dwell upon at length lest he go mad.

### CHAPTER III

#### The Fatal Equation

● Few people were in the lobby when George went in to meet the quiet, reserved looking Jules. He was a studious type of man—an expert designer.

"What's on your mind, Funkhouser?" asked the engineer in a mystified tone when they drove off. "What's Friede's death got to do with his integrator?"

"That's just what you're going to help me find out—I want to know and know badly." George drove on in a thoughtful silence for several moments. "Is it possible to be electrocuted by one of those machines?"

"No, you see everything is insulated. Oh, of course, there have been freak accidents—they're such a highly complicated mass of moving parts—but nothing quite so serious as death."

When they arrived at Dr. Friede's home a police guard met them at the door and admitted them. Up in the study George regarded the integrator with new interest. Lethal machine or not?

"First of all examine it for shorts, Jules," suggested the mathematician.

Jules sat down before the machine and set up several equations solving them as a preliminary gesture to determine its characteristics.

"Well, it seems normal enough in operation," he declared superficially, as he started to take off several of the side plates of the integrator.

Funkhouser stood at the engineer's elbow watching every move intently. Long accustomed to pattering around with calculating machines, Jules worked smoothly and surely. Presently, a grunt of surprise came from him, kindling a hopeful look of vindication in George.

"Hm," Jules hesitated a moment, staring into the complicated heart of the machine where a small motor hummed and a maze of levers waited to click into action.

"What is it?" prompted Funkhouser expectantly.

"Well, let's take a look here," murmured the other pursing his lips thoughtfully. "Set up any equation that comes to your mind while I watch the keys here."

Dutifully, the mathematician, without further question

operated the integrator, while Jules peered intently at the clicking keys and revolving cog wheels. After the machine ceased its work, the engineer looked up into the questioning dark eyes of Funkhouser.

"Some of these insulators between the keys have been removed, but I can't make sense out of the reason for it."

George gazed down into the machine wonderingly: "How does that affect it?"

"I don't know yet—but it certainly looks like someone has been tinkering with it. Now, let's see. . . ." And with laborious care Jules traced the wiring to each tiny electromagnet on the keys. Then he made a discovery. "Say, this machine is taking enough high frequency juice to paralyze a man!"

He took pencil and paper and, poking his fingers in among the rods and levers, jotted down a string of characters and figures. After he was finished, he stared up at George wide-eyed.

"There's the combination of keys—each one without an insulating separator! Why, man, if that were set up now the operator would get such a jolt of juice through his hand that the frequency would paralyze his heart muscles!"

"You mean," hesitated George with a sober expression in his face, "that as soon as that combination was set up, the operator would die if he put his hand on that little metal lever that starts the solution of the equation?"

"Yes. There are bodily currents circulating in the heart that would be multiplied enormously on the harmonics, thus paralyzing the muscles and causing death. That's how Friede was murdered!"

"God—so that's how it was done!" muttered Funkhouser, more to himself than to Jules. "But why? What was the reason?"

Then George seemed to rouse himself. He jumped for the telephone, and dialed a number. And when he made known his request to the man on the other end he spoke with almost a savage haste.

"Not listed, eh?" He hung up, a hard glint in his eyes. It was going to take swift work now.

The guard came upstairs. "Mr. Funkhouser, a report has just come to me from police radio central that Detective Wagner wants you located immediately. Something important."

"Oke, I'll call in now."

Relief was in Kip's voice when he heard George on the phone.

"Lord, I've been worried about you. Tried your apartment a dozen times. Where you been?—Oh, Friede's, eh? Say, I've got a line on Bishop. He lives down on the coast about ten miles outside of Astoria, and I think Lonsdale's on his way there now. One of the patrol cars reported that a fuelling station operator down toward the Wolf Creek road recognized the picture of Lonsdale. Said the fellow had stopped there earlier this evening. I'm on my way to the coast now, so hurry up and meet me here at headquarters!"

"You bet I'll meet you there. We've got to reach Bishop or there'll probably be another murder!"

Before Kip could shoot back a surprised, "What!", George hung up. Hastily, he grabbed all the papers that had become so valuable, and thrust them into his brief case.

"Come along, Jules, I'll drop you off down town," cried Funkhouser, and the two of them hurried down to his car.

Swiftly, but hardly recklessly, they sped along the arterial boulevard, clearing a right-of-way with the authoritative police siren. His all-important part in the solution finished, Jules rather enviously watched Funkhouser speed away from his hotel when they reached midtown.

● At headquarters Kip was waiting in a long, high speed machine, a new "tear-drop" model with a rear slung motor. The finest of engineering designers had fashioned the road monster into masterpiece of aerodynamics that would shear the wind of the open road at 150 miles per hour. Little was said, Kip being too occupied with driving through city traffic. Then they took a ramp up to an elevated speedway for fast traffic leaving town. At the limits, and within sight of the Wolf Creek super-highway going to the coast Kip opened the motor wide. It leapt ahead instantly with little effort. Far ahead in the powerful glow of the headlights the table smooth highway stretched in a straight line. There was little traffic.

"It's a good thing I checked up on Bishop at the University," began Kip enthusiastically, "they were the ones that told me he's away on Sabbatical leave at his estate on the coast. At any rate the whole case is clear now, isn't it, with Lonsdale headed in his direction? Things get too hot up here in the city for him, so he hot-foots it down to Bishop. What could be simpler!"

George looked at Kip with a penetrating gaze.

"Just how sure are you that Lonsdale is guilty?"

"Well, all the indications are that he's the one."

"Why, you haven't even got proof that it's murder yet," declared Funkhouser almost derisively.

"Say, by the way," began Kip, as if upon second thought, "what were you doing out at Friede's?"

"I've proved beyond a doubt that it's murder, all right, Kip. Someone has tampered with Friede's integrator so that if a certain equation were set up, the operator would receive a jolt of high frequency juice through his left hand when he tripped the 'solving' key. This would paralyze his heart muscles and cause death."

Across the Clatsop county line they flashed, zooming around long curves and out between thick wooded low hills. They were getting closer to Astoria. Behind them in its sound-proofed case hummed the engine, its hissing exhaust a background for their rising and falling voices.

"All right—good enough," exclaimed Kip defensively, "that establishes Lonsdale's method. Damned clever guy."

"Not so fast, you haven't heard me through yet. The death dealing combination that the murderer used was 20b—the 'fatal equation'!"

"But how did you discover that?"

"When I got to my apartments, I was glancing idly over the sheets of equations. Some of the photostats were on the desk too. That's how it suddenly struck me that one of the equations had been altered. *A minus sign in 20b had been changed to a plus!* That made me suspicious, so I decided to take an expert engineer out and examine Friede's integrator. If you remember correctly, I set up equation 20b on the keyboard, but it didn't kill me. That lethal equation had been slightly changed so that I wouldn't be killed, and as only one other person besides myself handled those sheets of equations after the photostats were taken, you may know, Kip, that we are trailing MacMillan and not Lonsdale!"

"MacMillan!" Kip gasped the word. Then after a

moment of sober reflection, he objected. "But he's on his way to Frisco, George."

"He told us he was catching the midnight plane to Frisco, all right, but he wasn't on the passenger list because I made inquiries!" George spoke with inexorable firmness. "Doesn't it strike you as odd that he left so suddenly after he discovered I had photostats of the computations taken before he changed 20b? Of course it does. That's why he hired some gunmen to get my brief case just as I started to leave my car at the apartments. Luckily enough, I escaped them."

A wavering expression was in Kip's eyes, but all he said was: "What makes you think MacMillan is headed for Bishop?"

"He told us he didn't know Bishop, but it seems illogical that he wouldn't know a fellow member of his own faculty. And even if he didn't know, he'd make an effort to find out Bishop's whereabouts, because he is attempting to destroy all evidence against himself. Still another reason lurking in back of my mind is that he may have his own peculiar—perhaps fantastic reasons for killing anyone investigating the theories held by Dr. Friede. The whole case is a weird affair—we can almost expect anything."

By now the two men were deep into the coast country. They had crossed the Nehalem summit and were descending rapidly into the Saddle Mountain district.

"I think we're almost there," announced Kip. Far ahead on the road appeared the two tail lights of a car. "Wonder who that could be?"

Quietly, they watched the two twinkling red lights, disappearing around wide sweeping curves only to appear again. Suddenly, the car swerved sharply to the right as if at high speed, heeling over dangerously, and followed a side road disappearing behind a hill. When they came to the crossroads, Kip cried in alarm.

"This is Bishop's private road to his estate. They told me he has a sign at the roads and there it is!"

Both men looked out at the sign: "Private road: The Evergreens."

Kip read the look in George's eyes. "Yes—you must be right. That's MacMillan ahead of us, I'll bet!"

● Kip gave her the gun, and the long car swung into the side road with swift acceleration. In and around clumps of firs and alders they wound, and when they came careening around a bend in the road, Bishop's beautiful country home met their eyes. It was brightly lighted, as if wide awake to some extraordinary circumstance. Several sleek, road-dusted machines stood in the driveway. When they parked before the house, Kip reached for several guns in a side wall pocket, handing one to Funkhouser.

"No telling what we'll run into here, Funkie. Keep your eyes open—"

"Yeah? You won't need to!"

Both men were suddenly the focus of several electric torches, as they started along the roadway.

"Drop the hot rods, flat-feet—you're covered!"

"Well, you—"

"Look out, Kip, look out," muttered George aside to the impetuous detective, "we're covered all right. No use being headstrong about it."

They handed over their guns calmly enough, and as they neared the lights of the front entrance, George noticed with some surprise that the men were the same two

who had attacked him at the garage elevators.

"So, MacMillan had you all set to take us in, eh?" challenged Funkhouser.

"Stow the chatter, brother," warned the one named Chick, "you got plenty of time."

Inside they were taken below to a big concrete box of a cell. In the center of the floor of the strange room was a shiny copper ring with sparkling, crackling knobs on the periphery. A similar one was suspended from the ceiling by brass rods. Against the wall stood odd-looking coils that gave off peculiar lacy-patterned webs of electric flashes. And in the midst of it all stood MacMillan, older in body, yet younger in face, confronting three men, one of whom George recognized as Lonsdale. The other two must have been Bishop and André. MacMillan shifted the gun in his hand, and picked up some sheaves of paper on a table.

"I came here to kill you, Bishop, but I know now that you're not a dangerous man to let live," said MacMillan, ignoring the arrival of the others. "Friede was the only real mathematician, the genius whose brilliant ideas the world had reason to fear instead of praise, as he thought. You're only a mechanical calculator, not a creator. You stole Friede's ideas and applied them in this contrivance."

"Good God, MacMillan, what've you been doing anyway!" Funkhouser cried out in desperation. "Why have you murdered Friede—your friend?"

MacMillan suddenly seemed tired as he turned his eyes on George, as if having spent his meager youthful spirit in one fell blow.

"I should have known better than to match wits against you, George," he began with a wan smile. "Youth is ever ready to take the place of old age. I changed that final equation to save your life. Yes, it's just as you suspected, I manipulated Friede's integrals to kill him, thinking I had left too complicated a trail to be suspected. But believe me, my boy, I didn't kill my friend in malice. Every time I visited him, I could see the vast, staggering truth of his theories mounting higher.

"I tried to discourage him but without success. Then it was that I realized I had to deal with a stupendous idea and not Friede, an idea that would plunge the world in chaos if carried to completion. There are things unseen in this world that present primitive man must not glimpse. He must be content with the 'shadows of reality on his cave walls'! That's why I killed my friend. I am destroying everything of Friede's mathematical theories so that fools like Bishop and his kind can not go on playing with high explosives!"

And the old professor tossed the papers into the space between the rings. Miraculously they disappeared in mid-air.

"Yes, you have a right to stare and mutter 'incredible,'" murmured MacMillan, looking at Kip and George, "that's the plaything Bishop has constructed on the basis of Friede's theories. But he can never make another, for I've destroyed all plans and descriptions. If you have any of Friede's works, burn them." He took a step toward the floor ring.

"What are you going to do?" cried one of the other two, his face taut and pale.

"I'm going to test your machine, Bishop. I'm going to invade that magnificent realm of *real* Reality that Friede dreamed of I'll meet him there. . . . and make amends."

(Concluded on page 884)