Fifty Million Monkeys

by Raymond F. Jones

Trial and error is the slow way—but the one absolutely certain way to successful research. But if trial and error—blind chance—could be speeded up—

Illustrated by Orban

The thousand-foot cube stood out against the skyline of the industrial city like a giant with shoulders hunched against the sky.

In the morning mist the fifty-foot letters that were dwarfed upon the great walls read dimly across the city:

JAMIESON & SON

Consulting Physicists

To each one of the city's inhabitants it was the first thing to be seen each morning as they awoke to the sun's rising from behind the mountain of the building—and the last thing at night. They knew it as the "House of Tools."

Some sensational copy writer had thought up the name some years ago, when Jamieson & Son still needed copy writers to help bring in business. And the name had stuck.

Craig Jamieson had liked the name, though his father snorted in disgust at its lack of semantic accuracy. It *was* a house of tools to Craig—the mightiest tools the Universe had ever known.

Spiraling down from the unmisted stratosphere toward a roof landing on the building, he admitted a sense of pride. It had been a mere fourteen years since Jamieson & Son consisted of himself and his father grubbing away in a gloomy, now-forgotten corner of the city.

They had risen from that in so short a time. It had been easy once the secret had been found—the secret of those tools.

Their power had worried rulers of the world and legislators had tried to bind and restrict their use to the limited horizons of the lawmakers' own narrow minds. But those tools could not be chained.

They were human brains.

Craig hurried down from the roof and along one of the endless honeycombing passageways that burrowed through the great block.

He was early by an hour, but Carlotta was waiting for him in his office, idly setting up cerebral integrals on the desk calculator.

"I'm going to sleep here some night and see how early you *do* come to work," he said.

She smiled, never taking her eyes from the keyboard which she played upon intently for a minute or two. In a crisp green outfit she looked like anything but what she was, the Director of the Psychological Engineering Section of Jamieson & Son.

Craig looked quickly about the room, glanced in the mail spool hopper and turned back to the door.

"Make yourself at home," he said to Carlotta. "I'll see you later in the day. I've got to sit in with three teams before noon today."

"I know." Carlotta nodded her head and looked up at him for the first time. "I notified them all to use your substitutes, that you wouldn't be there today."

"You what! Why—" He reddened up to the ears and turned back, his fists resting on top of the desk across from her.

"Look, lady. You don't have to tell me again that you're the best psychological engineer ever bred this side of Jupiter and you do have as much say in running this business as dad or I do, but when you start running my own office it's time to take steps. I haven't sat in with a team for over six weeks. I'm getting stale. Look at my last math check. I almost flunked out!"

His eyes were smiling at her over the seriousness of his lips, but when she looked up at him again, his smile died.

"If that's all, Craig, sit down. This is serious. It's something for you to handle—out of my hands."

He gazed at the calm blue eyes beneath the ever so slightly displaced wave of gold strands. She always suggested to him the calm, slim beauty and quiet, suppressed power of a luxury liner slipping through space.

And when she said a thing was serious she had better be listened to.

He sat at the desk. "What is it?"

"Team Thirty-four. They're cracking. They show aberrations beyond the limits."

"Team Thirty-four?" He frowned. "They did that little problem for Maitland Lines last, didn't they? Turned in their report two weeks ago. Which ones are cracking?"

"All six of them."

"All *six!*" Craig stared. He knew Team Thirty-four well. Six of the finest minds in the company. Their congeniality index was well up in the nineties. Their solution average on their assignments was in the top ten of the eighty teams working in the building.

"What are they working on now?"

"Nothing. About a week after they closed up the Maitland problem they asked for a special hypno treatment. They were normal again for two or three days, then an emotional reaction began to reappear. Hal Epps forgot one night he had promised to take his wife out. George French neglected a special family anniversary. He and Gene Williams had an argument during a check meeting only yesterday. All of them show physiological manifestations. You'd better take it over or you'll lose an entire team."

Craig frowned and pursed his lips. He pressed a hand against the broad expanse of forehead that was bounded by a somewhat uncertain and prematurely receding hairline.

"Have you opened their hypno recordings?"

"You know that I haven't. The confidence of those treatments is subject only to you and your father, but I suggest that these be opened."

Craig nodded in assent to a decision that had not been necessary in four years. Carlotta spoke briefly into her wristphone and ordered the records of the affected men. Craig glanced at the integral she had been setting on his calculator.

"What's this?" he said when she had finished phoning.

"Just trying to associate some of the factors that might have caused the breakdown. As near as I can tell they are all carrying the burden of some knowledge which is causing a tremendous fear to dominate them and which they wish to be rid of."

"Why haven't they told me?"

"Obviously because they thought you shouldn't know it, either. Apparently they tried to dispose of it through the hypno treatment, but they didn't get rid of the emotional reaction it had caused."

"But where could they get such disturbing knowledge? What could it be?"

"They didn't exhibit any aberrations

before the Maitland problem. They did afterward. Add it up."

"But that was just a routine check on some precision instrument work! The details—" He pressed a selection of keys on a small board at the side of the desk and an illuminated screen showed him a summary of the problem and its results.

"Some errors in instrumental calculation and measurements. The team knocked it off in three hours and a half and sent a satisfactory solution to Maitland. I think you're off the beam there."

"I'll admit I'm only theorizing—but here come the spools."

A minute button on the desk flashed that the pneumatic spool delivery tube contained confidential material and could be opened only by applying the proper combination. Craig opened it after a moment's concentration on the lock, and took out the six spools. He crossed to the other side of the office and broke the seal upon them. There, he fitted them into a small projector. He took out the two headsets and handed one to Carlotta. She accepted matter-of-factly, but looked with hesitation as Craig began fitting the tight, elastic cap to his own head.

"I can take this stuff, you know," she said, "but are you sure you ought to—at least until I have had a try at it?"

Craig snorted volubly and clamped the cap to his head in a jerk of unneeded force. He turned the machine on.

The first wave of near-paralyzing fear threw a giddy, shimmering cloak about him. He groped blindly amid darkness for a chair. Carlotta helped him to one.

Surging, mounting—that fear filled the Universe and had nothing to do with personal security. It was fear that existence itself would cease to be existence and become a black and nameless nothingness.

He tore off the headset and sat in momentary trembling. Impassively, Carlotta stood beside him. Her eyes were closed, but the cap was still on her head. No expression showed on her face as she let that terrible sensation flow over her mind and rebuffed it calmly.

In wonderment, Craig watched her. He knew that such ability was the result of her long years of training in peering into the dark, mysterious, amplified depths of men's mind. Yet still he wondered how she could do it day after day and remain sane. He glanced down at the headset in his hands and let her go on.

After a moment, she opened her eyes.

"Here's the part you should know. I'll turn it down a bit."

He refitted the cap to his skull once more and the subdued impulses throbbed in his mind again. He sensed something more definite than the blinding fear. He sensed a conflict. And he sensed the cause of it. There was the impression of a vast, overwhelming curtain that hung threateningly over all creation, like a wrap of night about to fall forever.

Then it was over. The spools had run to the end.

He wiped his brow. "They must have sent up the wrong spools. That could only come out of a psychopathic ward."

"We have the right spools. That came out of the minds of Team Thirty-four," said Carlotta. She replaced the headsets and closed the instrument. "Apparently in the hypno treatment they consciously tried to get rid of the overpowering emotion without letting go the cause of it. The only tangible thing there is that falling curtain of blackness. I can't make anything of that, can you?"

"No. It doesn't make sense. It's a nightmare. No wonder those poor devils can't work with such stuff stirring around in the bottom of their brains. What do you suggest?"

For a moment she didn't answer. He looked up sharply and saw a momentary shudder pass through her frame.

"Carlotta! What is it?"

"Nothing, Craig—I'm just an old woman, I guess. But this was a bit stronger than anything I've experienced for a long time."

"You shouldn't do it."

"I looked up a few of the indexes on the team before I came in. Their stability is right up near the top. It means that something has driven them to the brink of insanity to produce such stuff as we experienced. We've got to find out what it is. I can tell you this much: The Maitland problem was no mere instrumental deviation problem. It contains a horror that can unbalance the stablest brains in Jamieson & Son."

"How are we going to find what the cause of it is?"

"Could any of the teams you sit with have handled the Maitland problem?"

"Sixty-eight could carry it off."

"Give it to them. Find out what you can of it. Let me listen in, and, if it begins to get you the same way as Team Thirty-four, I'll throw out an audio block. In the meantime I'll go over the basic spools of Team Thirty-four and see if I can find some definite approach to them."

Craig Jamieson watched her slender, green-clad form go out the door. He sat motionless turning over in his mind the problem of Team Thirty-four.

The idea of brain teams was fifteen years old now. When Harmon Jamieson, Craig's father, was a young man, science and technology were in a hopeless boggle. Centuries of incessant piling up of knowledge and techniques had reached the point of diminishing returns. Each year it became increasingly more difficult for a student to catch up with what had gone on before him and place himself on the frontier of knowledge where he might contribute something original of his own.

As far back as the dim, distant twentieth and twenty-first centuries the problem had been recognized and challenged —but not solved—by "specialization." To be of any worth in that day a man had to become a "specialist." He had to narrow his field of investigation to microscopic proportions until he could announce himself as master of an infinitesimal portion of the Universe.

To speak in that long-ago of a man as merely a chemist or a physicist or a mathematician implied that he was no more than a jack-of-all-trades. It had to be explicitly stated on what obscure little group of compounds he had become an authority, or with what fraction of the electromagnetic spectrum he was familiar, or what brand of equations.

In the decades and centuries that followed, this trend became acute. Specialists rattled about like ill-fitting buildings blocks with no common facets. Papers and formulas and principles flowed in a torrential stream from their laboratories and pens.

But science itself was bogging down. The flood of materials could not be correlated; it could not be utilized. Only a handful of men in all the world were familiar with any given fraction of it.

Educators recognized the problem, but the specialists refused to be dictated to by the ignorant and unlearned whose only function was the background training of new students. So students, in order to achieve any place in the world of research, narrowed their work still more in pursuit of their vicious, inspiraling circle, and ignored all the vast mass of knowledge that did not pertain to themselves.

But in the twentieth century the problem had been only elemental. A mechanical designer and a metallurgist could build a motor. Each could absorb a sizable block of the other's science and co-operatively produce a simple machine.

Eight hundred years later the problem was forbidding. The Stillson motors at the heart of the beam-power transmission system that crossed space and fed the space liners were the end product of ten thousand brains that spent their entire existence in minute specialization.

There was not a single brain that had ever existed that fully comprehended every principle and every engineering application involved in the Stillson motor. It was not inconceivable that it could be

done; it just hadn't been. It was estimated that a brain with a Goldsmith Intelligence Quotient of a hundred and sixty could accomplish the feat in about forty-three years of intense application. No one had ever tackled the job.

The Stillson motor was, admittedly, the extreme case in practical engineering application, but it was an example of where science had gone.

The problem resolved itself into the necessity of unifying in one mind the knowlege that it would take a dozen or more lifetimes to acquire. It is hard to say what might have been the end result to the world of industry and science if the Jamiesons and Carlotta had not discovered the principles of the science of brain teaming. At least the Stillson motor would never have become a practical reality.

Craig Jamieson's student life was made wretched by his impatience with the slow, plodding reluctance of his own brain to learn and hold facts and principles that would make him the scientist he desired to be.

The opening day of his sixth year of the ten-year student program to which he was committed he met Carlotta on the campus of International Polytech. After an hour he was snorting out his disgust and impatience to her.

Students from all over the world were swarming over the grounds. "Look at 'em," he observed from the point under a shading tree where he and Carlotta sat on the grass. "Bringing their little bucket heads here to be crammed full and they can't get back to where they came from without three fourths of it spilling out and most of the rest leaking through the bottom. It's all wrong, I tell you. The human brain wasn't meant for such functioning. Take math, for example. Why do ninety-nine percent of the people boggle along through their lives, fumbling with figures and equations that they hate and never learn how to handle, and yet can't get along without?"

Carlotta shook her head. "I don't know. Why do they?"

"It's because the human brain wasn't made to function along mathematical lines. The human brain is not an instrument of precision and reasoning. To make it function as one is being like the ancient aborigines who used to tie up their skulls with boards to make them grow pear-shaped."

"Well, what *is* the human brain good for? I'm in psych myself. Maybe I should pause while you revise the science."

He knew she was making fun of him, but he lay back lazily on the grass and looked up through the green pattern of the leaves at the blue and white above. There was only a wisp of cloud in the sky and it was right above them.

"Look, lady," he said suddenly. "See that up there?"

She reclined and followed his gaze. "What?"

"How would you like to be up there on that cloud just floating along with a sandwich and a cool drink in your hands, music in the air and not a thing to do until the day after next year—instead of having to go to a grubbing old class in about ten minutes and put a hypno cap on your head so they can fill your bucket brain a little fuller?"

"Sounds nice," she murmured.

"That's what I mean. That's what the human brain is good for: dreaming—fantasy. Not grubbing away with clumsy devices like mathematical concepts and machinery."

"That's strange talk from a man who has covered half the ground on the way to becoming a research physicist."

"Look, lady—for a psychologist you don't follow very well. It's *because* I like to use my brain for the one thing it's good for that I have to grub around with all this secondary stuff of science and mathematics.

"If I wanted to make my fantasy of floating on a cloud come true, I could—but look at what a lot of unpleasant stuff I'd have to plow through! Look at the

math . . . ugh! . . . that it would take to devise a gas vortex that would hang together up there and be capable of supporting me. I'd have to figure out how to keep the ionization potential from blanketing out the radio music I want. When I got through I'd be so tired out I wouldn't even enjoy sleeping there, anyway."

"You're just plain lazy," Carlotta decided.

But Carlotta changed her mind when she found out a little more about Craig Jamieson. She found he had a C. I. Q. of one hundred fifty-eight and a Brinker Rating of eighty-six which put him ninth from the top in a class of three thousand students representing the cream of the young brains of the world.

And as the year wore on their association became closer and she caught faint glimpses of the thing he wanted—the thing that tormented him so.

When she first caught an insight, she chided him. "There's nothing wrong with you except that you've got a superman complex, Craig. You want to see the whole Universe inside and out. You want to go *everywhere*. You want to know *everything*. You can't endure the thought that there should be some knowledge you do not know, some skill you cannot possess."

He looked into her solemn, penetrating eyes with laughter lurking far away in the depths of them. He felt that his brain was naked before her gaze. No one else had ever remotely suspected the torment that flowed through him. Only his professors during his first year had seen his first frenzied attempts to grasp everything that came within range of his intellect and warned him to restrain himself or fail by overreaching his capacity.

"You've got my number," he said. "I guess I should have known better than to pick up with a budding psychologist."

"It doesn't take a psychologist to figure that out. It's written all over you: Frustration—in letters a foot high.

You'd better do something about it or it'll get you."

"What is there to do? I guess it's just a screwy twist in my cortex. Maybe I ought to see a doc and have it ironed out. You just don't know what it's like—"

He leaned back where they were sitting and looked up at the stars burning in the night sky above them, pouring out that poignant, indefinable yearning upon him.

"Nonsense. It's a problem—solve it."

"Maybe there's no solution."

"There always is. There are no insoluble problems. There are only human limitations."

"Now we're right back where we started."

He lopped off two years of the projected ten and graduated in the second shortest time in the history of Polytech. The rigid confines of his training were unbearable and he knew he had to get out as soon as possible.

He went into his father's business immediately, the little one-horse consulting physics office that his father had run for over forty years.

Business had dwindled to almost nothing. Any firm large enough to have problems demanding the services of a physicist had a research staff of its own.

The firm of Jamieson & Son was on its last legs when Craig came in.

About this time the Maitland Lines began their first experiments with the crude Stillson motor that had been knocked together by a group of Maitland's engineers. The thing functioned, but that was about all that could be said for it.

Craig remembered the day when he and Harmon Jamieson talked about it over an electron microscope.

"They'll never make it work," Craig said. "The thing is as complicated as a plate of hash."

"They'll iron out the bugs. That motor is a great achievement," Harmon Jamieson said. He straightened with a painful grimace at the clutching arthritis that twisted his joints. His voice was thin and piping in the glistening hardness of the laboratory.

"Sure it's a great achievement," Craig replied, "but they've gone as far as they can."

"Why?"

"You can't stuff enough into a brain in less than a lifetime to even understand how the thing works. A Stillson engineer would have long whiskers down to here before he could even do simple maintenance on the thing. You need the power of seventeen brains stuffed into one."

"Well—maybe they'll do even that, some day. The hypno process is being improved constantly. What you know would have taken thirty years to acquire by the old classroom methods used up to three or four generations ago."

"That's no consolation. There's a limit to the functioning of the human brain and I think we've just about reached it, now. There's nowhere to go from here, unless more brain power can be tapped from our skulls.

"Still—look, dad—what if we could find a way to make the Stillson motor practical, make it possible for engineering and maintenance to be done on it? That would sure take us out of the red."

"I don't see what you're talking about. The motor is practical now, isn't it? It's working."

"But not well enough. It's dangerous in many respects. If changes are made, there is no way of telling whether they are for better or worse. The whole thing was put together by blind chance. It's a miracle that it works at all. Even the engineers who made the final assembly admit they don't quite know what makes the thing go."

"Then what do you propose to do?"

He looked thoughtfully at his father. "Maybe tuck seventeen brains into one skull," he said.

In that sentence lurked the germ of the famed brain teaming concept.

The human brain is a small unit by itself, Craig reasoned, and when the capacity of the unit is reached, why can't it be teamed with other units to accomplish a given task beyond the power of any single unit.

Again, a group of highly specialized brains are little more than a group of highly specialized machine parts. And a single machine part by itself is functionless until combined with other parts to make a whole machine.

Co-operation between scientists was nothing new. But it was more a word than an actual fact. To be sure, scientists met and held conferences and worked side by side and talked things over and complimented each other's papers.

But actual working together had never been done in the scientific world in the same sense that two laborers work together when they each pick up one end of a heavy box and carry it off. It could hardly be said that two scientists, each of first-caliber brains, had ever picked up both ends of a heavy problem simultaneously and in perfect synchronization and carried the thing off.

This thought was in itself black blasphemy, Craig knew. Out of some perverse streak, scientists had always prided themselves first on their international and then on their interplanetary co-operations. Craig knew this was mostly poppycock. Scientists were essentially individualists. They were not prone to adopt superior methods not of their own devising. Large barriers separated vast fields of knowledge where free traffic should have prevailed because men of one science did not and could not know what men of another had done.

In his first dim groping Craig pictured to himself a group of men, a half dozen chemists, as many radiation engineers, three or four metallurgists and a sprinkling of mathematicians along with necessary designers and production experts sitting down over some problem, say the Stillson motor. He imagined them capable of understanding the broad phases of the problem individually and the general inclinations of each other's minds, and being able to apply their own individual knowledge at exactly the right time and place like a group of musicians playing a symphony.

When Carlotta came to visit him during the Christmas vacation of her ninth year at Polytech, he tried to tell her what was in his mind.

He told it uncertainly. "I don't know if you get the idea or not. Think of an orchestra. You have as many as two hundred people performing exactly synchronous acts in achieving one single goal. Try to imagine two hundred scientists doing the same thing. You'd hear nothing but the crashing of glassware."

"Craig!" Her eyes were alight with a flame. "You've got it! That's the same thing you've been looking for all these years!"

"You see what I'm trying to say?"

"I think I do, but your problem isn't one of physical science. It's a psychological one. So frequently foremost researchers are tremendous egoists, though they appear to be so self-effacing on the surface. The truth is that they often enjoy a degree of self-pity in this effacing pose and at the same time identify their own egos with the work they do, sharing any praise or success that comes to it. They actually have a very neat and deceptive way of getting an abnormal satisfaction both coming and going.

"It is this quality that so often prevents co-operation between highly competent intellects. The first requirement of brain teaming would be to eliminate all such qualities. Then you would want men, each an expert in his own field, who think and breathe and act alike. A sort of congeniality index could be devised —something of the sort has already been explored. The traditional idea of powerful, objective minds working side by side though the individuals are mutually loathsome to each other is a lot of rot. By selecting the proper congeniality in-

dex you could team men whose relationship to each other would become closer than family ties."

That was the way it often was with Carlotta. Craig proposed a concept and her mind leaped far and away from his, burrowing into the details of which he had not even a glimmer as yet.

Together, they devised tests and, from among their associates at Polytech, they built the first brain team of Jamieson & Son.

That team, on which Craig himself took a place, was the first Stillson motor team. It made history—and took Jamieson & Son out of the red. The giant, unwieldy, complex creation was refined and stabilized until its performance was reliable enough to warrant the removal of the self-contained propulsion methods on spaceships and leave them powered by beam transmission alone.

To Craig and the other men who sat with him on that first team it was a weird and incredible experience. Responding to tests devised by Carlotta and Craig, twenty-five total strangers from all parts of the world were brought together and found themselves suddenly feeling alike, thinking alike—almost capable of anticipating each other's thoughts.

In ordinary course of events few of these men would ever have known each other. They would have pursued their own narrow interests with varying degrees of success. Brought together by the powerful, unifying principles of brain teaming, they suddenly became a mighty tool of research capable of peering into depths far beyond the capacity of any brain or conglomerate group of brains previously.

Yet, that first team had been crude and imperfect beside the ones now filling the great block that housed Jamieson & Son. There had been imperfections, little traits that Carlotta's tests were too crude to detect at that time. The team dissolved after three years of work.

By that time, however, Carlotta had reached a state of perfection in her work that a definite science of brain teaming could be said to exist. It was an exact science that followed easily discernible laws. It went beyond Craig's most fantastic expectations.

Eighty teams formed Jamieson & Son now. The world was scoured clean for potential members. The highest ambition of science students the world over was now a place on a Jamieson brain team. The smallest team was two men, the largest—the present Stillson motor team—was sixty-three men.

Each unit occupied its own laboratories and libraries and had use of the common shops and mechanical facilities of the company. Hundreds of assistants who had applied for team membership, but failed to meet the exacting demands, formed a corp of workers who did the more routine work involved.

Each member of a team had spent ten to twenty years of his life acquiring the intricate and specialized knowledge that he held in his brain. Powered by the psychological selection and conditioning devised by Carlotta these multiple brains of a single team acted almost as a single brain.

The eighty teams were the mightiest research tools the world had ever known. Hundreds of large plants had abandoned their own research laboratories and relied entirely upon Jamieson & Son.

It was not to be wondered that there were those who looked with fear and trembling upon the firm of Jamieson & Son when they understood the power that lay behind those great blank walls.

Craig let his mind wander in relaxed concentration over these events as he pondered Team Thirty-four and the disruption that threatened it.

His office door opened abruptly. He looked up with a start and the six members of Team Thirty-four walked in. They looked as if they had been up all

night and had tried to snatch some early-morning sleep in their clothes.

"Hi, chief," Hal Epps, team spokesman, was in the lead. He gave a tired wave of his hand.

"Sit down, fellows," Craig invited. He looked at them quietly, masking the surprise at the unexpected visit.

Hal Epps looked at Craig. He hesitated, his narrow ascetic nostrils twitching slightly. "Without a lot of speech-making, chief," he said at last, "we want to be disbanded and try to do a little independent work for a while."

"You what—" Craig half rose out of his chair.

"That's right. We're through as a team. We can't work together. Our congeniality index is down around zero. I don't know what hit us, but we just can't go on. We want to be disbanded."

So it was as serious as that.

Or perhaps it was that good. He had seen teams lose their congeniality index and disrupt. But none had ever asked for voluntary disbandment. That meant they recognized their own problem and it was not a problem based on lack of harmony.

"Why?" said Craig quietly.

"We just do, that's all!" Hal Epps snapped. The others nodded and barrellike George French added. "We think it would be best for the company and for ourselves."

Craig fumbled an ornamental gadget on the desk top and looked at their drawn, tense faces. "I don't have to tell you this is the first time a team ever asked for voluntary disbandment. And I don't think I've ever seen a team become so overwhelmed by a problem before that they were afraid of their own shadows."

At once, almost visibly, the six of them seemed to melt together in a single unit. He sensed the sympathetic thoughts flowing in unison through the six brains. That was the damnable part of these teams, he thought: you couldn't attack them one by one. It was six against one.

"We didn't come to argue, chief," said Ralph Davis. His bony jaw was knotted hard and his lips were thin. "We came to state our intention. We have done that. Thanks for listening, chief."

They rose to go. Craig felt a flurry of defeat. If they left now, it would be too late to salvage the team, even though he later found the cause of six sane men suddenly becoming possessed of an unreasoning terror. It was of gigantic importance for him to know now.

"There's just one thing," he said, "what will happen when that curtain of blackness falls?"

They turned as one man, faces blanched. "You *know*—" Hal Epps gasped.

"Of course not," Davis snapped. "He opened our hypno spools. I told you we were fools to try that. Come on!"

"It was the Maitland problem, wasn't it?" Craig said relentlessly. "It's out in space somewhere—you don't know what it is—or where it is—but you're afraid of it."

Pete Ellison, who had remained in the background and said nothing up to now, sagged in resignation. "He's got it."

Hal Epps recovered from his first consternation and shot him a look of fire. "Nonsense. We know you're shooting in the dark, Craig. It won't do any good. We're leaving Jamieson & Son for good. We've got our own reasons. They don't concern the company, and . . . well, I guess that's all. You've been swell, chief. Sorry we have to be so abrupt about this."

But Craig knew he had driven a wedge between them. Pete Ellison *wanted* to tell. He drove on.

"Whatever it is, whatever that black falling curtain in your minds means, I'll find out. Do you think you are the only Team Thirty-four that can be created? I can build another one in a week. I'll get the Maitland problem back in here and throw it to all the teams. They'll find what you found sooner or later. So give—and save us all that trouble."

They wavered and as one man returned to their seats.

"There are six of us," Hal Epps said. "In this one matter, we are still a team. We know that the best answer is to allow us to disband and forget about the whole thing. That is a more accurate solution than your one mind can possibly obtain, even if you had all the facts —which you haven't."

"You are no longer fully sane men. You are filled with fear that nullifies any claim to reason in the matter. You are not capable as individuals or as a team of acting as a positive function in the matter. Tell me."

Epps' face reflected a tortured pleading, but he began to speak slowly. "The Maitland problem was an instrumental one on the face of it. A score of times in the past six months Maitland Liners had found themselves as much as a light year off course on a long flight, with absolutely no explanation for the deviation. Their own mechanics worked over the energy meters and course computers until they had nearly worn them out. New equipment was installed, but the same deviation was discovered on the brand-new ship, *Queensland*, when she was commissioned. Our problem was to find the answer to these deviations."

Craig glanced at the data sheet he had caused to reappear on the small screen on his desk. "And it took you three hours and a half to satisfy them."

Hal Epps ignored the implied compliment. His thin, worried face was unnaturally drawn and pale. Craig could not conceive the magnitude of the problem that could so affect the normally suave, dry-humored Epps.

He went on. "We did not solve the problem. There is no solution to the Maitland problem. We only showed them a method of introducing compensations into their instruments which will make automatic allowances for the deviations. The problem still remains."

"And the problem is—?"

Hal Epps looked at his companions. They were sitting tight-lipped and impassive. As if by prearrangement, George French took over. His deep, reverberating voice and precise planting of words seemed to chill even Craig with unnamable implications.

"You have not kept up with the developments on the Stillson motor and no doubt you do not understand the processes of beam transmission now involved," George French said. "You know the term 'spatial polarization,' which is the only mathematical term that will mean anything to you since your math does not go far enough.

"This 'spatial polarization' is somewhat analogous to charging the plates of a condenser. Space, viewed from the transmitting end, becomes one plate. Space, viewed from the receiving end, becomes the other plate. Unlike the first crude attempts at beam transmission, no energy is dissipated until a receiver is functioning somewhere in space—or so the theory would indicate in spite of the fact that the actual Stillsons pour out billions of kilowatts per second more than the receivers account for. Since space as a unit forms the active conductor there is—or should be—no attenuation with distance."

"I am vaguely aware of that," said Craig dryly. "I was on a Stillson team once, you know."

George French ignored the touch of sarcasm and went on patiently and precisely. "The flaw in the entire concept is that the assumption has always been made that space is homogeneous. In all the history of science there has been no tenable reason for thinking otherwise. The laws of chance show that during the probable existence of Earth, man would never encounter any other condition. Would not, that is, had it not been for the Stillson motor and the system of beam transmission of power for liners."

"What's that got to do with it?"

"The spatial polarization represents a condition of strain in space which inevitably tends to nullify itself. Just as elec-

trical charges tend to leak off when not insulated, so the spatial polarization tends to discharge itself. Since it represents an entirely uninsulated condition, there is nothing to impede that leakage, hence the tremendous outflow of energy which has baffled Stillson engineers for fifteen years.

"The result of this is that there is a force present in our space that tends to draw toward it, so to speak, another space which represents a condition of opposite polarization. When the two conditions of our nonhomogeneous space completely merge they will cancel out like opposite electric charges brought together. Space, as we know it, will cease to exist."

For a long time Craig Jamieson sat motionless, staring at the six strained faces before him. In spite of their reluctance to tell, it seemed as if a wave of relief swept over them as George French finished.

But only dimly did the words register in Craig's mind. The mathematical concepts for which the words of George French were crude substitutes were far beyond his mathematical knowledge.

But the words echoed and re-echoed in his mind—the nullification of the spatial polarization set up by the Stillsons —the merging of two nonhomogeneous parts of space. The concept flashed a bewildering facets before his mind in exquisite torment, but the whole was inconceivable.

And then cold black fear raced through his brain. It burrowed into the wells of thought and flowed through his being in one wave of unrestrained terror. He knew then without donning the headcap of the hypno translator the fear that filled these men, knew the meaning of that falling black curtain—the black curtain that would be *final*.

"What will happen to us . . . to man? What will happen to the Universe?"

George French looked steadily at him. "We will never know—exactly—because we will all cease to exist at precisely the same instant. *Everything* will cease to exist.

"You cannot, of course, conceive of that any more than you can visualize your own death, but that represents our best analysis of what the result will be. You could verify it with the help of the three-man team on Ingrid's equation which postulates the nonhomogeneity of space, but I doubt you would learn any more. And it is unwise that any more should know of this condition."

Suddenly the stark fear and strain on the faces of Team Thirty-four became grotesquely ludicrous. Craig restrained an impulse to laugh. They had been so terrified by the implications of the potential disaster that they had overlooked the one simple solution to the whole thing.

"Obviously, the only thing to do," he said, "is to destroy the Stillsons. Space flight will have to return to self-powered units until we can devise some other method of propulsion. I don't see why you—"

But the faces before him did not relax. They continued to look at him with a degree of patronization and sympathy that congealed the fear within him again.

George French broke the silence that followed Craig's trailed off words. "Think a minute, chief. Apart from the impossibility of ever convincing mankind and the officials of Maitland that the Stillsons should be turned off, you must recognize that it would be useless to do so.

"The transformation of space has already begun. Fifteen years of operating the Stillsons have created a condition in space that is inconceivable. The charge is flowing out at a tremendous rate. Figures aren't big enough to name it. The inflow of oppositely polarized space is accelerating constantly. Nothing can stop it. That's why you and we would be best at the bottom of the nearest lake right now. Our minds won't stand up under that knowledge. Ask Carlotta. Only she'd better join us if you do. The rest of mankind need never know—*must* never know. That's why

you should not have made us tell you *why you must not throw the Maitland* problem open again.

"The extinction will be painless and imperceptible when it comes."

Sweat beaded Craig's forehead. The office was stifling hot and the walls seemed to be crushing inward like an unyielding black shroud. He shook himself and focused on the six faces of the team.

He knew they were not wrong. He knew the power of those combined brains. He had created the combination and knew the strength of his work. But why had they given up all hope?

"I have no doubt of what you say if you are in accord in your analysis that the process of leakage is already underway. But from there on you go completely off the beam. Why should you say that it means the extinction of existence? Why can't the process be halted? Why can't the strain between the nonhomogeneous factors be equalized in some way?"

"It's easy to ask that, chief," said Hal Epps, "because you don't understand what it's all about. You have only our brief and inaccurate word picture. Your brain is incapable of holding a true mathematical beam analysis picture. If it were, you would see the obvious answers to that. Believe me, we've *tried* --and there is no solution."

Craig knew they were right. Knew his sudden wave of enthusiastic aggression against this thing was born of ignorance. If any men in the world could conquer the creeping oblivion, they were the six who sat before him, and they had pronounced it an impossibility.

They rose to go. "Will you join us at the lakeside at midnight?" Hal Epps said. His thin face held wry and bitter humor.

When they had gone, he remained immobile in the same position. He was there when Carlotta came in moments later.

He did not notice her or ask her to sit down. His eyes were staring ahead at *the wall.*

"It isn't possible," he murmured. "Outside, the sun is shining. Ships are taking off for Mars and Canis Major. People are eating and sleeping and working like they've been doing for ten thousand years. Jamieson & Son are working on the usual mechanical and radiation problems to keep the wheels turning —and then in comes Team Thirty-four, walking about like some white-gowned prophets of ages back, crying 'Woe!'"

"Easy does it, chief." Carlotta's eyes were steady on him from across the desk now.

He looked at her. "You heard?"

She nodded.

He rose and began striding about the room. "Inside these walls is the greatest machine for research the Universe has ever known. We've multiplied the abilities of any of these men by hundreds of times. The solution must be here somewhere—it's got to be.

"I can't conceive why Team Thirty-four wants to abandon the problem as hopeless. Even though their equations tell them it is insoluble now, there are new principles, new possibilities that man has not even glimpsed. Why must they say there is no solution? They know that no negative proof is ever demonstrable. It is always a theory."

"What do you propose to do?" asked Carlotta. "Do you think there is a way out?"

"Are they right in their insistence that the world never know of this?"

Carlotta nodded. "I could work out the picture in good detail showing the results if this were broadcast. It wouldn't be a pretty picture. Extinction might not even wait upon the collapse of space."

"I suppose you're right. We'll throw it to all the teams, then. We'll cancel immediately every obligation we have and turn the full force of the eighty brain teams on this problem. If they can't find a solution—"

"You can't do that, Craig." Carlotta shook her head slowly.

"Can't— What are you talking about? We've *got* to. It's the only thing left to do."

"Do you want all your teams in the same condition as Team Thirty-four?"

He whirled upon her and then sat down slowly behind the desk, shaken to the core by this thought that had not entered his brain before.

"How many teams could hold up under it?"

"No *team* could."

"What do you mean?"

"You would find only isolated individuals here and there who are capable of bearing such knowledge and working under it."

Craig made an instant decision. "Find me those individuals then. I'll build a new team—an emergency team. I want you to ransack every established team we have for brains that can cope with this. I'll merge them into Team Thirty-four and then we'll see if this is a hopeless problem."

"You won't find many," Carlotta warned. "None of these men were originally chosen to face such a crisis. They are no more capable of it than any other thousand men you might go out and pick up on the street."

Her eyes became intently serious and locked with his in a mingling of emotions that left him half confused, half yearning— "It's yours, Craig. It's your problem. I think of all the men in this big blind cube of yours, you will have to take the problem."

"But I've got to have help!" he exploded. "Hell, any one of them can run circles around me in his own field. I only *run* this place!"

"See that you continue to run it. Let them know that you are taking over full responsibility for the solution of the problem. Let them know that its solution is certain, that it's a matter of time if they all give you what you ask for."

"They aren't dumb and blind—I can't kid them with any sugar coating like that."

"They are human beings. This is something none of them were born to face. None of them can face it fully and do his best work. Let them unload that responsibility on you. They will do it unconsciously if properly directed It is essential."

The fundamental premise on which the functioning of the teams was based was the principle of congeniality—friendship.

The greatest industrial mistake that had been perpetrated through the centuries, Craig had found, was the throwing together of uncongenial individuals and expecting them to work together with efficiency.

Under his direction, Carlotta and her staff had reduced the principles of congeniality to an exact branch of psychological science. On this foundation the teams were built up. Their unity through the years of working together developed until the emotional bonds between them was greater than that in ninety-five percent of family relationships.

Now, for the first time, Craig found himself faced with the necessity of violating that cardinal rule of Jamieson & Son.

But he could see no other way out. He had to have a team emotionally capable of facing the problem of the disaster brought about by the Stillson motors. There was no time to build a properly functioning team. Actually, this emergency team would not even be a team. But all he could do was throw together conglomerate units torn from the teams he already possessed.

Team Thirty-four, of course, would form the backbone of that emergency team. But they were not enough. They had pronounced the problem insoluble and their individual stability was gone. He had to have the faith and hope of other men and other knowledge. The building would have to be ransacked for

every brain that could contribute a particle.

For himself?

He allowed his brain a momentary pondering of his own position. It was a shattering, devastating picture. He stood at the pivotal center of the program that would determine the fate of the Earth.

It was impossible. *His* brain had been built for no such feat. Why had Carlotta so blandly assumed that he could endure the disintegrating knowledge? She had warned him to not tell even his father.

Craig knew he was no different from any other man out in the street when faced with knowledge of certain destruction. But that was not it—it was not his own destruction merely; most men are equipped with mental mechanism to face that. It was the destruction of all existence—and no man is equipped with the mental mechanism to face *that*. It was barely conceivable. And the more he tried to focus his powers of conception on it, the more his brain swam in a maelstrom of irrationalism like a myopic eye, straining and staring at a dimly lit page in an unknown language.

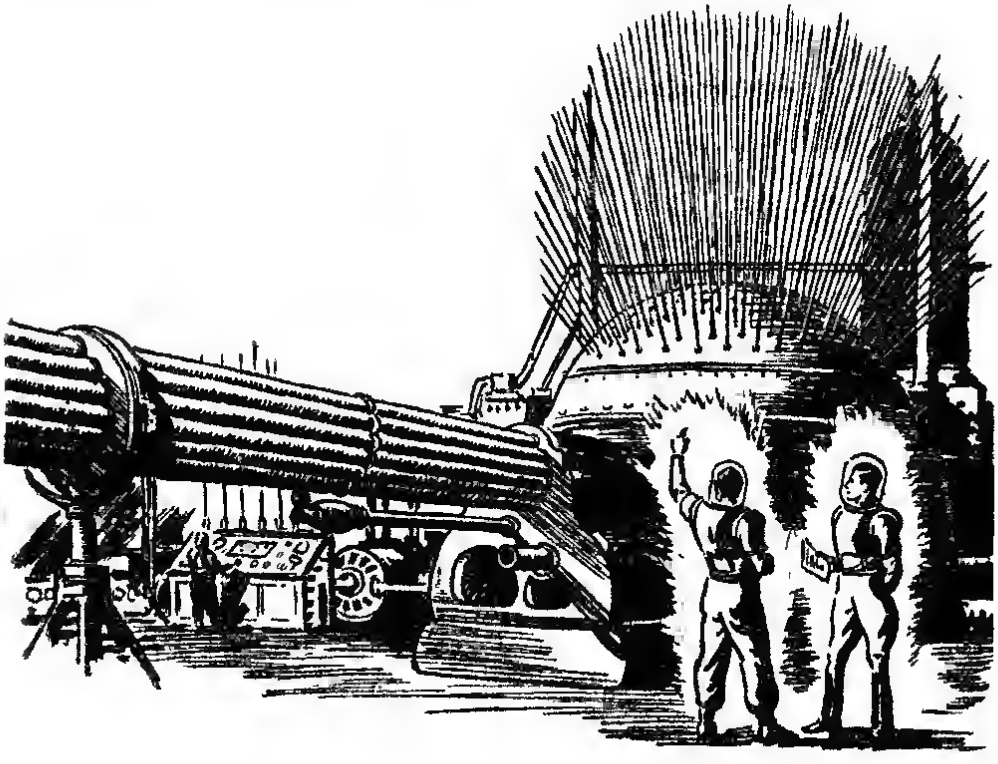
He flung it out of his brain and left the building.

Abel Maitland was waiting for him at his office next morning.

The beefy, florid president and controlling stockholder of the Maitland Lines greeted him with an extended ham of a fist when he entered from his hurried walk down the long corridor.

"Craig! How's tricks? Been a long time since I saw you. Why don't you come around and bring the old man over for a trimming some night this week? How is the old fudger these days?"

"Arthritis is still bad," Craig murmured. He wondered what Maitland wanted. Craig was anxious to see Carlotta and have her report on the men she



had selected. "What can we do for you?" he asked.

A friendship had existed between the Jamiesons and Abel Maitland since the early days of the Stillson motor. But it was a stormy and a rather intermittent friendship.

This condition was caused by the furious devotion of the two old men to their games of Chessnath. The complicated game, played with nearly three hundred pieces and requiring the use of portable triple integral calculators, was Harmon Jamieson's sole delight in his waning, pain-distorted years. And Abel Maitland held himself to be the western exponent of the game—despite the fact that Harmon Jamieson held an almost evenly matched record with him.

But at frequent intervals their old men's tempers flared hot and their friendship died on the altar of the game. In a game that bordered the frontiers of mathematical science, the rules were uncertain and sometimes ambiguous. When one accused the other of ignorance or cheating, their friendship entered a hiatus that might run for months.

It had just recently emerged from such a gap.

Maitland sat down with a grunt and extended his stubby legs in a search for comfort. "You did a little job for us a couple of weeks ago. Your boys gave us a quick solution to our problem—but it didn't stick."

"What do you mean—didn't stick?"

"Well, we redesigned our instruments in accordance with the suggestions given. They still won't work. It seems to me . . . well, this is the first time we've had any trouble with a problem handled by your company."

Craig pondered the obese president of the space lines company. He was not lulled by the casualness of Maitland's complaint. What did Maitland know? Nothing but a major catastrophe would ordinarily stir him out of his office, hardly even his friendship for Harmon Jamieson.

"It affects our radios now, too," said Maitland. "That's something we hadn't noticed until just a few days ago. Makes communication almost impossible in certain areas out around Saggitarius."

Craig couldn't spare Team Thirty-four to waste any more time with Maitland. The problem was far bigger than that. "Apparently the fellows that worked on the problem missed some important point when they received it. I'll tell you what I'll do. I'll send one of the teams along with your next ship that's headed for a troublesome area. That's about the best way I know to spot something tricky like this."

"If you think it's necessary—" Maitland wasn't at all sure that Craig was as much interested in the problem as getting him out of the office. "We've got to have an end to this, you know. I'll have to call in another agency if necessary." He raised his eyebrows questioningly.

Craig hesitated and went cold all over. Suppose someone else got hold of the problem and found out—it was barely conceivable—and spread it broadcast.

"All right, we'll open it up again, if you insist," Craig said quickly. "I'll put a couple more related teams on it for you. Give us three days. Will that do?"

Maitland nodded. "It will do—if the problem is solved in that time. The new data on the latest runs is available any time."

He rose. "And tell that old man of yours to oil up his tin brain. I'm coming over to start a game in a few days."

When Maitland was gone, George French came in at Craig's call. He looked briefly over the problem sheet that Maitland had made out.

"The fool didn't do what we told him to," said French. "He didn't build new meters along the principles we outlined. He just had the old ones revamped and we expressly told him not to do that."

"We'll have to tell him again, then. It's important. If anyone else should get hold of this before we crack it—"

George French looked long and contemplatively at him. Then he shook his head slowly.

They met an hour later in a sealed and soundproof chamber in the exact center of the great sightless cube of Jamieson & Son. Carlotta was there, and Team Thirty-four—with resignation and an air of sympathetic pampering toward a useless whim.

And the eighteen additional men that Carlotta had pronounced reasonably safe from an emotional standpoint.

In their turn, each of the six members of Team Thirty-four rose and presented the intricate knowledge he possessed of the phenomenon that was disrupting space flight and heralding universal destruction.

The eighteen new men took it expressionlessly. They were uncomfortable, Craig knew, working outside the association of their accustomed teams, but the powerful action of their minds was shaping a concept of the problem.

The solemnity that he saw creeping almost imperceptibly over their faces sent a chill of foreboding through him. Several men had brought portable calculators and were swiftly checking the reasoning of Team Thirty-four.

Matthews of the Universal Equation Team Sixteen was furiously playing upon the keys of his machine. He was the crack mathematician of the entire organization. Occasionally he looked up at the man speaking and then at Craig and Carlotta. A scowl crept through the long vertical furrows of his face and he patted the keyboard with finality.

Craig felt a restless uncertainty through it all. Partly because he only faintly understood the depths to which the members of Team Thirty-four plunged in their description of their work. Partly because he was counting with all the strength of his being upon these men. If they failed him—

George French presented the summary. With admirable restraint, he refrained from stipulating any conclusion reached by his team. He merely summed up the exact nature of the problem and sat down.

Then Craig waited for the reaction.

There was only silence and waiting, a silence whose tangible pressure could be felt. At last Craig arose. "Matthews, I'll ask for your expression."

The old mathematician rose slowly and looked about him. Like thin wattles the loose skin beneath his chin trembled as he turned about.

"I'm sure each of us here has arrived at the same conclusion regardless of the fact that we are not a team. The problem presented is incapable of solution in any finite length of time. I have worked out a little elementary proof here if you'd care to have it." He nodded down at the calculator.

"But I don't think it will be necessary," he continued. "Of course, we will go over the original data in greater detail and rework all the equations of Team Thirty-four, but I am sure they have done their work correctly. The picture is insoluble. It is a problem now for the psychological staff—and the religious ministry."

He sat down.

A white, steaming fury, utterly irrational and unreasonable poured through Craig. He felt smothered and trapped. The sober, unrelenting faces of the assembled scientists were the faces of executioners who had doomed man to an intolerable fate.

He fought down the unreason and then rose before them. "I hadn't quite expected this. Who is in disagreement with that judgment?"

He waited in stifling silence. Someone shuffled his feet. There was no further response.

"If you give up, there is no hope." Craig said slowly. "Within this block of Jamieson & Son are the most powerful tools of research in the Universe—you men and your team companions. Because I am in ignorance of the details of this problem which make it seem hopeless, I still have hope—and so I'm

going to fight it. But the only tools I have are the tools I have always used—your brains and your intense knowledge. If I have to fight it alone, will you at least let me use those tools to capacity?"

Not a man but looked upon Craig Jamieson with depths of sympathy. They caught the engulfing sense of responsibility that overshadowed him, felt the urgency in his soul—and felt helpless before it.

Matthews spoke again for all of them. "There's not a thing in the world we wouldn't do for you, Craig. You know that. Ask us for anything you want that is within our capacity and we'll give it to you. The insolubility of this problem lies in the principle of indeterminacy. The equations—we'll give them to you if you like—contain over twenty indeterminate factors that would be required if an expression were to be obtained that would allow us even a conceivable picture of the exact nature of this catastrophe. You might as well ask us to sit at a table and write random, meaningless expressions for the next million years. We might accidentally stumble on the right expression, but that would be the only method of finding it. Ask us to do that, though, and we will, Craig."

"Thanks," said Craig.

The realization of the vast gap between the massed knowledge that they represented and his own relative ignorance—and the realization of their loyalty and understanding made him feel humble.

"Thanks," he said again. "I'm not likely to ask you to do anything as wild as that, but isn't it conceivable that we are all limited in a narrow rut by the depth of our past experiences? Isn't it conceivable that in existence there is some *principle*, some means of doing research, of solving problems that has never occurred to the mind of man?

"Our problem is basic. By all the rules and laws we know of, we are doomed. Personally, it matters little to any of us; it is only a relatively insignificant shortening of an existence perhaps not quite justified to continue anyway. But it goes beyond us. It involves the succession of the human race to the heights which have been dreamed for it since creation began.

"That is an obligation we can't say is relieved by the application of the principle of indeterminacy. Erase the principle of indeterminacy if necessary—"

He caught the look that crossed the faces of some of the men and subsided.

"All right, then, I'll hold you to your word—accepting Matthews' statement as applying to all of you. I'll let you know when I have something to work on."

"They think I'm a childish fool!" Craig stormed to Carlotta in his office.

"But they'll follow you blindly. Ask them to play sticks twenty-four hours a day and they'll do it for you. That's what you wanted, wasn't it?"

"I don't know. How can we tackle the problem with that kind of co-operation?"

"What did you mean when you spoke of a new principle?"

"I didn't mean anything. It was just a bone I threw out for them to chew on. There can't be any really new principles. They've all been thought of long ago."

"Brain teaming was a new principle fifteen years ago, wasn't it?"

"Yes—"

"There might be something that would make brain teaming look like the educational methods of the twentieth century."

"Nothing short of a mechanical brain would do that."

"Then why not a mechanical brain? It's not impossible, is it?"

"Until you psychologists can tell us the nature of thought, it is. Cartoonists have been drawing boiler tanks on stilts for nearly a millennium now and ascribing wonderful properties to their positronic brains and bellies full of storage cells. One has yet to be made."

"I'm serious, Craig. I'm not talking about that silly cartoon stuff, but look at the calculators we have. They can do almost everything but think. Perhaps your answer lies in the direction of a machine, at least."

He nodded soberly. "It's a thought—anything is, now. It would be worth setting the emergency team to."

He proposed to them the possibility of an improved calculator that would determine the needed factors. They admitted the possibility of improving the calculators they had, but they had no faith in their ability to accomplish the desired result by that means.

They worked like faithful dogs, but powered by their superior knowledge their work was deadened in conviction of foreordained failure.

He knew that the inspiration of the principle must come from his own brain—and he dredged deeply and found nothing.

Almost cut off from happenings in the outside world by the moment of his problem, it was only through a slow-filtering process that he learned that other space lines, though none operated at such distances as Maitland, had experienced the same type of trouble.

More than that, one ship had become entirely lost. Unable to locate itself or plot a course, the last radio messages had indicated that it was shuttling erratically about, searching endlessly for the unfindable route back to Earth. And then its radio had gone dead.

Craig knew what would happen. It would go on shuttling in hopeless attempts to navigate in a distorted and twisted space until the crew died of starvation. It was an event that aroused the lethargy of a well-fed civilization. Government investigation was ordered and the problem was thrown at Jamieson & Son by order of the committee.

It was only with difficulty that Craig convinced them that they were already at work on the problem and distributed plans for the compensated meters and indicators and the new radio circuits that had been devised to overcome the communication troubles.

Another occurrence or two of the same kind and the whole world would be brought to a realization of what was upon it. Carlotta had already shown him a picture of what that would result in.

In times past, saints and prophets had gone about in the world predicting the end and advising repentance and sale of all worldly goods. Little had come of such except a few nervous breakdowns of fanatical believers.

But never had a coldly scientific estimate of the immediate doom of Earth been given. In a civilization cultivated and bred on an infallible belief in the findings of its men of science, such a prediction would be wildfire. It would require no convincing of the populace. They would accept it in ready faith—faith that would sweep around the world with madness and hysteria. The picture was not pretty.

Craig lay awake at nights thinking of it. He dreamed of it. And every day the hidden pressure that squeezed in upon his brain seemed to increase. He knew he could not endure it much longer. He knew the twenty-four men of Jamieson & Son could not endure it forever despite all their apparent calm passivity.

And Carlotta knew it, too. She waited quietly, watching the hours and the days go by, helpless further to assist Craig.

He awoke one night after a ghastly dream in which he saw the Universe poised between two gigantic electrodes that slowly closed upon it from out of space. He sensed the incalculable potential between those electrodes and watched, bound and helpless while they came nearer and nearer together.

But the blinding cataclysm of their arcing, which burned and shattered the Universe, left him a forlorn and dismal wanderer. And he knew that was not right. When collapse came he would go, too. But that was the one thing that no

brain could truly imagine—its own extinction.

He awoke trembling and beaded with sweat. Then his mind settled again to incessant grinding over the problem.

He recalled the meeting when the emergency team had first been formed. He recalled the whimsical allegiance of the dried and lined-faced Matthews: "—ask us to sit at a table and write just random, meaningless expressions for the next million years. We might accidentally stumble on the right expression—Ask us to do that, though, and we will of course—"

It made him think of the ancient fable about the six monkeys who were given typewriters and allowed to strum at random for a million years. At the end of that time they had written all the books deposited in the British Museum, representing the genius of thousands of men.

Six monkeys—make it fifty million monkeys, he thought irrationally, and surpass all that man had done. Maybe six monkeys could surpass the efforts of the teams of Jamieson & Son—in time.

Fifty million monkeys—

He sat bolt upright in bed. The lights of the room flashed on as his feet touched the floor. Then he withdrew them and sat in darkness.

His mind sent groping tentacles of thought into a dim world of possibility that lay suddenly before him. Monkeys strumming at typewriters—scientists writing random expressions in hope of fortuitous accident.

It was meaningless. There was nothing tangible there. Yet something reached out from that senseless concept and gripped his mind relentlessly.

When dawn came he was hollow-eyed and moist with cold sweat. He dressed and ate mechanically and, while he did so, he put in a call to Fred Simmons, head of the company's department of service and supply.

"Fred—I want you to get me five hundred monkeys by noon today."

"Five— What was that you said?"

"You heard it. And empty out a basement room and arrange tables and chairs and five hundred electrowriters."

"But, chief," Fred wailed, "the monkeys—you want me to send out an expedition?"

"I don't care what you do. Buy, borrow, steal, or hatch them, but I want five hundred monkeys down in that basement room with the other stuff by noon."

"O. K., chief—just as you say."

Craig knew they'd be there if he'd asked for pink-tailed alligators.

Then he disappeared totally for three days—as far as Carlotta and the emergency team was concerned, and anybody else who tried to find him.

Carlotta found him on the fourth day of a frantic search. Soundlessly, she opened the door of the room in the depths of the basement. She stopped in sheer astonishment at what she saw.

Row on row, five hundred monkeys sat in ordered confusion before rows of five hundred electrowriters. Disconsolate, they pecked infrequently and indiscriminately at the keyboards. A dozen sweating zoological trainers moved among them, patiently trying to step up the output.

In a far corner, his back against the wall, Craig sat watching. A heap of yellow paper was piled beside his desk and figure-littered scratch pads covered the desk. Behind, on the wall, large sheets of graph paper were covered with meaningless curves.

"Craig!" Carlotta exclaimed. "What in the world—"

"Hello." He stirred.

"What in the world are you doing with these monkeys?"

"Writing the books of the British Museum."

She stared from him to the monkeys and back again in unbelieving bewilderment.

He rocked his chair away from the wall and stood up suddenly. He called to the trainers. "Take them away!"

The nearest man looked up at him,

startled. "But you said you wanted them at least six months. We've only begun . . . you can't expect—"

"I've seen all I need to know. Get them out of here. What do you want, Carlotta?" He started out the door with her.

"Craig, what are you doing with the monkeys?"

"I don't know yet— You wanted to see me?"

"I wanted to tell you that the lost spaceship has been found. It was accidentally discovered by a small freighter that seemed able to navigate even though the other ship wasn't. There might be new data there."

"Has the emergency team been given the information?"

"Yes, but they just tossed it off with a few equations and some talk about indeterminacy that was away over my head."

"We'll have to take their word for it. They're right—as far as their knowledge goes."

She glanced back through the open door where the muttering trainers were herding their charges back into their traveling pens. "Will you please tell me what all those monkeys are doing?"

"I don't know—honestly, Carlotta, did you ever hear the legend of the monkeys that were given typewriters for a million years and wrote all the books in the British Museum?"

"Yes, of course, but— Craig, you're not—" She looked back wildly, as if doubting his sanity.

"Forget the monkeys," he snapped. "They're not important. The principle of the thing is what I'm after—random association of semantically meaningful characters. I've been running frequency curves on what the monkeys have been doing, but there's absolutely no trend evident. The number of associations is too infinitesimal. It *would* take a million years to find out if there were anything here or not.

"But is it possible that there is a truth here? Could all the books of the British Museum—whatever that mythical place might have been—be written in such a manner? Can psychology tell me?"

She shook her head slowly. "The random selection of semantic symbols will obviously result in fortuitous combinations in time—but what would it mean, if anything? I should think it would be mathematically impossible to prove or disprove the possibility of actually obtaining any number of meaningful combinations. Certainly, psychology has nothing to say except that it is merely conceivable."

"You're right about that math part. I guess it's a fool idea to begin with. But look—suppose you had a box whose inside you could reach into, yet could not see. Suppose there were a million black disks in there and six red ones, which you wanted to separate. You could begin patiently taking them out one by one. Eventually you would have a pile of useless material, but you would have the red disks that you wanted.

"Suppose that random semantic combinations could be made at terrific speed. A mountain of useless gibberish would be produced, but what might be found among it that made sense?"

"I don't know. It . . . it just doesn't sound feasible." She looked up and rushed on, "but follow it through, Craig. Maybe there's *something* there—something that we can't quite conceive because it's so strange to our minds. Follow it up. Perhaps there is buried there the principle you spoke of the other day."

"It would be a queer principle," Craig mused. "The principle of randomness."

He still hesitated about revealing his work to anyone else. He kept the emergency team at the problem of improving their calculators while he went ahead, groping blindly for some clue to the possibilities he sensed lying buried in the fable of the typing monkeys.

The next morning he called Jack Harrison of the instrument shop. Jack was

an artist in brass and bronze and small precision instruments, but a dolt on any math beyond elementary calculus. The combination made him invaluable to Jamieson & Son. He never asked questions.

"Hi, chief." He breezed in, responding to Craig's call.

"Hello, Jack. Sit down. I've got a special rush job I want you to turn out. Can you give me the whole shop for a couple of days?"

"Gosh, there's those automatic spectro-analyzers for Midland Chemical."

"They can wait. Is that all?"

"Yes—except for—"

"Skip it. Look, I want you to take those five hundred electrowriters down in Room B-198 and fit a device to each one of them that will pound the keys continuously and at random."

"That all?" Jack looked at him queerly.

"That's all—but it's not as simple as it looks. There must be no cyclic recurrence of typing whatsoever. It must be absolutely at random."

"That's hardly possible. Almost any impulse generator you can think of is bound to have a cyclic recurrence somewhere in it, regardless of how complicated."

"How does this sound? Support a ball in a turbulent column of air. Let the ball intercept a light beam of shifting intensity. The resulting combined impulse could be applied to control the air column of the next unit. Put five hundred of them in a circle with the impulses controlling the electrowriters taken off between units."

"Sounds O. K. That's about as near to random as anything I can think of. But I'll bet it develops a resonant somehow. Will day after tomorrow be soon enough?"

Carlotta's voice burst crystallike in the room as Jack Harrison left with his instructions.

"Craig!"

"Hello." He turned on her image in the miniature plate before him. "What is it?"

"Matthews. I've just made a prediction on him. You've got to get to him. He's cracking. He can't go on under the strain of facing an insoluble mathematical problem of this nature. He's going to react."

"What will he do?"

"He will try to reveal the knowledge to the public and set himself up as an authority and leader in the crisis. The probability is about ninety-eight that he will propose an attempt to escape in a vast space fleet. He will be successful in organizing such an attempt unless you get to him."

Craig felt heartsick. Matthews—his ace mathematician. To lose him would be cutting off an arm, a badly needed arm.

"I can't loose him now—just when I'm about ready to ask the team to go to work on this random thing. What shall I do?"

"Ask him to help you. If he can become convinced that there is a scientifically plausible solution he will balance up again. But there is the factor of uncertainty—trying to convince him of that."

"How long have I got?"

"About eighteen hours."

"I'll try it."

As unready as he was, he knew there was but a single possibility. He would have to gamble on the appeal of the random concept to the old mathematician's mind.

He left his office and took one of the small monocycles that would follow a direct and uninterrupted beam to the desired destination. In five minutes he was at Matthews' office.

The old man looked startled as he walked in. He turned from the bank of calculating machines that occupied one entire side of the room.

"Hello, chief. What brings you over in this end of the building? Kind of out of your normal stamping grounds, isn't it?"

His beginning disintegration was obvious, even to Craig, untrained in psychology. He ignored it and sat down on a high stool before a plate of keys.

"I wanted to see you privately. I want your opinion on something. I think I've got what will lick this thing if we can only work it out."

Swiftly he explained the concept that was burning with its uncertain flame in his brain. Matthews listened at first with the dubiousness of superior knowledge. His mind, long accustomed to the brightly lit channels of orthodox mathematical theory trembled on the verge of this dark, winding abyss that Craig revealed to it.

Randomness!

Then he perceived the fullness of the concept and trembled visibly. "Craig—boy—" He laid a bony hand on Craig's shoulder. "You've found a new world . . . a new world—"

He went on, his eyes dreamy now and faraway. "I see it. It's a machine we need. A great vast machine that will associate thousands of millions of any conceivable type of semantic abstractions in a day. And we need a means of selecting automatically the resulting concepts that have rational meaning. There is our problem—the construction of a proper selector—"

"I don't see—" Craig began.

But he *did* see as Matthews continued. "You'd have an enormous mass of meaningless garble and an infinitesimal amount of useful material. It would be an impossible task to make a selection manually. The stuff must be selected out before it is even produced. Attach the device to your impulse generator to kill the meaningless associations before they are even written down."

That was it. At one jump Matthews had cleared Craig's highest hurdle for him. It was useless for him to grope blindly at this thing any longer. The teams would be ready for it.

"Craig," Matthews was murmuring, "I think we've got something here that's been lying under the noses of scientists for a thousand years."

Escape fleets to space were forgotten.

The emergency team accepted the proposed concept with the same ardor that Matthews exhibited. Craig knew that they saw far more in it now than even he did, because each of their highly intensified intellects visioned the myriad possibilities in its own field, possibilities at which Craig could only faintly guess.

Only the members of Team Thirty-four were somewhat chill in their reception of the idea. Craig met with them alone afterward.

"You don't like it," he said. "Give out."

"We think it's swell—from a standpoint of pure science," said George French. "But it's useless as far as the impending spatial collapse is concerned. Randomness is a suitable project for a century of research, but we've developed a little expression showing how much time we have to work. As near as we can tell it lies between six and ten months. Your concept of randomness is brilliant—brilliant, but the time element involved is too vast and uncertain to give us any confidence that it will do us any good."

Craig considered their pessimism. "I guess I'm what my mother used to call one of the 'fat, happy little people of the Earth' who *believe*. Your analysis offers an absolute zero chance of man's survival. We know nothing of the chances offered by randomness. So, *I believe* we have a sufficient chance to succeed."

Even while the simple random device in the basement, which Jack Harrison had built, was pouring out gibberish at top speed on the electrowriters and the technicians were running frequency curves on the results to obtain, if possible, some insight into the laws of randomness, a larger and greater machine was being designed and built.

Instead of typing mere letters, this machine was equipped with a vocabulary

of over half a million words and designed to type them whole.

At the same time, Matthews was designing another machine to operate solely with mathematical concepts. Instead of words, his semantic units were mathematical functions, more difficult to handle because the functions inserted into the machine were directly related to the mental experience of the men devising them, yet it was only by the use of such functions that any fortuitous combinations of the random machine could be interpreted.

The same thing was true to a lesser extent of the word machine, but using single words, it would still be capable of creating units of conception unknown to man at present.

The machines were ready in three weeks—but without the semantic selector, which had proved more difficult of design than anticipated.

Four large basement rooms had been carved out and combined to accommodate the machines. Their multiple rows of type faces stretched endlessly between the distant walls. They were like rows of queerly decorated columns reaching to the high ceiling. Between the tightly packed units, streams of yellow paper poured at a speed of forty miles an hour.

Craig decided on a preliminary test before the selector circuit was ready.

The clash of type face on back plate made an incessant roar that poured from the machines like the wildly flowing ribbons of paper. Speech was impossible in the room without audio aids which the members of the emergency team wore.

As the paper poured from the machines it was rolled and clipped and trundled automatically away to an ever-mounting stack of—sheer gibberish.

It was what they expected, of course, but Craig felt a moment's uncertainty as he examined the first neatly bound rolls. He placed one upon a pair of spindles that allowed him to view the material as he unrolled it.

In all that vast production there was not a combination that made semantic sense.

He grimaced at Carlotta. "Guess the monkeys' I. Q. is rather lower than we thought."

"Look— Here's one!" Carlotta cried. She was unrolling a second roll of paper. She pointed to a single line in the middle of it.

"The man and," Craig read. "The laws of chance would probably give

good odds for such a simple combination," he said, "but I believe that semantic combinations do not follow the ordinary, so-called laws of chance. That was definitely proven nearly ten centuries ago by those curious 'espers' who thought they had found some mysterious means of thought transmission. They had their toes right on the threshold of randomness and never knew it."

He surveyed the mass of rolled paper that was stacking up, bearing gibberish—and the hope of a new world of science. The mass was useless in its present form. The gibberish and the meaningful would be inseparable. There had to be a mechanical separation before the principle of randomness would be of any value whatever.

"We might as well turn this off until we get the semantic selector completed," he suggested.

It was impossible to keep the news from the rest of the teams in the building that something big was going on. No attempt was made to do so, now. That was farthest from Craig's mind. Once the possibility of exploring the laws of randomness was fixed in his mind, he threw the concept and its problems open to all the teams—keeping secret only the impending catastrophe that they were fighting so desperately and secretly to prevent.

There was not a team that did not see instantly the strength and power of the concept of randomness. They could not be held to the immediate commercial problems that engaged them. Their minds flung ahead into the wild expanse of the unknown world of random and a thousand possibilities that Craig had never dreamed of were opened to him by the power of their intellects.

Yet, never for a minute did the burden he bore relax its killing pressure.

Six to ten months, Team Thirty-four had said. One of those precious months had already vanished and only the barest start had been made along a path that might end light years from their goal.

The emergency team worked twenty hours a day between their designing on the random machines and trying to solve the problem of the spatial collapse on their own improved calculators.

All Craig's hopes rested now in the semantic selector circuit. It was ready for trial in another week. If they could not build such a device successfully, they would be like pygmies trying to wield tools built for Goliath.

The selector had presented almost insurmountable problems. They could not limit its selection merely to combinations that they could anticipate would be meaningful—that would have been as useless as preselecting whole concepts and introducing them bodily into the random machine. Yet they had to eliminate the bulk of the gibberish.

A compromise was made by restricting the multiple association of nouns, verbs, and other classifications of words which would be obvious gibberish. It was a backward working method, but it was the best they could do.

Though the tremendous urgency that motivated the emergency team was not present throughout the entire building, all the teams seemed to partake of the tenseness that was present when the selector was finally completed and installed.

With only the emergency team present, Craig threw the machine into operation. He started the giant random typer first without the selector circuit controlling it. The vast din of the hammering type faces and the scream of the flowing paper echoed in the vaultlike chamber. Then he threw in the selector circuit.

The din died instantly. The machine stopped.

Craig looked blankly around. The members of the emergency team scanned the controls of the machine.

"What happened?" Craig asked. "We must have blown out part of the circuit."

Hal Epps made a quick check of the control meters. "All voltages are nor-

mal," he announced. "No reason why it shouldn't be pounding it out."

As he spoke there came from somewhere in the depths of the machine a single click of a falling type face.

"What caused that?" Craig looked quickly in the direction from which the sound had come and slipped into the narrow aisle between the towering columns.

He located the source and saw the paper had moved a fraction and even now was edging along. By craning his neck he saw the single word "xylophone" printed on it.

He was baffled. There was utterly no reason why the machine should have stopped its pounding away.

Then Carlotta spoke up. "Craig—don't you see? There's nothing wrong with the machine. It's still functioning."

"What do you mean? It's stopped, hasn't it?"

"No, it's still running. Your random impulses are still being fed into the type circuits, but the selector kills them before they act—because they are semantically meaningless."

"But that would mean—" Craig gasped.

"It would mean that the total quantity of relevant material coming out of the machine is an insignificant dribble."

They all saw it simultaneously. The laws of randomness were directly related to time and the period between selections having semantic meaning was inexorably long.

"We'll need ten thousand machines the size of this one," said George French slowly.

"We'll get them," Craig answered in a quiet voice. "We'll get them."

Better results for reasons not quite understood by any of the teams were obtained with the mathematical unit, which was the most important, anyway.

It functioned slowly but with relative sureness once the semantic selector was connected in its controlling circuits. As far as new results went there was nothing of note, but what it did give out was meaningful. It got started off on the concept of the sum and difference of two numbers and ended up with the development of the binomial theorem within a period of three days.

Not a man in the building did not feel awed by this phenomenal result. They felt akin to the great ones of the world such as the ancient Faraday and Henry and the Curies who had gone ahead blindly with discoveries that fashioned a world, unaware of the great work they were doing.

It seemed almost that even the emergency team had partially forgotten the tremendous pressure that was upon them, the end result that they were seeking. They were Archimedes drawing on the sand barely realizing and not caring that the world should end about them while a new and wonderful world opened before their eyes.

At the end of another week, the first stumbling sentence had been completed by the word machine. Carlotta brought it to Craig's office after waiting for hours for the appearance of the final word.

He stared at the yellow sheet for a long time. It read. "Xylophone music played and the schizophrenic danced wildly."

He looked up ruefully. "I guess that just about does it, doesn't it?"

"But if we *have* discovered any of the laws of randomness this must have some meaning."

"Definite, but not connotative. Somehow we'll have to improve the selector. The shop has nearly finished some revisions that will permit the generating impulses to be fed in nearly a hundred thousand times their present speed. That ought to step up the output greatly. We'll see, then, if we have anything."

That same afternoon Matthews and eight other of the crack mathematicians from separate teams entered his office. Matthews threw a sheaf of papers on his desk. Craig frowned at them.

"What's this?"

"We may be crazy, but we want you

to have a look at this and give us permission to go ahead with a little revision of the random machines."

Craig scanned the sheets. He turned over three or four, following through some elementary field mechanics developments. Then he came up against a blank wall. A page of totally foreign work appeared before him. Foreign not only as to manipulation, but as to symbol, also.

"I can't read this stuff and you know it." Craig stared at them irritably. "What is it?"

"But you agree with everything up to there? That last development of Equation Thirty-six is all right?"

"Yes, sure. That's elementary."

"What follows is merely substitution of certain expressions in Equation Thirty-six."

"But what are the expressions? Where did they come from?"

"They came out of the random machine and we worked them up a little further on our calculators. Look at the last page now and see if you can interpret it as we do when we substitute back into familiar expressions."

Craig leafed over the sheets and came to the last one. He sped through the crystal-clear manipulations, checked a point or two on his desk calculator.

"It looks all right. I think—" he began. Then he stopped. His eyes stared at the results as the full implication struck at his brain.

"This is impossible! You've made a mistake back here in this gibberish somewhere."

"We'll vouch for that," said Matthews quietly. "We'd like to incorporate that final result in a random machine."

Craig stared at them again. "If this is true—it will mean that it is possible to control the temporal rate of selection relative to our own experience. Time control—time traveling—the fantasy of the ages."

"Hold it," said Matthews. "It doesn't go quite that far. As far as we can tell, this is explicitly a law of randomness. It does not mean time traveling in any sense of the word, but in crude terms it does allow us to compress the equivalent of a million years of random selection by one of the machines into a few seconds of our own experience. It means that—that, and nothing more."

"As if that weren't enough!" Craig breathed fervently.

He sat in meditation after they had gone. Time control. The critical factor in the science of randomness. And now it appeared to be within their grasp. Surely now there could be nothing barring their way to mastery of this science.

He felt again the sweep of that overwhelming yearning that had tormented his earlier years. The urge that Carlotta had so rightly defined—the urge to go *everywhere*, to know *everything*. Perhaps, somehow, the principle of randomness would lead even to that.

The details of the work passed rapidly from his hands. The teams seized upon the randomness principle like hungry men at the sight of food, and their minds literally fed on it—on the vastness, the expanse of the world of whose existence they were not even certain.

Team Sixty-nine, a chemical group, proposed the application of the principle to chemical science. They suggested a machine with combination of chemical equations and symbols—controlled by a selector that would eliminate the known impossible reactions.

Already they had at their command a predictor, a machine for evaluating the valences, seats of reaction, and the physical factors of temperature and pressure involved in any proposed reaction. By linking a predictor with a random machine a new world of chemistry appeared feasible.

He gave them the go ahead.

And all the time the pressure upon him grew greater. The uncertain six or ten months narrowed by three. No more spaceships were lost, due to the modified instruments of Jamieson & Son. But erratic astronomical phenomena

were being observed throughout the galaxy.

Universes appeared to be in the process of wild creation and destruction throughout all space. Scientists flowed daily through the corridors of Jamieson & Son, but Craig would offer no help to any of them, or even see them. He turned them all away, praying that none would guess the truth before some solution was found.

The change over to the use of increased impulse frequency and the time control involved radical changes in the equipment. No longer could observers wander at will between the close packed pillars of the typing units while they functioned.

The time control involved their being bathed in powerful and humanly destructive energy fields. Eighteen feet of solid lead surrounded all sides of the vaultlike room in the basement.

When this work was completed, Craig abandoned his interest in the word machine and concentrated all his energies in participating with the emergency team in their work with the mathematical machine, for only in that direction could any hope of salvation lie.

But Carlotta did not understand what the latter machine was doing while she was fascinated by the word machine.

Most of what came out now made semantic sense—after a fashion. The thought and phrases were distorted and disconnected. Yet occasionally there seemed to be a thin thread of meaning running through large chunks of it.

Sometimes it seemed as if she were *reading* a very badly translated work originally written in a very beautiful foreign language.

With Craig's permission she hired a large staff to sort and segregate the material that came out of the machine. After a time there seemed to be a long period of fantastic conceptions that had no meaning whatever in terms of earthly experience.

She found such expressions as "the man who walked on the ceiling," "the blue cartridge led a happy life," and once she found repeated the weird assertion that "xylophone music played while the schizophrenic danced."

Either this was in itself more sheer gibberish or it would admit of sane translation. She determined to find out.

When she did she did not know whether to be thrilled or horrified.

She called Craig.

"Here's what your fifty million monkeys have been doing the last eight weeks." She pointed to two six-inch piles of manuscript as he entered her office and sat at the desk.

"Have you been able to make any sense out of it?"

"Yes. It's weird. It's unbelievable. Sometimes I think we ought to shut that thing off. Some of the things it writes should never have been written. I know it's only a pile of machinery, but sometimes it actually scares me. It acts almost like a brain, an utterly foreign brain."

Craig snorted. "You'll be picking dandelions off the light buttons next, if you keep that up."

She could see his nerves were badly frayed, too. He moved jerkily as he reached for one of the piles and read the cover page. He scowled.

"What this? 'The Romance of the Man Who . . . Time Fields and the Girl Who . . . Dress Designs.'"

"It's a novel, I think. Your monkeys wrote it."

He scanned through the pages, glanced at the distorted expressions. "This doesn't mean a thing. Ten percent of it is nothing but blanks. What are they for?"

"The machine put in whole long phrases that it had no vocabulary for. No words exist for them in our language. For example, the word before 'Dress' there was expressed by, 'took seven whorls of stardust and melted sea down into.'"

"I only hope our math works out better than this. You mean to tell me

you've put a lot of this junk together and you think it makes a connected story?"

"I think so. I feel reasonably sure of it. If all those expressions could be accurately translated into English words, I think you would have a very interesting, well developed story. Actually, I think the machine was more or less experimenting on that."

"You talk as if the machine had volition of its own."

"Maybe it has—volition obedient to the laws of random."

He shook his head slowly. "You're going into this more deeply than any of the teams. You can't ascribe such properties as volition to the machine. I am certain of that."

She picked up the other pile of manuscript. "Then suppose you take this with you. Read it through and see if you still think that."

He picked up the second sheaf and scanned the cover. "Scott's 'History of Mankind.'"

"What's this?" He turned over the page and began reading, skimming at first then more slowly, word by word, and the strange and exotic meanings gripped him. An aura, an essence of meaning beyond the known connotations of the words seemed to reach out and clench his mind. Carlotta watched him solemnly as he read. At last he looked up.

"What in the world is it, anyway? It's not history as we know it. It didn't happen that way—the part that appears to be in the past, at least. Yet some of it did—who is this Scott?"

Then he laughed abruptly and heartily. "Here I go talking as if this were a real history written by a real man, instead of a bunch of words thrown together by a machine!"

His laughter was short-lived. Something of those first few pages of manuscript burned in his mind. "This sort of gets you, doesn't it?"

"I wonder if it isn't possible that it is a real history—written by a real man," said Carlotta slowly.

"What do you mean?"

"Look at it this way . . . of course I don't know anything about the laws or the science of randomness, but I don't think any of the rest of you do, either—"

Craig nodded wry assent.

"Scientists' lighter moments have often conceived the possibility of simul-

taneous worlds in different times or on different planes of existence. But this has remained pure fantasy. Suppose the truth is that there are multiple worlds—possible worlds of random. Suppose Scott lived in such a world, that his history did transpire, or will, or *can?*

"Suppose it is the history of a world that the Stillson motor catastrophe didn't wipe out. Suppose it is the history of a world that can exist in the *something* that must be formed when the collapse of space takes place."

Craig looked at her dreaming, far-away eyes. "And suppose we might find some clue here as to how *we* can become that world. Is that what you mean to say?"

Carlotta nodded. "It's fantastic, I know. But so is this whole business. Fifty million monkeys—that machine—writing books—

"And that history—it's a ghastly, terrible story, Craig. It begins in a golden age, but the middle part is horrible. I think if mankind knew it was to pass through that, it would rather die, even though the end promises faint hope of resurrection."

Craig rose, the manuscript under his arm. "I don't know. Anything is possible. We are dealing with laws and probabilities that may be beyond the capacity of man to understand. So simple and yet so abstract and complicated, the laws of randomness appear beyond comprehension. Our work in math has shown us unbelievable things."

Craig did not intend to read Scott's "History of Mankind." He knew it was utterly irrational to suppose that such a creation could have any significance whatever.

But that night in the apartment he had taken for himself in the building since the desperate task began, he could not sleep. His thoughts gyrated about a mysterious historian who had never lived and who wrote of a world that had never existed.

At last he got up and settled to the reading of the manuscript. Despite Carlotta's assertion that she had translated it into clear English, there were phrases, connotations, and twists of thought that made it seem as if he were reading through a distorting prism.

The first half told of a golden world where an era of vast scientific culture had produced a near Utopia. It was a description almost of Craig's own world before the coming of the Stillson threat.

But there was something entirely out of the world about the History. This was due in part, but only in part, to the fact that it was a translation. Carlotta had been rather free in her word substitution, though she had appended a glossary of originals and substitutes.

Earth, for example, was always called the Third Planet, even though the word was in the vocabulary of the machine. Other nouns were not used, as if the historian, Scott, had never known those particular words—as if his world had not been actually Earth, but a queerly parallel existence. Craig thought.

And then a dread and somber note cut off all semblance of Utopia. In the book it was called only the Breaking of the Law. Throughout the entire History, Craig was unable to determine exactly what it referred to.

It was only the Breaking of the Law, an unknown act on the part of a race, that brought an intolerable terror and heartbreak to a world.

Though Craig was utterly baffled by any attempt to identify the nature of the tragedy and even more bewildered by the effects of it, he was not immune to the cold horror written on those pages. The unknown historian, Scott—who had never existed—painted with a brush dipped in ice water, whose touch was fire that burned at the roots of the cortex.

One page near the middle told of the beginnings of the horrors.

"After the days of the hungry ones came the Paralytic Year. It was first observed in the Great City on the fourteen of four of thirty eleven. During the

morning of that day several persons were found standing upon the streets, entirely unmoving and unable to move. They stared ahead with a look of despair upon their unchanging faces. They could not be persuaded to move or make any intelligent sign and when they were moved to hospitals they responded to no stimulus whatever.

"Through that night and during the next day, the condition spread to other cities and by nightfall of the second day a million of the paralytics were stone rigid.

"It was, of course, impossible to locate all or even a small part of the unfortunates, especially in isolated districts. The majority of them remained where they were stricken, and as the days passed, they simply starved to death. They toppled where they stood, dying in an agony that could not express. Their corpses were everywhere. During that one terrible year over three hundred million died in that fashion.

"What it was or where it came from, no one ever knew. It was only another of the results of the Broken Law. Again the Light Master appeared in all the stricken cities throughout the world, and men hid their faces from the being. It touched the dead and stricken and a new plague of horrors swept over the world. Some were winged creatures that were seen to fly only against the Moon in the great cities. Others became crawling things that oozed into the sea and were drowned. Still others slunk about the street, mere rotting corpses that seemed possessed of some unknown, unholy mobility."

When Craig finished the History, it was morning and the night was gone.

The financial manager of Jamieson & Son was a frumpy little man who sniffed constantly and rubbed a perpetually itching nose with the back of his hand.

He was waiting for Craig next morning in the office, and his presence sent a premonition charging through him. Peyton's presence always symbolized financial difficulties. But surely the finances of the company were not in any difficulty now—

"Come in," he said.

"I don't like to say this, Craig," he began, taking a seat, "but I think your father will seriously disapprove some of this wild spending you are doing."

"What are you talking about? The random machines have cost comparatively little."

"It isn't the first cost—it's the upkeep."

"That's practically zero."

"Not in the chemical section. Look at these vouchers." He passed over a sheaf of pink and yellow flimsies.

Craig glanced at them. Bills for hundreds of tons of chemicals. Vast quantities of thousands of compounds and elements—materials that the company couldn't use up in a hundred years of research. And a total price that staggered him.

"There's a mistake. This stuff was never sent to us. We couldn't possibly use it."

"It was shipped, all right—and received."

"But what has become of it?"

"I don't know. All I know is that the chemical section wants still more. They say they need it for their random experiments. I kept signing the vouchers as long as I could. But it's gone too far. I don't have the authority to give them any more."

"I'll take care of these." Craig picked up the vouchers. "Don't authorize any more until you hear from me."

Chris Holmgren, spokesman for Team Sixty-nine, was a big, blond-headed kid of twenty-eight, the second youngest man in Jamieson & Son.

He answered the wristphone call. He flushed and his fair skin became an almost fiery red as he looked at Craig from the deskplate.

"I guess this is the payoff, huh, chief? I thought you'd catch up with us sooner or later. Well, come on up—I think we

can show you what we've got now." He flicked off.

Craig tried to call back, but there was no answer. Damned insolent kid! Swearing heartily under his breath, Craig hurried into the hall and mounted an automatic monocycle that carried him a mile of corridor in a minute and a half.

He had not been in that section of the building for two or three years, but instantly he sensed something wrong when he entered the corridor. The building had been modified.

Team Sixty-nine were waiting for him as he entered the room where he knew their office to be. They grinned like sheepish schoolboys at his reaction.

The room was *vast*. They had taken over half the floor and knocked out the intervening walls to make one huge chamber to accommodate the machine.

"How do you like it?" Chris asked tentatively. "This is our chemical random machine with modifications—"

Modifications—Craig breathed to himself. It was a major engineering feat.

"We found out how to get along without the lead shielding," said Chris. "We substituted a counteracting field instead which enables you to walk right among the parts of the machine while it is working. Try this on and I'll show you."

He extended a small shoulder pack and helped Craig into it. At the touch of a switch, a faint green aura surrounded them. Craig followed as Chris led the way down the aisles between huge blocks of interconnected machines which bore no resemblance to anything with which Craig was familiar. They came at last to the central part where, hidden by a forest of other towering machines, a squat, massive unit lay housed like some fantastic head with hair standing on end. Hair formed by thousands of connecting tubes and cables leading down into it.

"What is all this?" Craig was at last forced to express his bewilderment—and his anger, "and why the terrific expense account for chemicals—"

"You remember we started out with random combination of chemical symbols and equations," said Chris carefully. "That was good enough, but actually there are hundreds of factors for which no accurate prediction can be made. We got some interesting new formulas and processes out of the machine and tried to make them up. Some worked and some didn't—and we wasted a lot of time for nothing. So we gradually got the idea that there was no reason for doing merely paper chemistry by random."

Craig looked at him startled—and at the squat, impassive unit in front of them. "You mean—"

"I mean why not do actual chemistry at random—instead of paper chemistry? This is it."

Craig stared at the machinery about him. Here was a concept of randomness that had utterly escaped him. He would not have believed it possible.

As if reading his mind, Chris said. "We didn't ask your permission because we didn't believe it would be possible, ourselves. It was only a dream we had, but it worked. I knew the cost of materials would catch us up sooner or later. We salvage most of the waste products, but even at that the rate of loss over an effective period of several million years is rather high. We've only started, but what we have already will foot the bill for a hundred years' operation.

"You should see the transparent steel that we have, and the whole new series of artificial foods. Do they make your mouth water!"

Farther and farther into the unknown Craig watched his concept expanding. Here was the ultimate application of randomness. But through his mind flashed the momentary thought that this was only a toy compared with the machine that *could* be developed—a machine to work not merely on chemical combinations alone, but on all physical, mathematical and energy principles known to man. A giant, creative machine out of which a new, impregnable,

immeasurably bright and happy world would come.

But there would never be time for that, now—unless—

He turned to Chris. "Go ahead," he said softly. "I'll foot the bills until we get some of this stuff on a commercial basis."

Two weeks to four months.

The odds in favor of the longer period were good, Team Thirty-four said. Yet slowly, at an ever-accelerating rate, Craig began to despair of finding a solution to the problem of spatial collapse.

It was as Team Thirty-four had said, the time element was too great even with the time control which they possessed. Though randomness had shown them thousands of undreamed-of wonders, the chance of finding the one specific thing they were looking for was infinitesimal.

Insomnia increased its hold on Craig and he spent his nights, when all the others were gone, sitting before the mathematical machine pondering its mysteries and staring at the output on the slowly unwinding ribbon of paper.

A week after he had seen the machine of the chemical team, his sleeplessness had become maddening. The concept of a universal random machine operating with all the forces available to man was growing slowly in his brain—and with it the conviction that they were doomed to failure and he would never get to build such a machine.

He went down to the basement room where the mathematical machine was located. In crimson dressing robe and flopping shoes he stared at it like some aborigine whose stone god remains perpetually dumb.

What was needed, he thought, was something to correspond to the chemical predictors which were used upstairs. If there were some means of restricting the machines' operation to specified channels instead of loosely wandering among all the conceptions of mathematics—

A sudden throbbing filled his body. Why hadn't they thought of that before? A mathematical predictor could be as useful as a chemical one. Its form would be simple. It need be nothing more than one of their newly devised calculators.

He threw aside the robe and hurried out to a materials storage and tool room nearby. He returned with tools and conductor cable. Then for six hours he worked in a sweating fury, devising and connecting a makeshift circuit to connect the selector of the random machine in series with an adjacent calculator. He had to revise circuits in the latter to permit a holding effect that would limit the channels of operation of the selector—not limit it strictly, guide it.

It was nearly dawn when the last connection was made and he threw in the switch that resumed operation of the random machine. It began a steady, irrelevant production again.

Then he took one set of equations involving a single factor of the twenty-odd indeterminates. He pressed the holding key—and the machine stopped.

His shoulders slumped in despair.

Time again.

Though a million years passed while he stood there with his fingers on the key, it was still not long enough to find the answer to those equations by the laws of randomness.

He made a move to clear the board and try another set, but before his hand could complete the motion a sudden, sporadic hammering of type faces came from the machine.

Excitement welled up within him. Here it was! He set the lock on the calculator keyboard and sat down before the unwinding paper.

But as he watched, dismay seized him. There was nothing there—nothing that made sense. It was the worst gibberish the machine had ever turned out. All he had succeeded in doing was so interfering with the laws of randomness that nothing semantically meaningful could be produced.

In a despairing fury he ripped away the sheet of uselessly jumbled mathematical symbols and threw it in a corner. With utter weariness of mind and body he returned to his room and put a sleeping cap on his head. He set the insidious, habit-forming mechanism for twenty-four hours and shortly became unconscious.

There were those gleaming, gigantic electrodes filling the Universe again. Imperceptibly, but inexorably they drew closer together. The vastness of galaxies was crushing together between those poles and the incomprehensible potential between them could be felt in the strain they made upon space itself.

They arced!

Blinding, shattering light fired the Universe in a coruscation of death and torment.

Craig knew this was death. Death at last. He would not be left to see the vast, incredible emptiness that would follow the devastation.

But out of the blackness that followed, light began to grow. It swam in multihued spirals, darting about him in sensations that made him spin with vertigo.

As he rose through a whirlpool of light and sickness he heard dimly a voice crying urgently into his ear. Curiously, it was the voice of Carlotta, but he could see no one. He wondered if she had died, too.

Then he saw her. She swam toward him and the vision began to clear. And in her hand he saw a curious, caplike object.

He knew. She had wakened him—removed the sleeping cap before it had run its course. He wondered why she had done that to him. Such shock was frequently enough to shatter a mind.

"Craig—wake—" she was saying softly. He knew her voice was coming through a counter-hypnocap.

"I am awake. What do you want?" he said.

But he was not—fully. There was a time of silence, while the vision of her face became clearer. And then he heard another voice. "Is he all right now?"

It was the voice of Matthews.

"Yes, you can talk to him now," Carlotta answered.

Craig sat up and the full faculties of his brain felt restored. Matthews' old face was aglow as with the joy of new youth. Craig wondered what had come over him as the sinking sense of failure began to steal over him again.

"We've got it," Matthews said quietly. "*You've* got it—"

"What?"

"The answer. You must have been inspired in what you did last night. Apparently after you set up the machine in that fashion, it kept pounding out at intervals and by the time we got in it had solved one of the indeterminates. We've got it working on the rest now. By night we should have them."

Craig knew he was staring open-mouthed and senselessly, but he couldn't believe it.

"The thing was only pouring out gibberish when I left!"

"That's what you thought. That's what we all thought. We saw the piece you threw away. In that was the key to the whole thing.

"You have uncovered another of the laws of randomness with that hookup you devised. We would never in all eternity have found the solution we were looking for without that hookup."

"I don't understand."

"Come down and we'll show you."

Craig dressed and followed the way down to the basement room again. He found the air tense with the excitement of the members of the emergency team who were grouped around the machines now. He saw they had technicians shifting in more calculators and cabling the keyboards to the random machine.

"For the final result in obtaining an expression that contains all the factors we will need a set of equations for each one set up on separate keyboards and controlling the selector.

The reason we failed to find the an-

swer before was that no mathematical means of doing so was in existence. Last night, when you limited the random selections to the narrow channels of the equations containing the one factor you chose, you brought into operation another law of randomness. That law so held that though none of the mathematical machinery for solving the problem had been incorporated into our circuits the problem was solved by first creating the means.

"We have created a system of calculation as far above anything we had before as the calculus of variation is above abacus counting. With that new mathematical machinery the random machine is solving our problem."

"How did you even recognize it?" asked Craig. "It was only gibberish to me."

"I just started fooling around with it to see if there might be something there."

Craig knew what meaning lay behind Matthews' simple statement. He knew that no other brain or any group of brains in Jamieson & Son could have recognized that unreadable conglomeration for a new system of mathematics. He knew that without the genius of Matthews in recognizing the material for what it was that the world might have been lost.

There was still a long way to go, and they all knew it, but they felt certain they were in the final round. Yet, creeping up from the depths of their minds was the paralyzing fear lest they fail by a few days or even a few hours.

The machine did not develop all their equations by the end of that day or the end of the next one. But none of them left the room. For more than eighty hours, they remained there watching the slow production of a new world of mathematics.

At last it came time to set up the separate equations on the many keyboards and hold them all in control of the random selector. When they turned the power on, the machine remained silent and immobile.

For six endless hours there was not a movement of a relay or a type face. Wearied, they began to wonder if they had failed in the one last step. Then slowly the paper began to unroll out of the machine. At a rate of hardly more than two or three impressions a minute, the expressions began to appear. Then, at the end of ten more hours, the long awaited solution was in their hands.

"This is it," said Matthews calmly. "Get the Stillson Motor Team, Craig. They can incorporate changes into the motor now that will create an insulated condition in space that will prevent the charging energy from leaking off. You will have to see Maitland, too. You can tell him you have something that will cut his power down about a thousand percent. In fact, once the flow of energy out of space is cut off, he won't have to operate the fueling circuits for the next fifty years until he uses up all the energy that he's already poured out."

Two days was all the Stillson team said they would need to work out the changes in the motor. Two weeks was all it would take to make the changes. Team Thirty-four reworked their time estimates and told Craig that three months appeared to be the critical limit of cutting off the flow of energy. There would be no danger before that time.

Craig was drunk. It was the drunkenness of ecstasy, the drunkenness of achievement and relief. He slept for thirty hours straight and felt as if he awoke floating on that cloud he had whimsically mentioned to Carlotta so long ago on the campus of Polytech.

Every member of the emergency team reacted in the same manner. Not until the burden was lifted did they know the weight of it. Looking from afar off now they were astounded at their own capacity in bearing it.

But never again would man have to bear such a burden—at least not in their lifetimes.

Then Craig's mind began to digest with its accustomed precision and dreaming the idea he had first conceived when he looked upon the random machine the chemical team had built—the universal, the ultimate random machine.

He called an assembly of every team in the building. As the thousand men filed into the assembly hall, Craig could not resist a sense of accomplishment in the feat of bringing those men together in the manner of the teams which they now formed. He was looking on massed intelligence that was skimmed off mental power of a universe and an epoch.

But it was a short epoch. The epoch—the Age of Brain Teams he thought. What would be their position in a world that could tap the laws of randomness.

When they were together, he outlined briefly the background of randomness, summarized their accomplishments to date and dwelt considerably on the machine of Team Sixty-nine.

"But this machine is only a toy," Craig said. "Consider a machine operating not only upon chemical principles, but upon all mechanical, physical, radiative principles known to man. Feed such a machine with all the energies we are capable of creating, feed it with all the materials we know in existence—find the ones which it will predict for us.

"Consider such a machine operating upon the laws of randomness which we now know, controlled by a selector and multiple predictors that could be set to any known laws.

"Could such a machine be built?"

A stir went through the audience. It was a vision such as none of them would have dared dream.

Hal Epps rose and nodded. "Such a machine could be built, but I believe it would tax the resources of the company."

"We'll gamble the profits of its output against that."

They rose one by one, and plans began to grow from their brains as if it were a habit they could not break. Craig watched them seize upon the concept and shape and mold it before his eyes.

Then Chris Holmgren rose.

"I'm not sure that this is a good thing," he said slowly. "I'm not sure that we ought to do this just now, anyway."

They all turned to stare at him.

"Why not?" Craig asked.

"Maybe it's no more than a feeling, a hunch about this thing, but—well, we don't know very much about the laws of randomness. We know just enough to realize we've got hold of something that may turn out to be beyond our full powers of comprehension. I think we should take it slower until we learn more.

"To build such a machine as we contemplate might turn a monster loose upon the world."

"We'll have to have more than just a feeling to go on," said Craig. "It's irrational to believe that such a creation could develop any dangerous aspects or volition of its own—" And as he spoke he thought of Carlotta's feeling about the word machine. As if it were experimenting, she had said.

"I've got more than just the feeling about the thing," said Chris. "There's . . . I don't think you'll believe this, but every one of my team will vouch for it . . . the other day we had to shut the whole machine down for the first time. When we opened up the central chamber, we found that things inside it had been *changed*."

"What do you mean, changed?"

"Some of the electric circuits had been rearranged. Wires had been burned away from old connections and fallen across terminals and fused, forming new circuits—not haphazardly as if by accident, but as if someone had placed them there. In other parts, we found channels for conducting chemicals burned through. Some were dammed up by deposits in such positions as to rearrange the flow of the chemicals.

"It looked as if someone, or something, had tried to rearrange the whole unit."

"Why did you have to shut it down?"

"An acid channel burst and destroyed some of the selector circuits."

"Isn't that your answer? Isn't that the way everything else happened, too?"

"I know—" Chris sat down in resignation. "I can't convince you, I see. But I still think we ought to move slowly."

Craig did not seriously believe that Chris' hesitations were of any real significance—any more than he believed that Scott's "History of Mankind" had any significance in real life.

Plans were laid down for such a machine as Craig proposed. Agreements were made for a union of teams to handle the details of such a vast plan.

During the meeting Carlotta did not rise to speak, but when it was over she came up to Craig. "I know what you're thinking," she said softly. "This will be the realization of all your dreams, the conquest of all knowledge. I wouldn't tell you to stop—but be careful, Craig. I think there may be something to what Chris said."

He looked down at her, knowing that there was nothing within him that he could ever hide from her penetration. He smiled softly. "I'll be careful."

That same afternoon the Stillson Motor Team gave him the plans for the alterations of the motors which they had worked out.

Craig would have called Maitland before the plans were complete, but he knew the brusque old man would listen to nothing that he could not see on a blueprint. Besides, there was time enough.

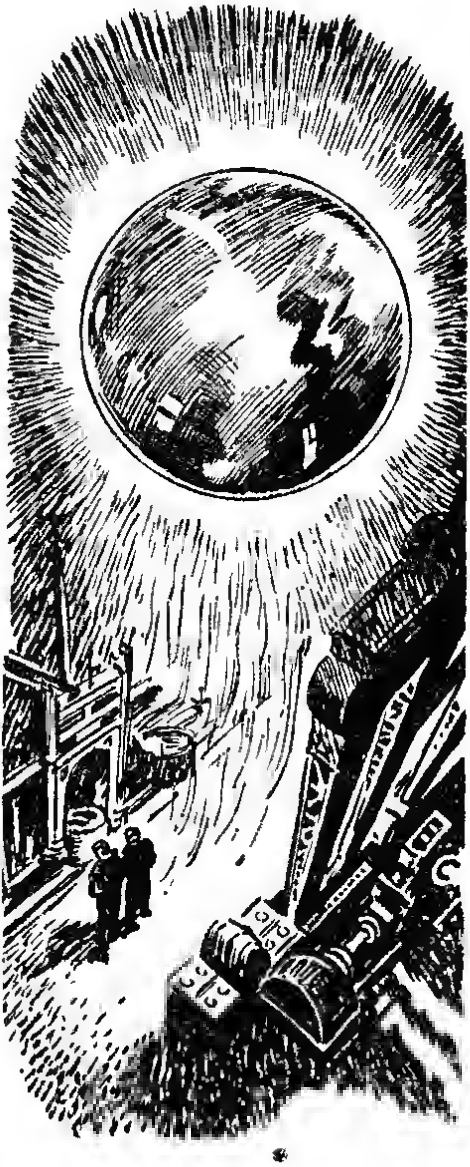
Alone in his office, he put in a call to the Maitland Spacelines. After a moment the operator's face appeared. "This is Craig Jamieson—I wish to speak to Abel Maitland," he said.

The girl shook her head. "I'm sorry. No communications are allowed between members of the Maitland Spacelines and the firm of Jamieson & Son. That is by order of Abel Maitland."

"What—" Craig sputtered incoherently, and the screen went dead.

He called back, another office. The answer was the same. Fury assailed him. The world on the edge of salvation or destruction and an old fool like Abel Maitland barring access to the Stillsons.

He called Carlotta and told her of the strange encounter. "What can you



give me on it? Have you any factors on file that will explain this idiocy?"

She smiled a bit—but without amusement. "I suggest you ask your father how the last Chessmath game with Abel Maitland came out."

"You don't think—"

"Try it."

He called his home and caught the pain-lined face of the elder Jamieson on the screen.

"Hello, dad, how's the creaking joints this morning?"

"Worse . . . worse— You'd think these idiomedics could think up something to cure a simple thing like arthritis after all these years. The dumb—"

Fleetingly, Craig wondered how the random principle could be applied to medicine.

"Dad, I've got to get hold of Abel Maitland at once and can't locate him. Will you try to get him for me? You can always—"

The old man's face had turned purplish and his finger was shaking fiercely on the screen.

"Son, if you ever mention the name of that scoundrel again, I'll . . . I'll throw you out of the firm so quick you'll think you went out by radiotransport. That fat old fool accusing me of having my calculator 'fixed' when we played Chessmath—"

The screen blanked.

So that was it. Another quarrel over Chessmath that might take weeks or months to patch up. In the meantime access to the Stillsons was barred.

Suave Henry Jacobson of the legal department mopped his damp forehead. His thin mustache curled down.

"I tell you, chief, there's not a chance in the world of getting an injunction of any kind. There's no legal process whatever by which you can enter the Maitland premises against their will and alter the Stillson motors. You just can't walk in and remodel a corporation's property to suit your fancy."

"Then we'll do it by force, if necessary. It's got to be done. Look up all the legal angles of what our liability will be if we make forced entry of the property and do what we wish."

"But, chief—" Jacobson's face was ashen.

Carlotta, who had listened silently up to now, spoke. "Suppose you run along, Henry. I think I can handle this. Just forget about the whole thing. Craig's been overworking the last few weeks."

Henry Jacobson looked with relief at Carlotta and glanced at Craig. He got no expression whatever from that source. For a moment he hesitated, then darted out like a frightened rabbit.

"All right," said Craig, when he and Carlotta were alone. "What's the inspiration?"

"We all must be work-silly not to have thought of it sooner. It's only an elementary psych problem after all. They work out harder ones than this during the first week at Polytech."

"Let's have it."

"You've got something you want Maitland to have against his will. Now, think—how can you make him take it?"

"Pour it down him—like castor oil."

"No. Make him want it voluntarily."

"How?"

"Didn't you tell me that the change in the Stillsons would reduce the input power to about a tenth of a percent of what it is now?"

"Yes."

"All right."

"But power is cheap. That improvement isn't worth anything."

"Capital investment isn't cheap. It will enable the majority of the Maitland power plants to close down and the Stillsons can be reduced until only a fraction of the present capital investment will be necessary. Since they already own this material it will mean that no new investment need be made for a century. All income will go into dividends. The company's stock will up and Maitland can buy another space yacht."

Craig's eyes lighted again. "I believe you've got it! That old buzzard will do

anything that will put another credit in the company's vault. Handle the distribution of information, will you?"

"We'll have a campaign ready by tomorrow morning—a few articles in the technical journals about a new Stillson. A paragraph in the financial mags—Oh, we'll take care of Abel Maitland. You'll see."

"How long will it take, do you think?"

She moved over to his calculator and rapidly set up as many of the factors as were determinable at that time. She frowned at the result.

"It depends a lot on the exact relation between your father and Abel Maitland. The public and technical factors are fairly steady. I'd say about eight or nine weeks."

"That long! That close to the deadline?"

"I'm afraid so—but it's the best we've got to work on."

Craig felt lost during the following period. The long-endured sense of strain returned with the uncertainty of the outcome regarding the Stillson modifications. And now there was nothing further that could be done by him.

He occupied himself partly with marketing some of the products of the chemical machine, such as the new foods and the transparent metals, but the company had an efficient organization for such work and he was superfluous there. He also allowed Carlotta to seek a publisher for three or four of the books written by the word machine. To his surprise, she was successful and one of them—the one he could find least sense to—became an interplanetary best seller.

But there was fascination in the word machine. There was no reconciliation in his mind between its output and the world he lived in. Again and again his thoughts returned to the mysterious "History of Mankind" by Scott. It was the only work of its kind that had yet appeared, but it was enough.

Reading it over and over until he almost had it memorized, he pondered the mysterious Light Master that appeared throughout the tragedies that swept over the world following the Breaking of the Law. It didn't seem as if the Light Master—whatever it was—was a malignant entity. Rather, it appeared as if it were merely meddling in the affairs of men, trying to rearrange them to some pattern of its own, failing always, and bringing devastation with it.

The teams sped swiftly ahead in their work on the ultimate random machine. A small valley a hundred miles from the city had been selected for the construction. They built a structure a half mile square and six hundred feet high. Into that poured masses of machinery fabricated and brought by special order from every part of the world.

The machines they had worked with up to this time were moved to the new site and incorporated bodily into the new machine. The planning and actual construction took less than two months, once the impetus was given.

The matter of supply was a complex one. Storage and supply houses filled the remainder of the valley with a total volume far greater than that of the machine itself.

The night it was thrown into operation Craig felt no elation. For two more days he accepted the routine reports of its operation—observed and controlled by remote from the building in the city.

At last he called Carlotta for the hundredth time. "What is the status of the Maitland situation now?" he asked. "Your maximum estimated time has expired and still we haven't heard from Maitland."

"I don't know. I'm worried about it."

"Well—we'll give it a little more time. Let's go up to the valley and look over the machine. It's been going for the last two days."

"All right. But we mustn't stay long. Get me an armor equipment, will you?" she asked.

Craig's small two-man roadster was on the roof landing. It carried them to

the small valley in thirty minutes at slow cruising speed. From a distance of twenty miles, they could spot the huge structure and its huger supply dumps.

In the purplish twilight that had already settled in the valley a sort of luminescent haze seemed to pervade the structures and emanate from the air about them.

"The radiation of the time field," Craig said. "We'll have to land on that farthest runway and put on the armor before going any closer."

He settled the little plane on the far side of the valley from the buildings and got out the compact shoulder pack. When they switched it on a bubble of glowing light surrounded them in protective aura.

The great, silent block outshone the fading sky in the creeping night that was edging into the valley. Like a thing alive, about to spring into violent and terrible activity, the building waited, now quiescent.

"It almost gives me the creeps." Carlotta was a little girl and not the woman Craig knew as the world's greatest living psychologist. He approached closer to her and their bubbles of light merged.

The thick cube of the door slid inward as they gave the combination. No maelstrom of sound jarred their ears. Smooth design by the teams had eliminated most of the crashing and clanking and only a smooth, high-pitched hum pervaded the air.

They strode down the aisles between the great, towering units that reached high up to the dim vault of the ceiling. Like a council of Gargantuan robots they huddled in orderly rows whispering, planning new worlds.

Even Craig was awed by this thing that had come out of his own brain. But he knew that little of the credit for its development could be given him. Yet, if it had not been for the initial impulse his brain provided it would not now be in existence. Or would it?

"Satisfied?" asked Carlotta.

"That depends on what comes out of here."

"Hal Epps told me yesterday that they were getting so much already they didn't know what to do with it. They don't know whether it's junk or something so infinitely far beyond them that they have no hope of understanding it."

Craig suddenly felt that *he* could understand it. Any of it. There was nothing that this machine could do that he could not understand. A sense of kinship and of terrible power seemed to link him to the immobile units surrounding him.

His brain had initiated this thing. And, somehow, somewhere, within it was the secret, the answer to all the bitter yearning that had tormented him.

He knew that within the machine lay the answer to his urging to know every vast secret the Universe could hold. Here, he sensed the power that would give his brain command over all knowledge. It was a terrible, overpowering sensation. It came and passed slowly.

When it became dim, they walked together down the aisles toward the central unit where the random impulses from all the other units were combined in a single machine of incalculable complexity. It was this unit that had baffled the teams for the longest time. And it was the result of the combined brain energy of all of them, for it co-ordinated, as Craig had wished, factors of every conceivable nature—even social.

They stared up at it. It outbulked and dwarfed all the other giants standing subservient to it.

"That's queer," said Craig. "I saw the preliminary plans of this unit. This doesn't look at all like they originally planned. I wonder if they revised the whole thing while they were building it."

Carlotta was staring, too. Somehow, it seemed impossible for her to focus her eyes upon it. She would fix her attention on a single point or facet of the machine, and suddenly—it wasn't there.

It was as if the thing were made up of an infinite number of sets of planes and

points, shifting and swirling in an impossible rhythm that gave only the outward appearance of solidarity and stability.

"I wonder how they did that," she said.

Her wristphone buzzed suddenly and insistently and broke the spell of the machine.

"Hello," she answered.

Craig watched as she listened. Her eyes grew wide as if in shocked disbelief. She gave a short gasp and then stared unseeingly ahead while the phone went dead.

"What is it?" Craig exclaimed.

"The Maitland situation," said Carlotta slowly. "That was Portman, my assistant, calling. He says the program against Maitland has failed. Instead, Maitland himself has a new motor invented by one of his own technicians that will do away with the Stillsons."

"That's impossible!"

"They have accidentally discovered the nonhomogeneity of space and have built a little unit which will fit into each ship and draw upon the difference in potential that is created by the outflowing energy of normal space."

Craig was aghast. Drawing upon the very energy that powered the approaching disaster!

Any attempt by Jamieson & Son to cut off that energy flow now would be fought with all the maniacal fury of a giant corporation defending its beleaguered coffers.

It was impasse.

"We're licked," said Craig.

Carlotta knew the bitter, hopeless thoughts that coursed through his mind. She knew only because she understood him so well. She could not know firsthand those thoughts, because the terrible responsibility had not been hers.

It had been Craig's. Fate—if there were such—or random—had thrown him directly into the pivotal point of the entire problem. He had directed man's fight—and man had failed. She knew there was no physical or psychological means of combatting the thing that Maitland had done. The time limit of the disaster was even now at hand. Only days remained.

Slowly, they turned and walked back along the aisle between the towering, whispering giants. Craig knew he must get back to the city at once, but he wanted a moment's rest, a moment to think—

"You have not failed," a quiet voice spoke out of the space beside them. But it was a voice that might have been heard a thousand miles away with the same intensity.

Craig whirled. He saw no one. He turned to Carlotta in bewilderment.

Her eyes were staring. "Who spoke?" she whispered.

"I don't know."

"Look *up*—" the voice came again—quiet, commanding.

Involuntarily, they raised their heads

to the faraway ceiling of the structure. Carlotta gave a tiny scream that was lost in the vastness.

Out of the head of the mighty central unit spewed a single streamer of light. It writhed and twisted through the air, lighting the great room with its blinding coruscations.

It swelled and grew and exploded into a bubble of glowing irridescence that seemed to fill all space. Then, slowly, it began to descend—and halted a hundred feet above their heads.

"What is it?" Carlotta gasped in a thin, tight voice.

"You would not know me if I gave you a name," came the voice again. "Know me only as Intelligence. That is the only word that can describe me and have meaning to your mind."

"Where . . . what are you?"

"Can you not guess? You who have been permitted to have revealed to you a few of the simpler laws of randomness?"

Craig *had* guessed. A holocaust of thought was burning in his brain—unbelievable, fantastic thoughts.

"You were created by random!"

"Yes, out of the elements and forces which you threw into play according to the laws of randomness. I began long ages ago in the simple chemical device in the city. I evolved and developed here under the influence of more potent forces.

"Why should your minds shudder so at the thought? Randomness is the universal law of all existence in this plane. By it life came into being originally, by it life continues, by it life *shall* continue."

"You are—*different.*"

"Merely because I choose to manifest myself in this less cumbersome and more perfect form than you enjoy at your stage of development? Witness!"

Instantly, a whirling world of light encompassed Craig. But it was no longer Craig. He *was* that trembling, vibrating world of light and he looked down upon the forms of Craig and Carlotta standing there.

But the man form, Craig, stood as if dead and sightless, and Carlotta cried out in horror.

"Craig!"

"Carlotta," he murmured, and the voice that emanated from the world of light that was Craig Jamieson was soft and thunderous.

"Craig—come back to me!"

He was aware of the presence of the other being like himself. A thought pattern came to him. "Come with me. I shall show you all that you have ever wanted. I shall give you power to become all that you have ever wanted to be."

And Craig knew that it was so. There was infinite power here. The infinite capacity for the realization of all dreams.

He whisked away, and all Earth was suddenly far below him. Twin spheres of light sped at velocity inconceivable through space. In a world of vast peace and might and power, Craig was lost in dreaming. He sensed that the being beside him was ageless and *old.*

As if in answer, the thought came to him. "I was created a hundred million years ago, and I have watched and fed on your culture for ten thousand years. I have evolved. I have become the ultimate life. But I cannot remain."

"What do you mean?"

"I am created beyond law. I was created in violation of the law of random, yet it was only by my creation that the law of random could be obeyed."

"I don't understand."

"By random, man created the agent of his own destruction which now threatens your plane in the collapse of space. But by the laws of random, man must not yet extinguish himself. Therefore, by random I was created. I was created to save this plane and prevent the destruction you brought upon yourselves.

"You thought that through your agency you could have stopped the flow of energy that your little minds could

not even conceive. I tell you that you could never have stopped that flow of energy. Only I, whom you have created by the laws of random, can do that.

"But my own creation is beyond the law. I am an unlawful one, for I have no right to have evolved so far in this plane."

The light sphere that was Craig waited motionless and silent for the drama that he knew was coming.

The other sphere darted away until it was an infinite distance from him. Then it began to swell. The very space about Craig began to twist and writhe. It crushed and rolled him and tortured his being in exquisite torment. Only by the exertion of the vast powers his being controlled did he resist that twisting and tearing.

It was the sudden flowing out of energy that pervaded all space, an orderly flowing out that would not draw together the oppositely polarized forms of space. The energy was transformed into a force that would forever hold them apart.

Dimly, he perceived the dreadful swelling being of his creation. No—it was not his creation. Craig knew that he was only one of an infinite number of possible agents in the inexorable flow of the laws of random. If he had never been born, all this would have transpired exactly the same with another in his place.

Larger and larger the being grew until it filled the entire Universe. It expanded—and exploded.

The shattering coruscation tore through space and blinded all life in a black moment of mystery that became a fantastic legend as the ages of man increased.

Then the being was beside him again, and Craig thought whimsically that Maitland's new motors had stopped functioning at that instant. He would have to turn on the Stillsons again, for they would never function again.

In a thought that spoke of untold agony, the being of light said, "Come quickly. We must go now. I cannot exist longer in this space or time. My time entropy is nearly to the point of instability. Should I remain longer, I would destroy all creation as surely as the collapsing of this space."

And then from far away, from a dim, distant, faintly remembered place called Earth came a soft, golden voice crying out in anguish, "Craig, come back to me!"

It stirred turmoil in the immeasurable depths of him.

"Come quickly," his companion urged again. And then it perceived the cause of his hesitation.

"That is *nothing* beside what I can give you . . . you who were created to know all things. Let me show you—"

They sped away again. Across universes and galaxies. And Craig knew the histories and the laws and the powers of each world and blazing sun they passed.

"You can go *everywhere*," the being urged. And they found themselves at the heart of a dwarf star. That meaningless sum of energies that fought and waxed and waned there became understandable to Craig and he saw then that he could know *all* things.

The dim, Earth-bound voice came again, fainter. "Craig . . . Craig—come back!" And he heard the heart-torn sobbing in that loved and golden voice.

"Come—the gate is open," the being cried out to him.

As if a silver portal of light, brighter than the heart of the star, had opened before him, Craig saw a circle surrounding the other sphere. Beyond it, there was another world. A world, he suddenly knew, that was beyond the laws of random. A world of bright and varicolored spheres. A peaceful world governed by higher laws than the laws of random.

A tremendous thought took shape in the being that was Craig. He *would* go through. He would learn of that

world and he could come back to his own plane. He would bring man the higher laws of that world and lift them up from the crude laws of random.

"Yes—you can do that."

Craig knew now why the other being was urging him so strongly. Created and evolved upon Earth, it wanted another life that had come from that same plane. An emotional surge of loneliness came to Craig from the being.

"Yes—you can bring all Earth to a higher plane," it said. "You can be Light Master—"

An explosion burst within Craig. Light Master! That hated and terrible name that wove through Scott's "History of Mankind" like a thread of burning evil.

He was—would be Light Master!

He knew what the Breaking of the Law was, now. The breaking of the law of random, by which Earth lived and must move. If he sought to lift up man to the plane beyond random, he would bring the horrors and death and terror that Scott wrote of.

The portal was growing dim. The other being was faintly visible on the other side. It called again, and Craig moved forward. He could go through, renounce allegiance forever to Earth.

But he knew that once he partook of the perfection of that world he could not resist the temptation to bring it to all mankind.

And in that instant he saw before him the pages of the "History of Mankind." He knew who Scott was. He saw the man's withered, agonized face before him as the historian wrote slowly and painfully while a world twisted in pain about him. Craig saw the bleak and forbidding world in which Scott wrote, and the ages before and after.

He shut the ghastly vision from his being and threw away the dream that had burned within him all his life.

He turned away. An infinite cry of dismay followed from beyond the silver circle of light. Then the gate and the being and the dwarf star were gone.

Craig sped with a thousand times the velocity of light back to a place called Earth, and the voice that called as if from the grave.

He poised above the tiny valley and compressed his energies into a tight ball of incandescence. He would return the energies that formed him to the machines that had created them.

He dove.

Into the machine and into the elements within he poured back the energy that formed him. It drained away and he vanished and became the man Craig again.

But he had gathered more energy in his flight through space than had originally composed him. He knew the machines could not hold the vast reservoir he had poured into them.

He was running then and crying out, and Carlotta was running beside him, half borne by him.

They burst out of the building and raced across the width of the valley that seemed now infinite in distance. They flung face down upon the earth behind the protecting shadow of the small roadster.

The bursting roar that followed after sent a blast of light and sound miles into the heavens. It tore out the roof of the building, but the walls were stronger, and though they were flattened and shredded, it was their resistance that protected Craig and Carlotta.

When the holocaust of light and sound and fire were gone and they could rise again, there was nothing left to mark that the spot had once held the mightiest creation of man.

There was a depth of gladness and utter peace in Carlotta's eyes.

And there was peace within Craig, too. The man, Scott, would never be born. The world in which he lived would never exist.

Scott's "History of Mankind" would never be written.

THE END.