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HUGO GERNSBACK
EDITOR



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August
1928

Stories by
H. G. Wells
Edward Elmer Smith
Philip Francis Nowlan

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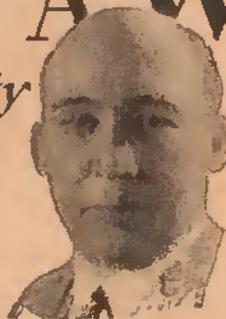
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AMAZING STORIES

August, 1928
Vol. 3, No. 5

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In Our August Issue:

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Our Cover

this month depicts a scene from the first instalment in this issue of the story entitled THE SKYLARK OF SPACE, by Edward Elmer Smith and Lee Hawkins Garby, in which the scientist, who has discovered a chemical substance for the liberation of intra-atomic energy, is making his initial tests, preparatory to his interplanetary flight by means of this liberated energy, which makes possible his interstellar space-flyer.

In Our Next Issue:

THE AMBASSADOR FROM MARS, by Harl Vincent. For a true prophetic gem, this story can't be beat. If some means of interplanetary travel could be devised sometime, what would be the method of communication between, say, Mars and the Earth. Obviously the spoken word will not be possible. The dot and dash system, on the other hand, seems illogical, because we have no basis of contact. The author suggests a very logical plan.

THE INVISIBLE BUBBLE, by Kirk Meadowcroft. If you know anything about the ultimate stage of matter, this story will seem quite plausible to you. At any rate, it contains a good bit of science and an ingenious idea, beautifully worked out.

THE SKYLARK OF SPACE, by Edward Elmer Smith, in collaboration with Lee Hawkins Garby. (A Serial in Three Parts) Part II. In this instalment, the opposition carries out some of its nefarious plans, but having been prepared, the builders of the Skylark follow and a series of startling adventures in interstellar space and then on another planet, are told. This instalment not only retains its high degree of interest, it becomes increasingly fascinating with each chapter and explains many things.

THE VOYAGE TO KEMPTONIA, by E. M. Scott. Certain irregularities of our moon's motion have led some of our astronomers to believe that there is another body—small, to be sure—between the earth and the moon. Around the idea of this extra-terrestrial body is woven an absorbing tale of unusual interest.

And others.

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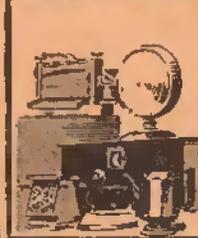
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THE AMAZING UNKNOWN

By HUGO GERNSBACK

IN a world wherein we pride ourselves that we know practically everything that is to be known it is astounding to find the tremendous amount of big voids of which we have not even the slightest conception. Our libraries, our text books and other books of instruction are full of the finite and tangible things, but you will find comparatively few books that tell you about the great world of the unknowns.

There is, for instance, one class of unknowns which probably will remain unknown and not understood for centuries and eons to come. We talk glibly about electricity, light, heat, gravitation, and hundreds of other subjects. Yet, all of these subjects are really unknown to us. By means of our senses, we can keep in touch with these things through the impressions that they give us, but beyond that, there is the great abyss of the unknown, for we do not know what electricity is; we do not know what light is, in their ultimate states, and there is practically nothing in the entire world that surrounds us, that we know anything about at all. You can pick up almost any object; you can look at almost any thing, alive or dead, or inanimate, and you will know nothing at all about it. You can pick up a pebble, and a chemist may tell you its chemical formula and what it is made of, but beyond that he knows nothing. He will tell you about its protons and electrons, atoms, molecules, that constitute the parts of the pebble, but he will not be able to tell you what holds the particles together, and he has only the vaguest ideas what the ultimate constitution of the pebble is.

As a matter of fact, when it comes to matter, we know nothing at all about it. It is a great unknown to us. Some scientists hold that matter is only another word for force and energy, but these, at best, are only meaningless terms—a handle for our ignorance. We look at the simplest of plants; a blade of grass that we see grow, and no scientist in the whole world can tell you exactly what makes it grow, and why it does grow, and why it is alive in comparison to the pebble, which is dead and lifeless. I need hardly touch upon the unknown properties of life, which have puzzled humanity ever since the dawn of reasoning. We have not the slightest conception just what life is; what it is composed of, and what the mysterious forces are that distinguish life from lifeless matter.

Unfortunately for us, we have only five senses, and these five senses are wholly inadequate to properly gauge our surroundings. Perhaps if we had twenty or thirty different senses, we would know more about the world in which we live, but even then, we would not know all about it. For instance, we have no sense at all when it comes to grasping the infinite; the best we can do is to start shuddering. If we keep on thinking long enough about the infinite, we become inmates for an insane asylum. Thus there is the infinity of time and of space, and of everything else. We believe that the thing we call, arbitrarily, time, cannot have a beginning, logically, and cannot have an end. You can destroy the entire universe, and still, something must be going on *thereafter*. It is the same with space. We believe that no matter how far we go out into space, there can be no end. No matter in what direction you go, it will be endless. But what is *endless*? No one knows.

Immediately the brain starts reeling if you give this serious consideration and dwell upon it for any great length of time. Perhaps there is a good answer to all this, if we had a sense to interpret it correctly, but it is simply another of the great unknowns which we probably will never comprehend.

Then there are all sorts of vibrations around us that we only dimly realize. For us they belong to the great unknown. X-rays, so far, are the highest in the vibration spectrum. These rays vibrate at the enormous rapidity of from 288,230,376,151,711,744 to 2,305,843,009,213,693,952 vibrations per second. There are, however, other vibrations beyond even the X-ray, but nothing is known about these.

Coming nearer home, and to our own bodies, in which one would think everything knowable would be known, we face, perhaps, one of the greatest abysses of the unknowns. We only know a small fraction of a per cent of what is going on in our own bodies. Up to a few centuries ago (William Harvey, 1619), we did not even know that blood circulated in our bodies, but there are thousands of other functions and actions, of which we are totally ignorant. We know very little of the gland functions, and while we can dissect the brain of the human being, only comparatively little is known about it.

An actor or an actress will learn an entire play by heart, never missing a word. A composer or a good musician may know hundreds or even thousands of different musical scores by heart, but we have not the slightest idea how all this works, and what happens in the ultimate inside of our brains to make this possible.

And as concerns the eye, here we have the perfect television apparatus, much more perfect than we can ever hope to construct, for, unlike the photographic camera, we can actually see in different colors. Yet, the eye is only a photographic camera, except, that it is a much better one than human beings have ever been able to construct. What happens between the eye and the brain that makes us conscious of "seeing?" This belongs in the classification of the great unknown. Nothing at all certain is known about it. It is so with most of our senses, as, for instance, hearing. We hear all sorts of sounds and can distinguish them, but how these are conveyed to our consciousness and what is really meant by the term "hearing," no one knows.

Then, when it comes to the certain thing that we are pleased to call the human soul, we have not the remotest idea what we mean by it; we don't even know the seat of the soul. We do not know whether it permeates our entire body; whether it is located in our heart, in our lungs, in our brain or in a certain gland. We simply do not know. Much worse, we do not know what the soul's function is. We know there is something that distinguishes us from a dog or a lion or a bird, but what that certain something is, we haven't the faintest idea. It all belongs to the great universe of the unknown.

The list might be extended indefinitely, and perpetually, which should sober us up considerably. Because, when we come right down to it, our understanding of practically everything is so frightfully slight, that we must stand aghast at our colossal ignorance in all directions.

The SKYLARK of SPACE

By Edward Elmer Smith

In Collaboration with

LEE HAWKINS GARBY

CHAPTER I

The Occurrence of the Impossible

DETRIFIED with astonishment, Richard Seaton stared after the copper steam-bath upon which he had been electrolyzing his solution of "X," the unknown metal. For as soon as he had removed the beaker the heavy bath had jumped endwise from under his hand as though it were alive. It had flown with terrific speed over the table, smashing apparatus and bottles of chemicals on its way, and was even now disappearing through the open window. He seized his prism binoculars and focused them upon the flying vessel, a speck in the distance. Through the glass he saw that it did not fall to the ground, but continued on in a straight line, only its rapidly diminishing size showing the enormous velocity with which it was moving. It grew smaller and smaller, and in a few moments disappeared utterly.

The chemist turned as though in a trance. How was this? The copper bath he had used for months was gone—gone like a shot, with nothing to make it go. Nothing, that is, except an electric cell and a few drops of the unknown solution. He looked at the empty space where it had stood, at the broken glass covering his laboratory table, and again stared out of the window.

He was aroused from his stunned inaction by the entrance of his colored laboratory helper, and silently motioned him to clean up the wreckage.

"What's happened, Doc-tuh?" asked the dusky assistant.

"Search me, Dan. I wish I knew, myself," responded Seaton, absently, lost in wonder at the incredible phenomenon of which he had just been a witness.

Ferdinand Scott, a chemist employed in the next room, entered breezily.

"Hello, Dicky, thought I heard a racket in here," the newcomer remarked. Then he saw the helper busily mopping up the reeking mass of chemicals.

"Great balls of fire!" he exclaimed. "What've you been celebrating? Had an explosion? How, what, and why?"

"I can tell you the 'what,' and part of the 'how,'" Seaton replied thoughtfully, "but as to the 'why,' I am completely in the dark. Here's all I know about it," and in a few words he related the foregoing inci-

dent. Scott's face showed in turn interest, amazement, and pitying alarm. He took Seaton by the arm.

"Dick, old top, I never knew you to drink or dope, but this stuff sure came out of either a bottle or a needle. Did you see a pink serpent carrying it away? Take my advice, old son, if you want to stay in Uncle Sam's service, and lay off the stuff, whatever it is. It's had enough to come down here so far gone that you wreck most of your apparatus and lose the rest of it, but to pull a yarn like that is going too far. The Chief will have to ask for your resignation, sure. Why don't you take a couple of days of your leave and straighten up?"

Seaton paid no attention to him, and Scott returned to his own laboratory, shaking his head sadly.

Seaton, with his mind in a whirl, walked slowly to his desk, picked up his blackened and battered briar pipe, and sat down to study out what he had done, or what could possibly have happened, to result in such an unbelievable infraction of all the laws of mechanics and gravitation. He knew that he was sober and sane, that the thing had actually happened. But why? And how? All his scientific training told him that it was impossible. It was unthinkable that an inert mass of metal should fly off into space without any applied force. Since it had actually happened, there must have been applied an enormous and hitherto unknown force. What was

that force? The reason for this unbelievable manifestation of energy was certainly somewhere in the solution, the electrolytic cell, or the steam-bath. Concentrating all the power of his highly-trained analytical mind upon the problem—deaf and blind to everything else, as was his wont when deeply interested—he sat motionless, with his forgotten pipe clenched between his teeth. Hour after hour he sat there, while most of his fellow-chemists finished the day's work and left the building and the

room slowly darkened with the coming of night.

Finally he jumped up. Crashing his hand down upon the desk, he exclaimed:

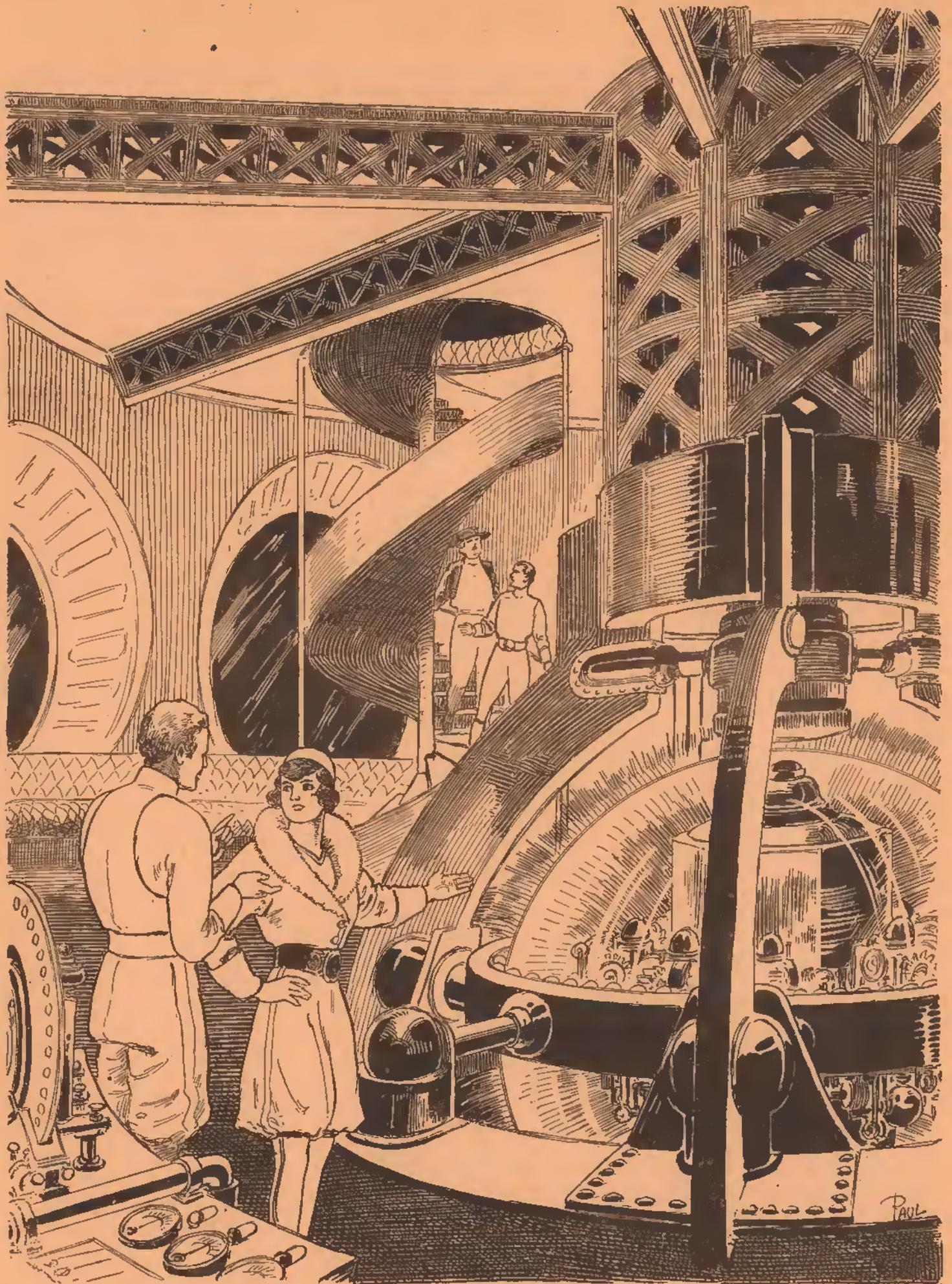
"I have liberated the intra-atomic energy of copper! Copper, 'X,' and electric current!

"I'm sure a fool for luck!" he continued as a new thought struck him. "Suppose it had been liberated all at once? Probably blown the whole world off its hinges. But it wasn't; it was given off slowly and in

*P*ERHAPS it is a bit unethical and unusual for editors to voice their opinion of their own wares, but when such a story as "The Skylark of Space" comes along, we just feel as if we must shout from the housetops that this is the greatest interplanetary and space flying story that has appeared this year. Indeed, it probably will rank as one of the great space flying stories for many years to come. The story is chock full, not only of excellent science, but woven through it there is also that very rare element, love and romance. This element in an interplanetary story is often apt to be foolish, but it does not seem so in this particular story.

We know so little about intra-atomic forces, that this story, improbable as it will appear in spots, will read commonplace years hence, when we have atomic engines, and when we have solved the riddle of the atom.

You will follow the hair-raising explorations and strange ventures into far-away worlds with bated breath, and you will be fascinated, as we were, with the strangeness of it all.



In the exact center of the huge shell was a spherical network of enormous steel beams. Inside this structure could be seen a similar network which, mounted upon universal bearings, was free to revolve in any direction.

a straight line. Wonder why? Talk about power! Infinite! Believe me, I'll show this whole Bureau of Chemistry something to make their eyes stick out, tomorrow. If they won't let me go ahead and develop it, I'll resign, hunt up some more 'X', and do it myself. That bath is on its way to the moon right now, and there's no reason why I can't follow it. Martin's such a fanatic on exploration, he'll fall all over himself to build us any kind of a craft we'll need . . . we'll explore the whole solar system! Great Cat, what a chance! A fool for luck is right!"

He came to himself with a start. He switched on the lights and saw that it was ten o'clock. Simultaneously he recalled that he was to have had dinner with his fiancée at her home, their first dinner since their engagement. Cursing himself for an idiot he hastily left the building, and soon his motorcycle was tearing up Connecticut Avenue toward his sweetheart's home.

CHAPTER II

Steel Becomes Interested

DR. MARC DUQUESNE was in his laboratory, engaged in a research upon certain of the rare metals, particularly in regard to their electrochemical properties. He was a striking figure. Well over six feet tall, unusually broad-shouldered even for his height, he was plainly a man of enormous physical strength. His thick, slightly wavy hair was black. His eyes, only a trifle lighter in shade, were surmounted by heavy black eyebrows which grew together above his aquiline nose.

Scott strolled into the room, finding DuQuesne leaning over a delicate electrical instrument, his forbidding but handsome face strangely illuminated by the ghastly glare of his mercury-vapor arcs.

"Hello, Blackie," Scott began, "I thought it was Seaton in here at first. A fellow has to see your faces to tell you two apart. Speaking of Seaton, d'you think that he's quite right?"

"I should say, off-hand, that he was a little out of control last night and this morning," replied DuQuesne, manipulating connections with his long, muscular fingers. "I don't think that he's insane, and I don't believe that he dopes—probably overwork and nervous strain. He'll be all right in a day or two."

"I think he's a plain nut, myself. That sure was a wild yarn he sprung on us, wasn't it? His imagination was hitting on all twelve, that's sure. He seems to believe it himself, though, in spite of making a flat failure of his demonstration to us this morning. He saved that waste solution he was working on—what was left of that carboy of platinum residues after he had recovered all the values, you know—and got them to put it up at auction this noon. He resigned from the Bureau, and he and M. Reynolds Crane, that millionaire friend of his, bid it in for ten cents."

"M. Reynolds Crane?" DuQuesne concealed a start of surprise. "Where does he come in on this?"

"Oh, they're always together in everything. They've been thicker than Damon and Pythias for a long time.

They play tennis together—they're doubles champions of the District, you know—and all kinds of things. Wherever you find one of them you'll usually find the other. Anyway, after they got the solution Crane took Seaton in his car, and somebody said they went out to Crane's house. Probably trying to humor him. Well, ta-ta; I've got a week's work to do yet today."

As Scott left DuQuesne dropped his work and went to his desk, with a new expression, half of chagrin, half of admiration, on his face. Picking up his telephone, he called a number.

"Brookings?" he asked, cautiously. "This is DuQuesne. I must see you immediately. There's something big started that may as well belong to us. . . . No, can't say anything over the telephone. . . . Yes, I'll be right out."

He left the laboratory and soon was in the private office of the head of the Washington or "diplomatic" branch, as it was known in certain circles, of the great World Steel Corporation. Offices and laboratories were maintained in the city, ostensibly for research work, but in reality to be near the center of political activity.

"How do you do, Doctor DuQuesne?" Brookings said as he seated his visitor. "You seem excited."

"Not excited, but in a hurry," DuQuesne replied. "The biggest thing in history has just broken, and we've got to work fast if we get in on it. Have you any doubts that I always know what I am talking about?"

"No," answered the other in surprise, "Not the slightest. You are widely known as an able man. In fact, you have helped this company several times in various deal—er, in various ways."

"Say it, Brookings. 'Deals' is the right word. This one is going to be the biggest ever. The beauty of it is that it should be easy—one simple burglary and an equally simple killing—and won't mean wholesale murder, as did that . . ."

"Oh, no, Doctor, not murder. Unavoidable accidents."

"Why not call things by their right names and save breath, as long as we're alone? I'm not squeamish. But to get down to business. You know Seaton, of our division, of course. He has been recovering the various rare metals from all the residues that have accumulated in the Bureau for years. After separating out all the known metals he had something left, and thought it was a new element, a metal. In one of his attempts to get it into the metallic state, a little of its solution fizzed out and over a copper steam bath or tank, which instantly flew out of the window like a bullet. It went clear out of sight, out of range of his binoculars, just that quick." He snapped his fingers under Brookings' nose. "Now that discovery means such power as the world never dreamed of. In fact, if Seaton hadn't had all the luck in the world right with him yesterday, he would have blown half of North America off the map. Chemists have known for years that all matter contains enormous stores of intra-atomic energy, but have always considered it 'bound'—that is, incapable of liberation. Seaton has liberated it."

"And that means?"

"That with the process worked out, the Corporation

could furnish power to the entire world, at very little expense."

A LOOK of scornful unbelief passed over Brookings' face.

"Sneer if you like," DuQuesne continued evenly. "Your ignorance doesn't change the fact in any particular. Do you know what intra-atomic energy is?"

"I'm afraid that I don't, exactly."

"Well, it's the force that exists between the ultimate component parts of matter, if you can understand that. A child ought to. Call in your chief chemist and ask him what would happen if somebody would liberate the intra-atomic energy of one hundred pounds of copper."

"Pardon me, Doctor. I didn't presume to doubt you. I will call him in."

He telephoned a request and soon a man in white appeared. In response to the question he thought for a moment, then smiled slowly.

"If it were done instantaneously it would probably blow the entire world into a vapor, and might force it clear out of its orbit. If it could be controlled it would furnish millions of horsepower for a long time. But it can't be done. The energy is bound. Its liberation is an impossibility, in the same class with perpetual motion. Is that all, Mr. Brookings?"

As the chemist left, Brookings turned again to his visitor, with an apologetic air.

"I don't know anything about these things myself, but Chambers, also an able man, says that it is impossible."

"As far as he knows, he is right. I should have said the same thing this morning. But I do know about these things—they're my business—and I tell you that Seaton has done it."

"This is getting interesting. Did you see it done?"

"No. It was rumored around the Bureau last night that Seaton was going insane, that he had wrecked a lot of his apparatus and couldn't explain what had happened. This morning he called a lot of us into his laboratory, told us what I have just told you, and poured some of his solution on a copper wire. Nothing happened, and he acted as though he didn't know what to make of it. The foolish way he acted and the apparent impossibility of the whole thing, made everybody think him crazy. I thought so until I learned this afternoon that Mr. Reynolds Crane is backing him. Then I knew that he had told us just enough of the truth to let him get away clean with the solution."

"But suppose the man *is* crazy?" asked Brookings. "He probably is a monomaniac, really insane on that one thing, from studying it so much."

"Seaton? Yes, he's crazy—like a fox. You never heard of any insanity in Crane's family, though, did you? You know that he never invests a cent in anything more risky than Government bonds. You can bet your last dollar that Seaton showed him the real goods." Then, as a look of conviction appeared upon the other's face, he continued:

"Don't you understand that the solution was Government property, and he had to do something to make

everybody think it worthless, so that he could get title to it? That faked demonstration that failed was certainly a bold stroke—so bold that it was foolhardy. But it worked. It fooled even me, and I am not usually asleep. The only reason he got away with it, is, that he has always been such an open-faced talker, always telling everything he knew.

"He certainly played the fox," he continued, with undisguised admiration. "Heretofore he has never kept any of his discoveries secret or tried to make any money out of them, though some of them were worth millions. He published them as soon as he found them, and somebody else got the money. Having that reputation, he worked it to make us think him a nut. He certainly is clever. I take off my hat to him—he's a wonder!"

"And what is your idea? Where do we come in?"

"You come in by getting that solution away from Seaton and Crane, and furnishing the money to develop the stuff and to build, under my direction, such a power-plant as the world never saw before."

"Why get that particular solution? Couldn't we buy up some platinum wastes and refine them?"

"Not a chance," replied the scientist. "We have refined platinum residues for years, and never found anything like that before. It is my idea that the stuff, whatever it is, was present in some particular lot of platinum in considerable quantities as an impurity. Seaton hasn't all of it there is in the world, of course, but the chance of finding any more of it without knowing exactly what it is or how it reacts is extremely slight. Besides, we must have exclusive control. How could we make any money out of it if Crane operates a rival company and is satisfied with ten percent profit? No, we must get all of that solution. Seaton and Crane, or Seaton, at least, must be killed, for if he is left alive he can find more of the stuff and break our monopoly. I want to borrow your strong-arm squad tonight, to go and attend to it."

After a few moments' thought, his face set and expressionless, Brookings said:

"No, Doctor, I do not think that the Corporation would care to go into a matter of this kind. It is too flagrant a violation of law, and we can afford to buy it from Seaton after he proves its worth."

"BAH!" snorted DuQuesne. "Don't try that on me, Brookings. You think you can steal it yourself, and develop it without letting me in on it? You can't do it. Do you think I am fool enough to tell you all about it, with facts, figures, and names, if you could get away with it without me? Hardly! You can steal the solution, but that's all you can do. Your chemist or the expert you hire will begin experimenting without Seaton's lucky start, which I have already mentioned, but about which I haven't gone into any detail. He will have no information whatever, and the first attempt to do anything with the stuff will blow him and all the country around him for miles into an impalpable powder. You will lose your chemist, your solution, and all hope of getting the process. There are only two men in the United States, or in the world, for that matter, with brains enough and information enough to work it out.

One is Richard B. Seaton, the other is Marc C. DuQuesne. Seaton certainly won't handle it for you. Money can't buy him and Crane, and you know it. You must come to me. If you don't believe that now, you will very shortly, after you try it alone."

Brookings, caught in his duplicity and half-convinced of the truth of DuQuesne's statements, still temporized.

"You're modest, aren't you, Doctor?" he asked, smiling.

"Modest? No," said the other calmly. "Modesty never got anybody anything but praise, and I prefer something more substantial. However, I never exaggerate or make over-statements, as you should know. What I have said is merely a statement of fact. Also, let me remind you that I am in a hurry. The difficulty of getting hold of that solution is growing greater every minute, and my price is getting higher every second."

"What is your price at the present second?"

"Ten thousand dollars per month during the experimental work; five million dollars in cash upon the successful operation of the first power unit, which shall be of not less than ten thousand horsepower; and ten percent of the profits."

"Oh, come, Doctor, let's be reasonable. You can't mean any such figures as those."

"I never say anything I don't mean. I have done a lot of dirty work with you people before, and never got much of anything out of it. You were always too strong for me; that is, I couldn't force you without exposing my own crookedness, but now I've got you right where I want you. That's my price; take it or leave it. If you don't take it now, the first two of those figures will be doubled when you do come to me. I won't go to anybody else, though others would be glad to get it on my terms, because I have a reputation to maintain and you are the only ones who know that I am crooked. I know that my reputation is safe as long as I work with you, because I know enough about you to send all you big fellows, clear down to Perkins, away for life. I also know that that knowledge will not shorten my days, as I am too valuable a man for you to kill, as you did. . . ."

"Please, Doctor, don't use such language. . . ."

"Why not?" interrupted DuQuesne, in his cold, level voice. "It's all true. What do a few lives amount to, as long as they're not yours and mine? As I said, I can trust you, more or less. You can trust me, because you know that I can't send you up without going with you. Therefore, I am going to let you go ahead without me as far as you can—it won't be far. Do you want me to come in now or later?"

"I'm afraid we can't do business on any such terms as that," said Brookings, shaking his head. "We can undoubtedly buy the power rights from Seaton for what you ask."

"You don't fool me for a second, Brookings. Go ahead and steal the solution, but take my advice and give your chemist only a little of it. A very little of that stuff will go a long way, and you will want to have some left when you have to call me in. Make him experiment with extremely small quantities. I would suggest that he work in the woods at least a hundred

miles from his nearest neighbor, though it matters nothing to me how many people you kill. That's the only pointer I will give you—I'm giving it merely to keep you from blowing up the whole country," he concluded with a grim smile. "Good-bye."

AS the door closed behind the cynical scientist, Brookings took a small gold instrument, very like a watch, from his pocket. He touched a button and held the machine close to his lips.

"Perkins," he said softly, "M. Reynolds Crane has in his house a bottle of solution."

"Yes, sir. Can you describe it?"

"Not exactly. It is greenish yellow in color, and I gather that it is in a small bottle, as there isn't much of the stuff in the world. I don't know what it smells or tastes like, and I wouldn't advise experimenting with it, as it seems to be a violent explosive and is probably poisonous. Any bottle of solution of that color kept in a particularly safe place would probably be the one. Let me caution you that this is the biggest thing you have ever been in, and *it must not fail*. Any effort to purchase it would be useless, however large a figure were named. But if the bottle were only partly emptied and filled up with water, I don't believe anyone would notice the difference, at least for some time, do you?"

"Probably not, sir. Good-bye."

Next morning, shortly after the office opened, Perkins, whose principal characteristic was that of absolute noiselessness, glided smoothly into Brookings' office. Taking a small bottle about half full of a greenish-yellow liquid from his pocket, he furtively placed it under some papers upon his superior's desk.

"A man found this last night, sir, and thought it might belong to you. He said this was a little less than half of it, but that you could have the rest of it any time you want it."

"Thank you, Perkins, he was right. It is ours. Here's a letter which just came," handing him an envelope, which rustled as Perkins folded it into a small compass and thrust it into his vest pocket. "Good morning."

As Perkins slid out, Brookings spoke into his telephone, and soon Chambers, his chief chemist, appeared.

"Doctor Chambers," Brookings began, showing him the bottle, "I have here a solution which in some way is capable of liberating the intra-atomic energy of matter, about which I asked you yesterday. It works on copper. I would like to have you work out the process for us, if you will."

"What about the man who discovered the process?" asked Chambers, as he touched the bottle gingerly.

"He is not available. Surely what one chemist can do, others can? You will not have to work alone. You can hire the biggest men in the line to help you—expense is no object."

"No, it wouldn't be, if such a process could be worked out. Let me see, whom can we get? Doctor Seaton is probably the best man in the country for such a research, but I don't think that we can get him. I tried to get him to work on the iridium-osmium problem, but he refused.

"We might make an offer big enough to get him."

"No. Don't mention it to him," with a significant look. "He's to know nothing about it."

"Well, then, how about DuQuesne, who was in here yesterday? He's probably next to Seaton."

"I took it up with him yesterday. We can't get him, his figures are entirely out of reason. Aren't there any other men in the country who know anything? You are a good man, why don't you tackle it yourself?"

"Because I don't know anything about that particular line of research, and I want to keep on living awhile longer," the chemist replied bluntly. "There are other good men whom I can get, however. Van Schravendyck, of our own laboratory, is nearly as good as either Seaton or DuQuesne. He has done a lot of work on radio-activity and that sort of thing, and I think he would like to work on it."

"All right. Please get it started without delay. Give him about a quarter of the solution and have the rest put in the vault. Be sure that his laboratory is set up far enough away from everything else to avoid trouble in case of an explosion, and caution him not to work on too much copper at once. I gather that an ounce or so will be plenty."

THE chemist went back to his laboratory and sought his first assistant.

"Van," he began, "Mr. Brookings has been listening to some lunatic who claims to have solved the mystery of liberating intra-atomic energy."

"That's old stuff," the assistant said, laughing. "That and perpetual motion are always with us. What did you tell him?"

"I didn't get a chance to tell him anything—he told me. Yesterday, you know, he asked me what would happen if it could be liberated, and I answered truthfully that lots of things would happen, and volunteered the information that it was impossible. Just now he called me in, gave me this bottle of solution, saying that it contained the answer to the puzzle, and wanted me to work it out. I told him that it was out of my line and that I was afraid of it—which I would be if I thought there was anything in it—but that it was more or less in your line, and he said to put you on it right away. He also said that expense was no object; to set up an independent laboratory a hundred miles off in the woods, to be safe in case of an explosion; and to caution you not to use too much copper at once—that an ounce or so would be plenty!"

"An ounce! Ten thousand tons of nitroglycerin! I'll say an ounce would be plenty, if the stuff is any good at all, which of course it isn't. Queer, isn't it, how the old man would fall for anything like that? How did he explain the failure of the discoverer to develop it himself?"

"He said the discoverer is not available," answered Chambers with a laugh. "I'll bet he isn't available—he's back in St. Elizabeth's again by this time, where he came from. I suggested that we get either Seaton or DuQuesne of Rare Metals to help us on it, and he said that they had both refused to touch it, or words to that effect. If those two turned down a chance to work on

a thing as big as this would be, there probably is nothing in this particular solution that is worth a rap. But what Brookings says goes, around here, so it's you for the woods. And don't take any chances, either—it is conceivable that something might happen."

"Sure it might, but it won't. We'll set up that lab near a good trout stream, and I'll have a large and juicy vacation. I'll work on the stuff a little, too—enough to make a good report, at least. I'll analyze it, find out what is in it, deposit it on some copper, shoot an electrolytic current through it, and make a lot of wise motions generally, and have a darn good time besides."

CHAPTER III

Seaton Solves the Problem of Power

"**W**ELL, Mart," said Seaton briskly, "now that the Seaton-Crane Company, Engineers, is organized to your satisfaction, let's hop to it. I suppose I'd better beat it downtown and hunt up a place to work?"

"Why not work here?"

"Your house? You don't want this kind of experimenting going on around here, do you? Suppose a chunk of the stuff gets away from me and tears the side out of the house?"

"This house is the logical place to work. I already have a complete machine shop and testing laboratory out in the hangar, and we can easily fit up a chemical laboratory for you up in the tower room. You can have open windows on four sides there, and if you should accidentally take out the wall there will be little damage done. We will be alone here, with the few neighbors so thoroughly accustomed to my mechanical experiments that they are no longer curious."

"Fine. There's another good thing, too. Your man Shiro. He's been with you in so many tight pinches in all the unknown corners of the world on your hunting trips and explorations that we can trust him, and he'll probably come in handy."

"Yes, we can trust him implicitly. As you know, he is really my friend instead of my man."

During the next few days, while workmen were installing a complete chemical laboratory in the tower room, Seaton busied himself in purchasing the equipment necessary for the peculiar problem before him. His list was long and varied, ranging from a mighty transformer, capable of delivering thousands of kilovolts down to a potentiometer, so sensitive that it would register the difference of potential set up by two men in shaking hands.

From daylight until dark Seaton worked in the laboratory, either alone or superintending and assisting the men at work there. Every night when Crane went to bed he saw Seaton in his room in a haze of smoke, poring over blueprints or, surrounded by abstruse works upon the calculus and sub-atomic phenomena, making interminable calculations.

Less than two miles away lived Dorothy Vaneman, who had promised to be his wife. He had seen her but once since "the impossible" had happened, since his

prosaic copper steam-bath had taken flight under his hand and pointed the way to a great adventure. In a car his friend was to build, moved by this stupendous power which he must learn to control, they would traverse interstellar space—visit strange planets and survey strange solar systems.

While he did not forget his sweetheart—the thought of her was often in his mind, and the fact that her future was so intimately connected with his own gave to every action a new meaning—he had such a multitude of things to do and was so eager to get them all done at once that day after day went by and he could not find time to call upon her.

Crane remonstrated in vain. His protests against Seaton's incessant work had no effect. Seaton insisted that he *must* fix firmly just a few more points before they eluded him, and stuck doggedly to his task.

Finally, Crane laid his work aside and went to call upon the girl. He found her just leaving home, and fell into step beside her. For awhile she tried to rouse herself to be entertaining, or at least friendly, but the usual ease with which she chatted had deserted her, and her false gayety did not deceive the keen-minded Crane for an instant. Soon the two were silent as they walked along together. Crane's thoughts were on the beautiful girl beside him, and on the splendid young genius under his roof, so deeply immersed in his problem that he was insensible to everything else.

"I HAVE just left Dick," Crane said suddenly, and paying no attention to her startled glance. "Did you ever in your life see anyone with his singleness of purpose? With all his brilliance, one idea at a time is all that he seems capable of—though that is probably why he is such a genius. He is working himself insane. Has he told you about leaving the Bureau?"

"No. Has he? Has it anything to do with what happened that day at the laboratory? I haven't seen him since the accident, or discovery, whichever it was, happened. He came to see me at half-past ten, when he was invited for dinner—oh, Martin, I had been so angry!—and he told such a preposterous story, I've been wondering since if I didn't dream it."

"No, you didn't dream it, no matter how wild it sounded. He said it, and it is all true. I cannot explain it to you; Dick himself cannot explain it, even to me. But I can give you an idea of what we both think it may come to."

"Yes, do."

"Well, he has discovered something that makes copper act mighty queer—knocks it off its feet, so to speak. That day a piece went up and never did come down."

"Yes, that is what is so preposterous!"

"Just a moment, please," replied the imperturbable Crane. "You should know that nothing ordinary can account for Dick's behavior, and after what I have seen this last week I shall never again think anything preposterous. As I said, this piece of copper departed, *via* the window, for scenes unknown. As far as a pair of good binoculars could follow it, it held to a perfectly straight course toward those scenes. We intend to follow it in some suitable vehicle."

He paused, looking at his companion's face, but she did not speak.

"Building the conveyance is where I come in," he continued in his matter-of-fact voice. "As you know, I happen to have almost as much money as Dick has brains, and some day, before the summer is over, we expect to go somewhere. We do not know where, but it will be a long way from this earth."

There was a silence, then Dorothy said, helplessly:

"Well, go on . . . I can't understand. . . ."

"Neither can I. All I know is that Dick wants me to build a heavy steel hull, and he is going to put something inside it that will take us out into space. Only occasionally do I see a little light as he tries to explain the mechanism of the thing to me."

After enjoining upon her the strictest secrecy he repeated the story that Seaton had told him, and informed her as to the present condition of affairs.

"It's no wonder the other chemists thought he was crazy, is it, Martin?"

"No, especially after the failure of his demonstration the next morning. You see, he tried to prove to the others that he was right, and nothing happened. He has found out since that an electrical machine in another room, which was not running that morning, played a very important part. When the copper refused to act as it had the night before they all took the snap judgment that he had suffered an attack of temporary insanity, and that the solution was worthless. They called him 'Nobody Holme'."

"It almost fits, at that!" exclaimed Dorothy, laughing.

"But if he thought of that," she added, thoughtfully, "if he was brilliant enough to build up such a wonderful theory . . . think out such a thing as actually traveling to the stars . . . all on such a slight foundation of fact . . . I wonder why he couldn't have told me?"

She hadn't meant to utter the last thought. Nobody must know how being left out of it had hurt her, and she would have recalled the words if she could. Crane understood, and answered loyally.

"He will tell you all about it very soon, never fear. His is the mind of a great scientist, working on a subject of which but very few men have even an inkling. I am certain that the only reason he thought of me is that he could not finance the investigation alone. Never think for an instant that his absorption implies a lack of fondness for you. You are his anchor, his only hold on known things. In fact, it was about this that I came to see you. Dick is working himself at a rate that not even a machine can stand. He eats hardly anything, and if he sleeps at all, I have never caught him at it. That idea is driving him day and night, and if he goes on the way he is going, it means a breakdown. I do not know whether you can make him listen to reason or not—certainly no one else can. If you think you can do it, that is to be your job, and it will be the biggest one of the three."

"How well you understand him," Dorothy said, after a pause. "You make me feel ashamed, Martin. I should have known without being told. Then I wouldn't have had these nasty little doubts about him."

"I should call them perfectly natural, considering the circumstances," he answered. "Men with minds like Dick's are rare. They work on only one track. Your part will be hard. He will come to you, bursting with news and aching to tell you all about his theories and facts and calculations, and you must try to take his mind off the whole thing and make him think of something else. It looks impossible to me."

THE smile had come back to Dorothy's face. Her head, graced by its wealth of gleaming auburn hair, was borne proudly, and glancing mischief lit her violet eyes.

"Didn't you just tell me nothing is impossible? You know, Martin, that I can make Dicky forget everything, even interstellar—did I get that word right?—space itself, with my violin."

"Trying to beguile a scientist from his hobby is comparable only to luring a drug addict away from his vice . . . but I would not be surprised if you could do it," he slowly replied.

For he had heard her play. She and Seaton had been caught near his home by a sudden shower while on horseback, and had dashed in for shelter. While the rain beat outside and while Shiro was preparing one of his famous suppers, Crane had suggested that she pass the time by playing his "fiddle." Dorothy realized, with the first sweep of the bow, that she was playing a Stradivarius, the like of which she had played before only in her dreams. She forgot her listeners, forgot the time and the place, and poured out in her music all the beauty and tenderness of her nature. Soft and full the tones filled the room, and in Crane's vision there rose a home filled with happy work, with laughter and companionship, with playing children who turned their faces to their mother as do flowers to the light. Sensing the girl's dreams as the music filled his ears, he realized as never before in his busy, purposeful life how beautiful a home with the right woman could be. No thought of love for Dorothy entered his mind, for he knew that the love existing between her and his friend was of the kind that nothing could alter, but he felt that she had unwittingly given him a great gift. Often thereafter in his lonely hours he had imagined that dream-home, and nothing less than its perfection would ever satisfy him.

For a time they walked on in silence. On Dorothy's face was a tender look, the reflection of her happy thoughts, and in Crane's mind floated again the vision of his ideal home, the home whose central figure he was unable to visualize. At last she turned and placed her hand on his arm.

"You have done a great deal for me—for us," she said simply. "I wish there were something I could do for you in return."

"You have already done much more than that for me, Dorothy," he answered, more slowly even than usual. "It is hard for me to express just what it is, but I want you to know that you and Dick mean much to me. . . . You are the first real woman I have ever known, and some day, if life is good to me, I hope to have some girl as lovely care for me."

Dorothy's sensitive face flushed warmly. So unexpected and sincere was his praise that it made her feel both proud and humble. She had never realized that this quiet, apparently unimaginative man had seen all the ideals she expressed in her music. A woman expects to appear lovely to her lover, and to the men who would be her lovers if they could, but here was a man who neither sought nor expected any favors, saying that he wanted some girl as lovely for his own. Truly it was a compliment to be cherished.

After they had returned to the house and Crane had taken his departure, Dorothy heard the purr of a rapidly approaching motorcycle, and her heart leaped as she went to the door to welcome her lover.

"It seems like a month since I saw you last, sweetheart!" he exclaimed, as he lifted her clear from the floor in a passionate embrace and kissed in turn her lips, her eyes, the tip of her nose, the elusive dimple in her cheek, and the adorable curve of her neck.

"It seems longer than that to me, Dicky. I was perfectly miserable until Martin called this afternoon and explained what you have been doing."

"Yes, I met him on the way over. But honestly, Dottie, I simply couldn't get away. I wanted to, the worst way, but everything went so slow. . . ."

"Slow? When you have a whole laboratory installed in a week? What would you call speed?"

"About two days. And then, there were a lot of little ideas that had to be nailed down before they got away from me. This is a horribly big job, Dottie, and when a fellow gets into it he can't quit. But you know that I love you just the same, even though I do appear to neglect you," he continued with fierce intensity. "I love you with everything there is in me. I love you, mind, body and spirit; love you as a man should love the one and only woman. For you are the only woman, there never was and never will be another. I love you morally, physically, intellectually, and every other way there is, for the perfect little darling that you are."

She moved in his embrace and her arms tightened about his neck.

"You are the nearest thing to absolute perfection that ever came into this imperfect world," he continued. "Just to think of a girl of your sheer beauty, your ability, your charm, your all-round perfection, being engaged to a thing like *me*, makes me dizzy—but I sure do love you, little girl of mine. I will love you as long as we live, and afterward, my soul will love your soul throughout eternity. You know that, sweetheart girl."

"Oh, Dick!" she whispered, her soul shaken with response to his love. "I never dreamed it possible for a woman to love as I love you. 'Whither thou goest . . .'"

Her voice failed in the tempest of her emotion, and they clung together in silence.

They were finally interrupted by Dorothy's stately and gracious mother, who came in to greet Seaton and invite him to have dinner with them.

"I knew that Dot would forget such an unimportant matter," she said, with a glint of Dorothy's own mischief in her eyes.

AS they went into the dining-room Dorothy was amazed to see the changes that six days had

wrought in Seaton. His face looked thin, almost haggard. Fine lines had made their appearance at the corners of his eyes and around his mouth, and faint but unmistakable blue rings encircled his eyes.

"You have been working too hard, boy," she reproved him gravely.

"Oh, no," he rejoined lightly. "I'm all right, I never felt better. Why, I could whip a rattlesnake right now, and give him the first bite!"

She laughed at his reply, but the look of concern did not leave her face. As soon as they were seated at the table she turned to her father, a clean-cut, gray-haired man of fifty, known as one of the shrewdest attorneys in the city.

"Daddy," she demanded, "what do you mean by being elected director in the Seaton-Crane Company and not telling me anything about it?"

"Daughter," he replied in the same tone, "what do you mean by asking such a question as that? Don't you know that it is a lawyer's business to get information, and to give it out only to paying clients? However, I can tell you all I know about the Seaton-Crane Company without adding to your store of knowledge at all. I was present at one meeting, gravely voted 'aye' once, and that is all."

"Didn't you draw up the articles of incorporation?"

"I am doing it, yes; but they don't mean anything. They merely empower the Company to do anything it wants to, the same as other large companies do." Then, after a quick but searching glance at Seaton's worn face and a warning glance at his daughter, he remarked:

"I read in the *Star* this evening that Euright and Stanwix will probably make the Australian Davis Cup team, and that the Hawaiian with the unpronounceable name has broken three or four more world's records. What do you think of our tennis chances this year, Dick?"

Dorothy flushed, and the conversation, steered by the lawyer into the safer channels, turned to tennis, swimming, and other sports. Seaton, whose plate was unobtrusively kept full by Mr. Vaneman, ate such a dinner as he had not eaten in weeks. After the meal was over they all went into the spacious living-room, where the men ensconced themselves in comfortable Morris chairs with long, black cigars between their teeth, and all four engaged in a spirited discussion of various topics of the day. After a time, the older couple left the room, the lawyer going into his study to work, as he always did in the evening.

"Well, Dicky, how's everything?" Dorothy asked, unthinkingly.

The result of this innocent question was astonishing. Seaton leaped to his feet. The problem, dormant for two hours, was again in complete possession of his mind.

"Rotten!" he snapped, striding back and forth and brandishing his half-smoked cigar. "My head is so thick that it takes a thousand years for an idea to filter into it. I should have the whole thing clear by this time, but I haven't. There's something, some little factor, that I can't get. I've almost had it a dozen times, but it always gets away from me. I know that the

force is there and I can liberate it, but I can't work out a system of control until I can understand exactly why it acts the way it does." Then, more slowly, thinking aloud rather than addressing the girl:

"The force is attraction toward all matter, generated by the vibrations of all the constituent electrons in parallel planes. It is directed along a line perpendicular to the plane of vibration at its center, and approaches infinity as the angle theta approaches the limit of Pi divided by two. Therefore, by shifting the axis of rotation or the plane of vibration, thus making theta vary between the limits of zero and Pi divided by two . . ."

He was interrupted by Dorothy, who, mortified by her thoughtlessness in getting him started, had sprung up and seized him by the arm.

"Sit down, Dicky!" she implored. "Sit down, you're rocking the boat! Save your mathematics for Martin. Don't you know that I could never find out why 'x' was equal to 'y' or to anything else in algebra?"

She led him back to his chair, where he drew her down to a seat on the arm beside him.

"Whom do you love?" she whispered gayly in his ear.

After a time she freed herself.

"I HAVEN'T practised today. Don't you want me to play for you a little?"

"Fine business, Dottie. When you play a violin, it talks."

She took down her violin and played; first his favorites, crashing selections from operas and solos by the great masters, abounding in harmonies on two strings. Then she changed to reveries and soft, plaintive melodies. Seaton listened with profound enjoyment. Under the spell of the music he relaxed, pushed out the footrest of the chair, and lay back at ease, smoking dreamily. The cigar finished and his hands at rest, his eyes closed of themselves. The music, now a crooning lullaby, grew softer and slower, until his deep and regular breathing showed that he was sound asleep. She stopped playing and sat watching him intently, her violin in readiness to play again, if he should show the least sign of waking, but there was no such sign. Freed from the tyranny of the mighty brain which had been driving it so unmercifully, his body was making up for many hours of lost sleep.

Assured that he was really asleep, Dorothy tip-toed to her father's study and quietly went in.

"Daddy, Dick is asleep out there in the chair. What shall we do with him?"

"Good work, Dottie Dimple. I heard you playing him to sleep—you almost put me to sleep as well. I'll get a blanket and we'll put him to bed right where he is."

"Dear old Dad," she said softly, sitting on the arm of his chair and rubbing her cheek against his. "You always did understand, didn't you?"

"I try to, Kitten," he answered, pulling her ear. "Seaton is too good a man to see go to pieces when it can be prevented. That is why I signalled you to keep the talk off the company and his work. One of the

best lawyers I ever knew, a real genius, went to pieces that same way. He was on a big, almost an impossible, case. He couldn't think of anything else, didn't eat or sleep much for months. He won the case, but it broke him. But he wasn't in love with a big, red-headed beauty of a girl, and so didn't have her to fiddle him to sleep.

"Well, I'll go get the blanket," he concluded, with a sudden change in his tone.

In a few moments he returned and they went into the living-room together. Seaton lay in exactly the same position, only the regular lifting of his powerful chest showing that he was alive.

"I think we had better . . ."

"Sh . . . sh," interrupted the girl in an intense whisper. "You'll wake him up, Daddy."

"Bosh! You couldn't wake him up with a club. His own name might rouse him, particularly if you said it; no other ordinary sound would. I started to say that I think we had better put him to bed on the davenport. He would be more comfortable."

"But that would surely wake him. And he's so big . . ."

"Oh, no, it wouldn't, unless I drop him on the floor. And he doesn't weigh much over two hundred, does he?"

"About ten or eleven pounds."

"Even though I am a lawyer, and old and decrepit, I can still handle that much."

With Dorothy anxiously watching the proceeding and trying to help, Vaneman picked Seaton up out of the chair, with some effort, and carried him across the room. The sleeping man muttered as if in protest at being disturbed, but made no other sign of consciousness. The lawyer then calmly removed Seaton's shoes and collar, while the girl arranged pillows under his head and tucked the blanket around him. Vaneman bent a quizzical glance upon his daughter, under which a flaming blush spread from her throat to her hair.

"Well," she said, defiantly, "I'm going to, anyway."

"My dear, of course you are. If you didn't, I would disown you."

As her father turned away, Dorothy knelt beside her lover and pressed her lips tightly to his.

"Good night, sweetheart," she murmured.

"'Night," he muttered in his sleep, as his lips responded faintly to her caress.

Vaneman waited for his daughter, and when she appeared, the blush again suffusing her face, he put his arm around her.

"Dorothy," he said at the door of her room, using her full name, a very unusual thing for him, "the father of such a girl as you are hates to lose her, but I advise you to stick to that boy. Believe in him and trust him, no matter what happens. He is a real man."

"I know it, Dad . . . thank you. I had a touch of the blues today, but I never will again. I think more of his little finger than I do of all the other men I ever knew, put together. But how do you know him so well? I know him, of course, but that's different."

"I have various ways of getting information. I know Dick Seaton better than you do—better than he knows

himself. I have known all about every man who ever looked at you twice. I have been afraid once or twice that I would have to take a hand, but you saw them right, just as you see Seaton right. For some time I have been afraid of the thought of your marrying, the young men in your social set are such a hopeless lot, but I am not any more. When I hand my little girl over to her husband next October I can be really happy with you, instead of anxious for you. That's how well I know Richard Seaton. . . . Well, good night, daughter mine."

"Good night, Daddy dear," she replied, throwing her arms around his neck. "I have the finest Dad a girl ever had, and the finest . . . boy. Good night."

IT was three o'clock the following afternoon when Seaton appeared in the laboratory. His long rest had removed all the signs of overwork and he was his alert, vigorous self, but when Crane saw him and called out a cheery greeting he returned it with a sheepish smile.

"Don't say anything, Martin—I'm thinking it all, and then some. I made a regular fool of myself last night. Went to sleep in a chair and slept seventeen hours without a break. I never felt so cheap in my life."

"You were worn out, Dick, and you know it. That sleep put you on your feet again, and I hope you will have sense enough to take care of yourself after this. I warn you now, Dick, that if you start any more of that midnight work I will simply call Dorothy over here and have her take charge of you."

"That's it, Mart, rub it in. Don't you see that I am flat on my back, with all four paws in the air? But I'm going to sleep every night. I promised Dottie to go to bed not later than twelve, if I have to quit right in the middle of an idea, and I told her that I was coming out to see her every other evening and every Sunday. But here's the dope. I've got that missing factor in my theory—got it while I was eating breakfast this afternoon.

"If you had eaten and slept regularly here and kept yourself fit you would have seen it before."

"Yes, I guess that's right, too. If I miss a meal or a sleep from now on I want you to sand-bag me. But never mind that. Here's the explanation. We doped out before, you know, that the force is something like magnetism, and is generated when the coil causes the electrons of this specially-treated copper to vibrate in parallel planes. The knotty point was what could be the effect of a weak electric current in liberating the power. I've got it! It shifts the plane of vibration of the electrons!"

"It is impossible to shift that plane, Dick. It is fixed by physical state, just as speed is fixed by temperature."

"No, it isn't. That is, it usually is, but in this case it may be shifted. Here's the mathematical proof."

So saying, Seaton went over to the drafting table, tacked down a huge sheet of paper, and sketched rapidly, explaining as he drew. Soon the two men were engaged in a profound mathematical argument. Sheet

after sheet of paper was filled with equations and calculations, and the table was covered with reference books. After two hours of intense study and hot discussion Crane's face took on a look of dawning comprehension, which changed to amazement and then to joy. For the first time in Seaton's long acquaintance with him, his habitual calm was broken.

"By George!" he cried, shaking Seaton's hand in both of his. "I think you have it! But how under the sun did you get the idea? That calculus isn't in any of the books. Where did you get it? Dick, you're a wonder!"

"I don't know how I got the idea, it merely came to me. But that Math is right—it's *got* to be right, no other conclusion is possible. Now, if that calc. is right, and I know it is, do you see how narrow the permissible limits of shifting are? Look at equation 236. Believe me, I sure was lucky, that day in the Bureau. It's a wonder I didn't blow up the whole works. Suppose I hadn't been working with a storage cell that gave only four amperes at two volts? That's unusually low, you know, for that kind of work."

CRANE carefully studied the equation referred to and figured for a moment.

"In that case the limit would be exactly eight watts. Anything above that means instant decomposition?"

"Yes."

Crane whistled, a long, low whistle.

"And that bath weighed forty pounds—enough to vaporize the whole planet. Dick, it cannot be possible."

"It doesn't seem that way, but it is. It certainly makes me turn cold all over, though, to think of what might have happened. You know now why I wouldn't touch the solution again until I had this stuff worked out?"

"I certainly do. You should be even more afraid of it now. I don't mind nitroglycerin or T.N.T., but anything like that is merely a child's plaything compared to this. Perhaps we had better drop it?"

"Not in seven thousand years. The mere fact that I was so lucky at first proves that Fate intended this thing to be my oyster. However, I'll not tempt the old lady any farther. I'm going to start with one millionth of a volt, and will use a piece of copper visible only under a microscope. But there's absolutely no danger, now that we know what it is. I can make it eat out of my hand. Look at this equation here, though. That being true, it looks as though you could get the same explosive effect by taking a piece of copper which had once been partially decomposed and subjecting it to some force, say an extremely heavy current. Again under the influence of the coil, a small current would explode it, wouldn't it?"

"It looks that way, from those figures."

"Say, wouldn't that make some bullet? Unstabilize a piece of copper in that way and put it inside a rifle bullet, arranged to make a short circuit on impact. By making the piece of copper barely visible you could have the explosive effect of only a few sticks of dynamite—a piece the size of a pea would obliterate New York City. But that's a long way from our flying-machine."

"Perhaps not so far as you think. When we explore new worlds it might be a good idea to have a liberal supply of such ammunition, of various weights, for emergencies."

"It might, at that. Here's another point in equation 249. Suppose the unstabilized copper were treated with a very weak current, not strong enough to explode it? A sort of borderline condition? The energy would be liberated, apparently, but in an entirely new way. Wonder what would happen? I can't see from the theory—have to work it out. And here's another somewhat similar condition, right here, that will need investigating. I've sure got a lot of experimental work ahead of me before I'll know anything. How're things going with you?"

"I have the drawings and blue-prints of the ship itself done, and working sketches of the commercial power-plant. I am working now on the details, such as navigating instruments, food, water, and air supplies, special motors, and all of the hundred and one little things that must be taken into consideration. Then, as soon as you get the power under control, we will have only to sketch in the details of the power-plant and its supports before we can begin construction."

"Fine, Mart, that's great. Well, let's get busy!"

CHAPTE IV

Steel Liberates Energy—Unexpectedly

DUQUESNE was in his laboratory, poring over an abstruse article in a foreign journal of science, when Scott came breezily in with a newspaper in his hand, across the front page of which stretched great headlines.

"Hello, Blackie!" he called. "Come down to earth and listen to this tale of mystery from that world-renowned fount of exactitude and authority, the *Washington Clarion*. Some miscreant has piled up and touched off a few thousand tons of T.N.T. and picric acid up in the hills. Read about it, it's good."

Duquesne read:

MYSTERIOUS EXPLOSION!

MOUNTAIN VILLAGE WIPED OUT OF EXISTENCE!
TWO HUNDRED DEAD, NONE INJURED!

FORCE FELT ALL OVER WORLD. CAUSE UNKNOWN.
SCIENTISTS BAFFLED.

HARPER'S FERRY, March 26.—At 10:23 A.M., today, the village of Bankerville, about thirty miles north of this place, was totally destroyed by an explosion of such terrific violence that seismographs all over the world recorded the shock, and that windows were shattered even in this city. A thick pall of dust and smoke was observed in the sky and parties set out immediately. They found, instead of the little mountain village, nothing except an immense, crater-like hole in the ground, some two miles in diameter and variously estimated at from two to three thousand feet deep. No sur-

vivors have been found, no bodies have been recovered. The entire village, with its two hundred inhabitants, has been wiped out of existence. Not so much as a splinter of wood or a fragment of brick from any of the houses can be found. Scientists are unable to account for the terrific force of the explosion, which far exceeded that of the most violent explosive known.

"Hm . . . m. That sounds reasonable, doesn't it?" asked DuQuesne, sarcastically, as he finished reading.

"It sure does," replied Scott, grinning. "What'd you suppose it was? Think the reporter heard a tire blow out on Pennsylvania Avenue?"

"Perhaps. Nothing to it, anyway," as he turned back to his work.

As soon as the visitor had gone a sneering smile spread over DuQuesne's face and he picked up his telephone.

"The food did it. That will cure him of sucking eggs!" he muttered. "Operator? DuQuesne speaking. I am expecting a call this afternoon. Please ask him to call me at my house. . . . Thank you."

"Fred," he called to his helper, "if anyone wants me, tell them that I have gone home."

He left the building and stepped into his car. In less than half an hour he arrived at his house on Park Road, overlooking beautiful Rock Creek Park. Here he lived alone save for an old colored couple who were his servants.

In the busiest part of the afternoon Chambers rushed unannounced into Brookings' private office. His face was white as chalk.

"Read that, Mr. Brookings!" he gasped, thrusting the *Clarion* extra into his hand.

Brookings read the news of the explosion, then looked at his chief chemist, his face turning gray.

"Yes, sir, that was our laboratory," said Chambers, dully.

"The fool! Didn't you tell him to work with small quantities?"

"I did. He said not to worry, that he was taking no chances, that he would never have more than a gram of copper on hand at once in the whole laboratory."

"Well . . . I'll . . . be . . . damned!" Slowly turning to the telephone, Brookings called a number and asked for Dotcor DuQuesne, then called another.

"Brookings speaking. I would like to see you this afternoon. Will you be at home? . . . I'll be there in about an hour. Good bye."

WHEN Brookings arrived he was shown into DuQuesne's study. The two men shook hands perfunctorily and sat down, the scientist waiting for the other to speak.

"Well, DuQuesne, you were right. Our man couldn't handle it. But of course you didn't mean the terms you mentioned before?"

DuQuesne's lips smiled; a hard, cold smile.

"You know what I said, Brookings. Those terms are now doubled, twenty thousand and ten million. Nothing else goes."

"I expected it, since you never back down. The Corporation expects to pay for its mistakes. We accept your terms and I have contracts here for your services as research director, at a salary of two hundred and forty thousand dollars per annum, with the bonus and royalties you demand."

DuQuesne glanced over the documents and thrust them into his pocket.

"I'll go over these with my attorney to-night, and mail one back to you if he approves the contract. In the meantime, we may as well get down to business."

"What would you suggest?" asked Brookings.

"You people stole the solution, I see . . ."

"Don't use such harsh language, Doctor, it's . . ."

"Why not? I'm for direct action, first, last and all the time. This thing is too important to permit of mincing words or actions, it's a waste of time. Have you the solution here?"

"Yes, here it is," drawing the bottle from his pocket.

"Where's the rest of it?" asked DuQuesne as he noted the size of the bottle.

"All that we found is here, except about a teaspoonful which the expert had to work on," replied Brookings. "We didn't get it all, only half of it. The rest of it was diluted with water, so that it wouldn't be missed. After we get started, if you find it works out satisfactorily, we can procure the rest of it. That will certainly cause a disturbance, but it may be necessary. . . ."

"Half of it!" interrupted DuQuesne. "You haven't one-twentieth of it here. When I saw it in the Bureau, Seaton had about five hundred milliliters—over a pint—of it. I wonder if you're double-crossing me again?"

"No, you're not," he continued, paying no attention to the other's protestations of innocence. "You're paying me too much to want to block me now. The crook you sent out to get the stuff turned in only this much. Do you suppose he is holding out on us?"

"No. You know Perkins and his methods."

"He missed the main bottle, then. That's where your methods make me tired. When I want anything done, I believe in doing it myself, then I know it's done right. As to what I suggest, that's easy. I will take three or four of Perkins' gunmen tonight. We'll go out there and raid the place. We'll shoot Seaton and anybody else who gets in the way. We'll dynamite the safe and take their solution, plans, notes, money, and anything else we want."

"No, no, Doctor, that's too crude altogether. If we have to do that, let it be only as a last resort."

"I say do it first, than we know we will get results. I tell you I'm afraid of pussyfooting and gumshoeing around Seaton and Crane. I used to think that Seaton was easy, but he seems to have developed greatly in the last few weeks, and Crane never was anybody's fool. Together they make a combination hard to beat. Brute force, applied without warning, is our best bet, and there's no danger, you know that. We've got away clean with lots worse stuff."

"It's always dangerous, and we could wink at such tactics only after everything else has failed. Why not work it out from this solution we have, and then quietly

get the rest of it? After we have it worked out, Seaton might get into an accident on his motorcycle, and we could prove by the state of development of our plans that we discovered it long ago."

"Because developing the stuff is highly dangerous, as you have found out. Even Seaton wouldn't have been alive now if he hadn't had a lot of luck at the start. Then, too, it would take too much time. Seaton has already developed it—you see, I haven't been asleep and I know what he has done, just as well as you do—and why should we go through all that slow and dangerous experimental work when we can get their notes and plans as well as not? There is bound to be trouble anyway when we steal all their solution, even though they haven't missed this little bit of it yet, and it might as well come now as any other time. The Corporation is amply protected, and I am still a Government chemist. Nobody even suspects that I am in on this deal. I will never see you except after hours and in private, and will never come near your offices. We will be so cautious that, even if anyone should get suspicious, they can't possibly link us together, and until they do link us together, we are all safe. No, Brookings, a raid in force is the only sure and safe way. What is more natural than a burglary of a rich man's house? It will be a simple affair. The police will stir around for a few days, then it will all be forgotten and we can go ahead. Nobody will suspect anything except Crane, if he is alive, and he won't be able to do anything."

So the argument raged. Brookings was convinced that DuQuesne was right in wanting to get possession of all the solution, and also of the working notes and plans, but would not agree to the means suggested, holding out for quieter and more devious, but less actionable methods. Finally he ended the argument with a flat refusal to countenance the raid, and the scientist was forced to yield, although he declared that they would have to use his methods in the end, and that it would save time, money, and perhaps lives, if they were used first. Brookings then took from his pocket his wireless and called Perkins. He told him of the larger bottle of solution, instructing him to secure it and to bring back all plans, notes, and other material he could find which in any way pertained to the matter in hand. Then, after promising DuQuesne to keep him informed of developments, and giving him an instrument similar to the one he himself carried, Brookings took his leave.

SEATON had worked from early morning until late at night, but had rigorously kept his promise to Dorothy. He had slept seven or eight hours every night and had called upon her regularly, returning from the visits with ever-keener zest for his work.

Late in the afternoon, upon the day of the explosion, Seaton stepped into Crane's shop with a mass of notes in his hand.

"Well, Mart, I've got it—some of it, at least. The power is just what we figured it, so immensely large as to be beyond belief. I have found:

"First: That it is a practically irresistible *pull* along the axis of the treated wire or bar. It is apparently focused at infinity, as near-by objects are not affected.

"Second: I have studied two of the border-line regions of current we discussed. I have found that in one the power is liberated as a similar attractive force, but is focused upon the first object in line with the axis of the bar. As long as the current is applied it remains focused upon that object, no matter what comes between. In the second border-line condition the power is liberated as a terrific repulsion.

"Third: That the copper is completely transformed into available energy, there being no heat whatever liberated.

"Fourth: Most important of all, that the X acts only as a catalyst for the copper and is not itself consumed, so that an infinitesimally thin coating is all that is required."

"You certainly have found out a great deal about it," replied Crane, who had been listening with the closest attention, a look of admiration upon his face. "You have all the essential facts right there. Now we can go ahead and put in the details which will finish up the plans completely. Also, one of those points solves my hardest problem, that of getting back to the earth after we lose sight of it. We can make a small bar in that border-line condition and focus it upon the earth, and we can use that repulsive property to ward off any meteorites which may come too close to us."

"That's right. I never thought of using those points for anything. I found them out incidentally, and merely mentioned them as interesting facts. I have a model of the main bar built, though, that will lift me into the air and pull me all around. Want to see it work?"

"I certainly do."

As they were going out to the landing field, Shiro called to them and they turned back to the house, learning that Dorothy and her father had just arrived.

"Hello, boys!" Dorothy said, bestowing her radiant smile upon them both as Seaton seized her hand. "Dad and I came out to see that you were taking care of yourselves, and to see what you are doing. Are visitors allowed?"

"No," replied Seaton promptly. "All visitors are barred. Members of the firm and members of the family, however, are not classed as visitors.

"You came at the right time," said Crane, smiling. "Dick has just finished a model, and was about to demonstrate it to me when you arrived. Come with us and watch the . . ."

"I object," interrupted Seaton. "It is a highly undignified performance as yet, and . . ."

"Objection overruled," interposed the lawyer, decisively. "You are too young and impetuous to have any dignity; therefore, any performance not undignified would be impossible, *a priori*. The demonstration will proceed."

LAUGHING merrily, the four made their way to the testing shed, in front of which Seaton donned a heavy leather harness, buckled about his shoulders, body and legs; to which were attached numerous handles, switches, boxes and other pieces of apparatus. He snapped the switch which started the Tesla coil in the shed and pressed a button on an instrument in his

hand, attached to his harness by a small steel cable. Instantly there was a creak of straining leather and he shot vertically into the air for perhaps a hundred feet, where he stopped and remained motionless for a few moments. Then the watchers saw him point his arm and dart in the direction in which he pointed. By merely pointing, apparently, he changed his direction at will; going up and down, forward and backward, describing circles and loops and figures of eight. After a few minutes of this display he descended, slowing up abruptly as he neared the ground and making an easy landing.

"There, oh beauteous lady and esteemed sirs," he began, with a low bow and a sweeping flourish—when there was a snap, and he was jerked sidewise off his feet. In bowing, his cumbersome harness had pressed the controlling switch and the instrument he held in his hand, which contained the power-plant, or bar, had torn itself loose from its buckle. Instead of being within easy reach of his hand it was over six feet away, and was dragging him helplessly after it, straight toward the high stone wall! But only momentarily was he helpless, his keen mind discovering a way out of the predicament even as he managed to scramble to his feet in spite of the rapid pace. Throwing his body sidewise and reaching out his long arm as far as possible toward the bar, he succeeded in swinging it around so that he was running back toward the party and the spacious landing field. Dorothy and her father were standing motionless, staring at Seaton; the former with terror in her eyes, the latter in blank amazement. Crane had darted to the switch controlling the coil, and was reaching for it when Seaton passed them.

"Don't touch that switch!" he yelled. "I'll catch that thing yet!"

At this evidence that Seaton still thought himself master of the situation, Crane began to laugh, though he still kept his hand near the controlling switch. Dorothy, relieved of her fear for her lover's safety, could not help but join him, so ludicrous were Seaton's antics. The bar was straight out in front of him, about five feet above the ground, going somewhat faster than a man could run. It turned now to the right, now to the left, as his weight was thrown to one side or the other. Seaton, dragged along like a small boy trying to hold a runaway calf by the tail, was covering the ground in prodigious leaps and bounds; at the same time pulling himself up, hand over hand, to the bar in front of him. He soon reached it, seized it in both hands, again darted into the air, and descended lightly near the others, who were rocking with laughter.

"I said it would be undignified," chuckled Seaton, rather short of breath, "but I didn't know just how much so it was going to be."

Dorothy tucked her fingers into his hand.

"Are you hurt anywhere, Dick?"

"Not a bit. He led me a great chase, though."

"I was scared to death until you told Martin to let the switch alone. But it *was* funny then! I hadn't noticed your resemblance to a jumping-jack before. Won't you do it again sometime and let us take a movie of it?"

"That was as good as any show in town, Dick," said the lawyer, wiping his eyes, "but you must be more careful. Next time, it might not be funny at all."

"There will be no next time for this rig," replied Seaton. "This is merely to show us that our ideas are all right. The next trip will be in a full-scale, completely-equipped boat."

"It was perfectly wonderful," declared Dorothy. "I know this first flight of yours will be a turning-point or something in history. I don't pretend to understand how you did it—the sight of you standing still up there in the air made me wonder if I really were awake, even though I knew what to expect—but we wouldn't have missed it for worlds, would we, Dad?"

"No. I am very glad that we saw the first demonstration. The world has never before seen anything like it, and you two men will rank as two of the greatest discoverers."

"Seaton will, you mean," replied Crane, uncomfortably. "You know I didn't have anything to do with it."

"It's nearly all yours," denied Seaton. "Without your ideas I would have lost myself in space in my first attempt."

"You are both wrong," said Vaneman. "You, Martin, haven't enough imagination; and you, Dick, have altogether too much, for either of you to have done this alone. The honor will be divided equally between you."

HE turned to Crane as Dorothy and Seaton set out toward the house.

"What are you going to do with it, commercially? Dick, of course, hasn't thought of anything except this space-car—equally of course, you have?"

"Yes. Knowing the general nature of the power and confident that Dick would control it, I have already drawn up sketches for a power-plant installation of five hundred thousand electrical horsepower, which will enable us to sell power for less than one-tenth of a cent per kilowatt-hour and still return twenty percent annual dividends. However, the power-plant comes after the flyer."

"Why? Why not build the power-plant first, and take the pleasure trip afterward?"

"There are several reasons. The principal one is that Dick and I would rather be off exploring new worlds, while the other members of the Seaton-Crane Company, Engineers, build the power-plant."

During the talk the men had reached the house, into which the others had disappeared some time before. Upon Crane's invitation, Vaneman and his daughter stayed to dinner, and Dorothy played for awhile upon Crane's wonderful violin. The rest of the evening was spent in animated discussion of the realization of Seaton's dreams of flying without wings and beyond the supporting atmosphere. Seaton and Crane did their best to explain to the non-technical visitors how such flight was possible.

"Well, I am beginning to understand it a little," said Dorothy finally. "In plain language, it is like a big magnet or something, but different. Is that it?"

"That's it exactly," Seaton assured her.

"What are you going to call it? It isn't like any-

thing else that ever was. Already this evening you have called it a bus, a boat, a kite, a star-hound, a wagon, an aerial-flivver, a sky-chariot, a space-eating wampus, and I don't know what else. Even Martin has called it a vehicle, a ship, a bird, and a shell. What is its real name?"

"I don't know. It hasn't got any that I know of. What would you suggest, Dottie?"

"I don't know what general name should be applied to them, but for this one there is only one possible name, 'The Skylark.'"

"Exactly right, Dorothy," said Crane.

"Fine!" cried Seaton. "And you shall christen it, Dottie, with a big Florence flask full of absolute vacuum. 'I christen you "The Skylark." BANG!'"

As the guests were leaving, at a late hour, Vaneman said:

"Oh, yes, I bought an extra *Clarion* as we came out. It tells a wild tale of an explosion so violent that science cannot explain it. I don't suppose it is true, but it may make interesting reading for you two scientific sharps. Good night."

Seaton accompanied Dorothy to the car, bidding her a more intimate farewell on the way. When he returned, Crane, with an unusual expression of concern on his face, handed him the paper without a word.

"WHAT'S up, old man? Something in it?" he asked, as he took the paper. He fell silent as he read the first words, and after he had read the entire article he said slowly:

"True, beyond a doubt. Even a *Clarion* reporter couldn't imagine that. It's an intra-atomic energy, all right—some poor devil trying our stunt without my horseshoe in his pocket."

"Think, Dick! Something is wrong somewhere. You know that two people did not discover X at the same time. The answer is that somebody stole your idea, but the idea is worthless without the X. You say that the stuff is extremely rare—where did they get it?"

"That's right, Mart, I never thought of that. The stuff is extremely rare. I am supposed to know something about rare metals, and I never heard of it before—there isn't even a gap in the Periodic System in which it belongs. I would bet a hat that we have every milligram known to the world at present."

"Well, then," said the practical Crane, "we had better see whether or not we have all we started with."

Asking Shiro to bring the large bottle from the vault, he opened the living-room safe and brought forth the small vial. The large bottle was still nearly full, the seal upon it unbroken. The vial was apparently exactly as Seaton had left it after he had made his bars.

"Our stuff seems to be all there," said Crane. "It looks as though someone else has discovered it also."

"I don't believe it," said Seaton, their positions now reversed. "It's altogether too rare."

He scanned both bottles narrowly.

"I can tell by taking the densities," he added, and ran up to the laboratory, returning with a Westphal balance in his hand. After testing both solutions he said slowly:

"Well, the mystery is solved. The large bottle has a specific gravity of 1.80, as it had when I prepared it; that in the vial reads only 1.41. Somebody has burglarized this safe and taken almost half of the solution, filling the vial up with colored water. The stuff is so strong that I probably never would have noticed the difference."

"But who could it have been?"

"Search me! But it's nothing to worry about now, anyway, because whoever it was is gone where he'll never do it again. He's taken the solution with him, too, so that nobody else can get it."

"I wish I were sure of that, Dick. The man who tried to do the research work is undoubtedly gone—but who is back of him?"

"Nobody, probably. Who would want to be?"

"To borrow your own phrase, Dick, Scott 'chirped it' when he called you 'Nobody Holme.' For a man with your brains you have the least sense of anybody I know. You know that this thing is worth, as a power project alone, thousands of millions of dollars, and that there are dozens of big concerns who would cheerfully put us both out of the way for a thousandth of that amount. The question is not to find one concern who might be backing a thing like that, but to pick out the one who is backing it."

AFTER thinking deeply for a few moments he went on:

"The idea was taken from your demonstration in the Bureau, either by an eye-witness or by someone who heard about it afterward, probably the former. Even though it failed, one man saw the possibilities. Who was that man? Who was there?"

"Oh, a lot of the fellows were there. Scott, Smith, Penfield, DuQuesne, Roberts—quite a bunch of them. Let's see—Scott hasn't brains enough to do anything. Smith doesn't know anything about anything except amines. Penfield is a pure scientist, who wouldn't even quote an authority without asking permission. DuQuesne is . . . hm-m . . . DuQuesne . . . he . . . I . . ."

"Yes, DuQuesne. I have heard of him. He's the big black fellow, about your own size? He has the brains, the ability, and the inclination, has he not?"

"Well, I wouldn't want to say that. I don't know him very well, and personal dislike is no ground at all for suspicion, you know."

"Enough to warrant investigation. Is there anyone else who might have reasoned it out as you did, and as DuQuesne possibly could?"

"Not that I remember. But we can count DuQuesne out, anyway, because he called me up this afternoon about some notes on gallium; so he is still in the Bureau. Besides, he wouldn't let anybody else investigate it if he got it. He would do it himself, and I don't think he would have blown himself up. I never did like him very well personally—he's such a cold, inhuman sort of a fish—but you've got to hand it to him for ability. He's probably the best man in the world today on that kind of thing."

"No, I do not think that we will count him out yet. He may have had nothing to do with it, but we will

have him investigated nevertheless, and will guard against future visitors here."

Turning to the telephone, he called the private number of a well-known detective.

"Prescott? Crane speaking. Sorry to get you out of bed, but I should like to have a complete report upon Dr. Marc C. DuQuesne, of the Rare Metals Laboratory, as soon as possible. Every detail for the last two weeks, every move and every thought if possible. Please keep a good man on him until further notice. . . . I wish you would send two or three guards out here right away, to-night; men you can trust and who will stay awake. . . . Thanks. Good night."

CHAPTER V Direct Action

SEATON and Crane spent some time developing the object-compass. Crane made a number of these instruments, mounted in gimbals, so that the delicate needles were free to turn in any direction whatever. They were mounted upon jeweled bearings, but bearings made of such great strength, that Seaton protested.

"What's the use, Mart? You don't expect a watch to be treated like a stone-crusher. That needle weighs less than half a gram. Why mount it as though it weighed twenty pounds?"

"To be safe. Remember the acceleration the Lark will be capable of, and also that on some other worlds, which we hope to visit, this needle will weigh more than it does here."

"That's right, Mart, I never thought of that. Anyway, we can't be too safe to suit me."

When the compasses were done and the power through them had been adjusted to one-thousandth of a watt, the lowest they could maintain with accuracy, they focused each instrument upon one of a set of most carefully weighed glass beads, ranging in size from a pin-head up to a large marble, and had the beads taken across the country by Shiro, in order to test the sensitiveness and accuracy of the new instruments. The first test was made at a distance of one hundred miles, the last at nearly three thousand. They found, as they had expected, that from the weight of the object and the time it took the needle to come to rest after being displaced from its line by a gentle tap of the finger, they could easily calculate the distance from the compass to the object. This fact pleased Crane immensely, as it gave him a sure means of navigation in space. The only objection to its use in measuring earthly distances was its extreme delicacy, the needle focused upon the smallest bead in the lot at a distance of three thousand miles coming to rest in little more than one second.

The question of navigation solved, the two next devoted themselves to perfecting the "X-plosive bullet," as Seaton called it. From his notes and equations Seaton calculated the weight of copper necessary to exert the explosive force of one pound of nitro-glycerin, and weighed out, on the most delicate assay-balance made, various fractions and multiples of this amount of the treated copper, while Crane fitted up the bullets of automatic-pistol cartridges to receive the charges and to explode them on impact.

They placed their blueprints and working notes in the safe, as usual, taking with them only those notes dealing with the object-compass and the X-plosive bullet, upon which they were still working. No one except Shiro knew that the original tracings, from which the blue-prints had been made, and their final, classified notes were always kept in the vault. They cautioned him and the three guards to keep a close watch until they returned. Then they set out in the biplane, to try out the new weapon in a lonely place where the exploding shells could do no damage.

THEY found that the X-plosive came fully up to expectations. The smallest charge they had prepared, fired by Crane at a great stump a full hundred yards away from the bare, flat-topped knoll that had afforded them a landing-place, tore it bodily from the ground and reduced it to splinters, while the force of the explosion made the two men stagger.

"She sure is big medicine!" laughed Seaton. "Wonder what a real one will do?" and drawing his pistol, he inserted a cartridge carrying a much heavier charge.

"Better be careful with the big ones," cautioned Crane. "What are you going to shoot at?"

"That rock over there," pointing to a huge boulder half a mile away across the small valley. "Want to bet me a dinner I can't hit it?"

"No. You forget that I saw you win the pistol trophy of the District."

The pistol cracked, and when the bullet reached its destination the great stone was obliterated in a vast ball of flame. After a moment there was a deafening report—a crash as though the world were falling to pieces. Both men were hurled violently backward, stumbling and falling flat. Picking themselves up, they looked across the valley at the place where the boulder had stood, to see only an immense cloud of dust, which slowly blew away, revealing a huge hole in the ground. They were silent a moment, awed by the frightful power they had loosed.

"Well, Mart," Seaton broke the silence, "I'll say those one-milligram loads are plenty big enough. If that'd been something coming after us—whether any possible other-world animal, a foreign battleship, or the mythical great sea-serpent himself, it'd be a good Indian now. Yes? No?"

"Yes. When we use the heavier charges we must use long-range rifles. Have you had enough demonstration or do you want to shoot some more?"

"I've had enough, thanks. That last rock I bounced off of was no pillow, I'll tell the world. Besides, it looks as though I'd busted a leg or two off of our noble steed with my shot, and we may have to walk back home."

An examination of the plane, which had been moved many feet and almost overturned by the force of the explosion, revealed no damage that they could not repair on the spot, and dusk saw them speeding through the air toward the distant city.

In response to a summons from his chief, Perkins silently appeared in Brookings' office, without his usual complacent smile.

"Haven't you done anything yet, after all this time?" demanded the magnate. "We're getting tired of this delay."

"I can't help it, Mr. Brookings," replied the subordinate. "They've got detectives from Prescott's all over the place. Our best men have been trying ever since the day of the explosion, but can't do a thing without resorting to violence. I went out there myself and looked them over, without being seen. There isn't a man there with a record, and I haven't been able so far to get anything on any one of them that we can use as a handle."

"No, Prescott's men are hard to do anything with. But can't you . . .?" Brookings paused significantly.

"I was coming to that. I thought one of them might be seen, and I talked to him a little, over the phone, but I couldn't talk loud enough without consulting you. I mentioned ten, but he held out for twenty-five. Said he wouldn't consider it at all, but he wants to quit Prescott and go into business for himself."

"Go ahead on twenty-five. We want to get action," said Brookings, as he wrote an order on the cashier for twenty-five thousand dollars in small-to-medium bills. "That is cheap enough, considering what DuQuesne's rough stuff would probably cost. Report tomorrow about four, over our private phone—no, I'll come down to the café, it's safer."

THE place referred to was the Perkins Café, a high-class restaurant on Pennsylvania Avenue, heavily patronized by the diplomatic, political, financial, and sporting circles of upper-class Washington. It was famous for its discreet waiters, and for the absolutely private rooms. Many of its patrons knew of its unique telephone service, in which each call went through such a devious system of relays that any attempt to trace it was hopeless; they knew that while "The Perkins" would not knowingly lend itself to any violation of law, it was an entirely safe and thoroughly satisfactory place in which to conduct business of the most secret and confidential character; a place from which one could enjoy personal conversation with persons to whom he wished to remain invisible and untraceable; a place which had never been known to "leak." For these reasons it was really the diplomatic and political center of the country, and over its secret wires had gone, in guarded language, messages that would have rocked the world had they gone astray. It was recognized that the place was occasionally, by its very nature, used for illegal purposes, but it was such a political, financial, and diplomatic necessity that it carried a "Hands Off" sign. It was never investigated by Congress and never raided by the police. Hundreds of telephone calls were handled daily. A man would come in, order something served in a private room, leave a name at the desk, and say that he was expecting a call. There the affair ended. The telephone operators were hand-picked, men of very short memories, carefully trained never to look at a face and never to remember a name or a number. Although the precaution was unnecessary, this shortness of memory was often encouraged by bills of various denominations.

No one except Perkins and the heads of the great

World Steel Corporation knew that the urbane and polished proprietor of the café was a criminal of the blackest kind, whose liberty and life itself were dependent upon the will of the Corporation; or that the restaurant was especially planned and maintained as a blind for its underground activities; or that Perkins was holding a position which suited him exactly and which he would not have given up for wealth or glory—that of being the guiding genius who planned nefarious things for the men higher up, and saw to it that they were carried out by the men lower down. He was in constant personal touch with his superiors, but in order to avoid any chance of betrayal he never saw his subordinates personally. Not only were they entirely ignorant of his identity, but all possible means of their tracing him had been foreseen and guarded against. He called them on the telephone, but they never called him. The only possible way in which any of his subordinates could get in touch with him was by means of the wonderful wireless telephone already referred to, developed by a drug-crazed genius who had died shortly after it was perfected. It was a tiny instrument, no larger than a watch, but of practically unlimited range. The controlling central station of the few instruments in existence, from which any instrument could be cut out, changed in tune, or totally destroyed at will, was in Perkins' office safe. A man intrusted with an unusually important job would receive from an unknown source an instrument, with directions sufficient for its use. As soon as the job was done he would find, upon again attempting to use the telephone, that its interior was so hopelessly wrecked that not even the most skilled artisan could reproduce what it had once been.

AT four o'clock Brookings was ushered into the private office of the master criminal, who was plainly ill at ease.

"I've got to report another failure, Mr. Brookings. It's nobody's fault, just one of those things that couldn't be helped. I handled this myself. Our man left the door unlocked and kept the others busy in another room. I had just started to work when Crane's Japanese servant, who was supposed to be asleep, appeared upon the scene. If I hadn't known something about jiu-jitsu myself, he'd have broken my neck. As it was, I barely got away, with the Jap and all three guards close behind me. . . ."

"I'm not interested in excuses," broke in the magnate, angrily. "We'll have to turn it over to DuQuesne after all unless you get something done, and get it done quick. Can't you get to that Jap some way?"

"Certainly I can. I never yet saw the man who couldn't be reached, one way or another. I've had 'Silk' Humphreys, the best fixer in the business, working on him all day, and he'll be neutral before night. If the long green won't quiet him—and I never saw a Jap refuse it yet—a lead pipe will. Silk hasn't reported yet, but I expect to hear from him any minute now, through our man out there."

As he spoke, the almost inaudible buzzer in his pocket gave a signal.

"There he is now," said Perkins, as he took out his

wireless instrument. "You might listen in and hear what he has to say."

Brookings took out his own telephone and held it to his ear.

"Hello," Perkins spoke gruffly into the tiny transmitter. "What've you got on your chest?"

"Your foot slipped on the Jap," the stranger replied. "He crabbed the game right. Slats and the big fellow put all the stuff into the box, told us to watch it until they get back tonight—they may be late—then went off in Slats' ship to test something—couldn't find out what. Silk tackled the yellow boy, and went up to fifty grand, but the Jap couldn't see him at all. Silk started to argue, and the Jap didn't do a thing but lay him out, cold. This afternoon, while the Jap was out in the grounds, three stick-up men jumped him. He bumped one of them off with his hands and the others with his gat—one of those big automatics that throw a slug like a cannon. None of us knew he had it. That's all, except that I am quitting Prescott right now. Anything else I can do for you, whoever you are?"

"No. Your job's done."

The conversation closed. Perkins pressed the switch which reduced the interior of the spy's wireless instrument to a fused mass of metal, and Brookings called DuQuesne on the telephone.

"I would like to talk to you," he said. "Shall I come there or would you rather come to my office?"

"I'll come there. They're watching this house. They have one man in front and one in back, a couple of detectaphones in my rooms here, and have coupled onto this telephone.

"Don't worry," he continued calmly as the other made an exclamation of dismay. "Talk ahead as loud as you please—they can't hear you. Do you think that those poor, ignorant flat feet can show me anything about electricity? I'd shoot a jolt along their wires that would burn their ears off if it weren't my cue to act the innocent and absorbed scientist. As it is, their instruments are all registering dense silence. I am deep in study right now, and can't be disturbed!"

"Can you get out?"

"Certainly. I have that same private entrance down beside the house wall and the same tunnel I used before. I'll see you in about fifteen minutes."

IN Brookings' office, DuQuesne told of the constant surveillance over him.

"They suspect me on general principles, I think," he continued. "They are apparently trying to connect me with somebody. I don't think they suspect you at all, and they won't unless they get some better methods. I have devices fitted up to turn the lights off and on, raise and lower the windows, and even cast shadows at certain times. The housekeeper knows that when I go to my library after dinner, I have retired to study, and that it is as much as anyone's life is worth to disturb me. Also, I am well known to be firmly fixed in my habits, so it's easy to fool those detectives. Last night I went out and watched them. They hung around a couple of hours after my lights went out, then walked off together. I can dodge them any time and have all

my nights free without their ever suspecting anything."

"Are you free tonight?"

"Yes. The time-switches are all set, and as long as I get back before daylight, so they can see me get up and go to work, it will be all right."

Brookings told him briefly of the failures to secure the solution and the plans, of the death of the three men sent to silence Shiro, and of all the other developments. DuQuesne listened, his face impassive.

"Well," he said as Brookings ceased, "I thought you would bull it, but not quite so badly. But there's no use whining now. I can't use my original plan of attack in force, as they are prepared and might be able to stand us off until the police could arrive."

He thought deeply for a time, then said, intensely:

"If I go into this thing, Brookings, I am in absolute command. Everything goes as I say. Understand?"

"Yes. It's up to you, now."

"All right, I think I've got it. Can you get me a Curtiss biplane in an hour, and a man about six feet tall who weighs about a hundred and sixty pounds? I want to drive the plane myself, and have the man, dressed in full leathers and hood, in the passenger's seat, shot so full of chloroform or dope that he will be completely unconscious for at least two hours."

"Easy. We can get you any kind of plane you want in an hour, and Perkins can find a man of that description who would be glad to have a dream at that price. But what's the idea? . . . Pardon me, I shouldn't have asked that," he added, as the saturnine chemist shot him a black look from beneath his heavy brows.

Well, within the hour, DuQuesne drove up to a private aviation field and found awaiting him a Curtiss biplane, whose attendant jumped into an automobile and sped away as he approached. He quickly donned a heavy leather suit, similar to the one Seaton always wore in the air, and drew the hood over his face. Then, after a searching look at the lean form of the unconscious man in the other seat, he was off, the plane climbing swiftly under his expert hand. He took a wide circle to the west and north.

Soon Shiro and the two guards, hearing the roar of an approaching airplane, looked out and saw what they supposed to be Crane's biplane coming down with terrific speed in an almost vertical nose-dive, as though the driver were in an extremity of haste. Flattening out just in time to avert destruction it taxied up the field almost to the house. The watchers saw a man recognizable as Seaton by his suit and his unmistakable physique stand up and wave both arms frantically, heard him shout hoarsely ". . . all of you . . . out here," saw him point to Crane's apparently lifeless form and slump down in his seat. All three ran out to help the unconscious aviators, but just as they reached the machine there were three silenced reports and the three men fell to the ground. DuQuesne leaped lightly out of the machine and looked narrowly at the bodies at his feet. He saw that the two detectives were dead, but found with some chagrin that the Japanese still showed faint signs of life. He half drew his pistol to finish the job, but observing that the victim was probably fatally wounded he thrust it back into its holster and

went on into the house. Drawing on rubber gloves he rapidly blew the door off the safe with nitro-glycerin and took out everything it contained. He set aside a roll of blueprints, numerous notebooks, some money and other valuables, and a small vial of solution—but of the larger bottle there was no trace. He then ransacked the entire house, from cellar to attic, with no better success. So cleverly was the entrance to the vault concealed in the basement wall that he failed to discover it.

"I might have expected this of Crane," he thought, half aloud, "after all the warning that fool Brookings persisted in giving him. This is the natural result of his nonsense. The rest of the solution is probably in the safest safe-deposit vault in the United States. But I've got their plans and notes, and enough solution for the present. I'll get the rest of it when I want it—there's more than one way to kill any cat that ever lived!"

Returning to the machine, DuQuesne calmly stepped over the bodies of the detectives and the unconscious form of the dying Japanese, who was uttering an occasional groan. He started the engine and took his seat. There was an increasing roar as he opened the throttle, and soon he descended upon the field from which he had set out. He noted that there was a man in an automobile at some distance from the hangar, evidently waiting to take care of the plane and his still unconscious passenger. Rapidly resuming his ordinary clothing, he stepped into his automobile and was soon back in his own rooms, poring over the blueprints and notebooks.

SEATON and Crane both felt that something was wrong when they approached the landing field and saw that the landing-lights were not burning, as they always were kept lighted whenever the plane was abroad after dark. By the dim light of the old moon Crane made a bumpy landing and they sprang from their seats and hastened toward the house. As they neared it they heard a faint moan and turned toward the sound, Seaton whipping out his electric torch with one hand and his automatic pistol with the other. At the sight that met their eyes, however, he hastily replaced the weapon and bent over Shiro, a touch assuring him that the other two were beyond the reach of help. Silently they picked up the injured man and carried him gently into his own room, barely glancing at the wrecked safe on the way. Seaton applied first-aid treatment to the ghastly wound in Shiro's head, which both men supposed to be certainly fatal, while Crane called a noted surgeon, asking him to come at once. He then telephoned the coroner, the police, and finally Prescott, with whom he held a long conversation.

Having done all in their power for the unfortunate man, they stood at his bedside, their anger all the more terrible for the fact that it was silent. Seaton stood with every muscle tense. He was seething with rage, his face purple and his eyes almost emitting sparks, his teeth clenched until the muscles of his jaws stood out in bands and lumps. His right hand, white-knuckled, gripped the butt of his pistol, while under his left the

brass rail of the bed slowly bent under the intensity of his unconscious muscular effort. Crane stood still, apparently impassive, but with his face perfectly white and with every feature stern and cold as though cut from marble. Seaton was the first to speak.

"Mart," he gritted, his voice husky with fury, "a man who would leave another man alone to die after giving him that, ain't a man—he's a thing. If Shiro dies and we can ever find out who did it I'll shoot him with the biggest explosive charge I've got. No, I won't, either, that'd be too sudden. I'll take him apart with my bare hands."

"We will find him, Dick," Crane replied in a level, deadly voice entirely unlike his usual tone. "That is one thing money can do. We will get him if money, influence, and detectives can do it."

The tension was relieved by the arrival of the surgeon and his two nurses, who set to work with the machine-like rapidity and precision of their highly-specialized craft. After a few minutes, the work completed, the surgeon turned to the two men who had been watching him so intently, with a smile upon his clean-shaven face.

"Merely a scalp wound, Mr. Crane," he stated. "He should recover consciousness in an hour or so." Then, breaking in upon Seaton's exclamation, "It looks much worse than it really is. The bullet glanced off the skull instead of penetrating it, stunning him by the force of the blow. There are no indications that the brain is affected in any way, and while the affected area of the scalp is large, it is a clean wound and should heal rapidly. He will probably be up and around in a couple of days, and by the time his hair grows again, he will not be able to find a scar."

As he took his leave, the police and coroner arrived. After making a thorough investigation, in which they learned what had been stolen and shrewdly deduced the manner in which the robbery had been accomplished, they departed, taking with them the bodies. They were authorized by Crane to offer a reward of one million dollars for information leading to the arrest and conviction of the murderer. After everyone except the nurses had gone, Crane showed them the rooms they were to occupy while caring for the wounded man. As the surgeon had foretold, Shiro soon recovered consciousness. After telling his story he dropped into a deep sleep, and Seaton and Crane, after another telephonic conference with Prescott, retired for the rest of the night.

CHAPTER VI

The Object-Compass at Work

PRESCOTT, after a sleepless night, joined Seaton and Crane at breakfast.

"What do you make of it, Mr. Prescott?" asked Crane. "Seaton here thinks it was DuQuesne, possibly acting for some foreign power, after our flying-machine to use in war. I think it was some big industrial concern after our power-plant. What is your opinion?"

"I haven't any," replied the great detective after a moment. "Either guess may be true, although I am almost positive that Dr. DuQuesne had nothing to do

with it, either way. It was no ordinary burglary, that is certain from Shiro's story. It was done by someone who had exact information of your movements and habits. He chose a time when you were away, probably not so much from fear of you as because it was only in your absence that he could succeed as he did in getting all the guards out at once where he could handle them. He was a man with one accomplice or who worked alone, and who was almost exactly Seaton's size and build. He was undoubtedly an expert, as he blew the safe and searched the whole house without leaving a finger-print or any other clue, however slight, that I can find—a thing I have never before seen done in all my experience."

"His size should help in locating him," declared Crane. "While there are undoubtedly thousands of men of Dick's six-feet-one and two-fifths, they are fairly well scattered, are they not?"

"Yes, they are, but his very size only makes it worse. I have gone over all the records I could, in the short time I have had, and can't find an expert of that class with anywhere near that description."

"How about the third guard, the one who escaped?" asked Seaton.

"He wasn't here. It was his afternoon off, you know, and he said that he wouldn't come back into this job on a bet—that he wasn't afraid of anything ordinary, but he didn't like the looks of things out here. That sounded fishy to me, and I fired him. He may have been the leak, of course, though I have always found him reliable before. If he did leak, he must have got a whale of a slice for it. He is under constant watch, and if we can ever get anything on him, I will nail him to the cross. But that doesn't help get this affair straightened out. I haven't given up, of course, there are lots of things not tried yet, but I must admit that temporarily, at least, I am up a stump."

"Well," remarked Seaton, "that million-dollar reward will bring him in, sure. No honor that ever existed among thieves, or even among free-lances of diplomacy, could stand that strain."

"I'm not so sure of that, Dick," said Crane. "If either one of our ideas is the right one, very few men would know enough about the affair to give pertinent information, and they probably would not live long enough to enjoy the reward very thoroughly. Even a million dollars fails in that case."

"I rather agree with Mr. Crane, Seaton. If it were an ordinary affair—and I am as sure it is not as the police are that it is—a reward of that size would get us our man within two days. As it is, I doubt very much that the reward will do us any good. I'm afraid that it will never be claimed."

"Wonder if the Secret Service could help us out? They'd be interested if it should turn out to be some foreign power."

"I took it up with the Chief himself, just after it happened last night. He doesn't think that it can be a foreign country. He has their agents pretty well spotted, and the only one that could fill the bill—you know a man with that description and with the cold nerve to do the job would be apt to be known—was in

San Francisco, the time this job was pulled off."

"THE more you talk, the more I am convinced that it was DuQuesne himself," declared Seaton, positively. "He is almost exactly my size and build, is the only man I know of who could do anything with the solution after he got it, and he has nerve enough to do anything."

"I would like to think it was DuQuesne," replied the detective, thoughtfully, "but I'm afraid we'll have to count him out of it entirely. He has been under the constant surveillance of my best men ever since you mentioned him. We have detectaphones in his rooms, wires on his telephone, and are watching him night and day. He never goes out except to work, never has any except unimportant telephone calls, and the instruments register only the occasional scratching of a match, the rustle of papers, and other noises of a man studying. He's innocent."

"That may be true," assented Seaton doubtfully, "but you want to remember that he knows more about electricity than the guy that invented it, and I'm not sure that he can't talk to a detectaphone and make it say anything he wants it to. Anyway, we can soon settle it. Yesterday I made a special trip down to the Bureau, with some notes as an excuse, to set this object-compass on him," taking one of the small instruments from his pocket as he spoke. "I watched him a while last night, then fixed an alarm to wake me if the needle moved much, but it pointed steady all night. See! It's moving now. That means that he is going to work early, as usual. Now I'm morally certain that he's mixed up in this thing somewhere, and I'm not convinced that he isn't slipping one over on your men some way—he's a clever devil. I wonder if you wouldn't take this compass and watch him yourself tonight, just on general principles? Or let me do it. I'd be glad to. I say 'tonight' because if he did get the stuff here he didn't deliver it anywhere last night. It's just a chance, of course, but he may do it tonight."

After the compass had been explained to the detective he gladly consented to the plan, declaring that he would willingly spend the time just to watch such an unheard-of instrument work. After another hour of fruitless discussion Prescott took his leave, saying that he would mount an impregnable guard from that time on.

Late that evening Prescott joined the two men who were watching DuQuesne's house. They reported that all was perfectly quiet, as usual. The scientist was in his library, the instruments registering only the usual occasional faint sounds of a man absorbed in study. But after an hour of waiting, and while the microphones made a noise as of rustling papers, the needle of the compass moved. It dipped slowly toward the earth as though DuQuesne were descending into the cellar, but at the same time the shadow of his unmistakable profile was thrown upon the window shade as he apparently crossed the room.

"Can't you hear him walk?" demanded Prescott.

"No. He has heavy Turkish rugs all over the library, and he always walks very lightly, besides."

PRESCOTT watched the needle in amazement as it dipped deeper and deeper, pointing down into the earth almost under his feet and then behind him, as though DuQuesne had walked beneath him. He did not, could not, believe it. He was certain that something had gone wrong with the strange instrument in his hand, nevertheless he followed the pointing needle. It led him beside Park Road, down the hill, straight toward the long bridge which forms one entrance to Rock Creek Park. Though skeptical, Prescott took no chances, and as he approached the bridge he left the road and concealed himself behind a clump of trees, from which point of vantage he could see the ground beneath the bridge as well as the roadway. Soon the bridge trembled under the weight of a heavy automobile going toward the city at a high rate of speed. He saw DuQuesne, with a roll of papers under his arm, emerge from under the bridge just in time to leap aboard the automobile, which slowed down only enough to enable him to board it in safety. The detective noticed that the car was a Pierce-Arrow limousine—a car not common, even in Washington—and rushed out to get its number, but the license plates were so smeared with oil and dust that the numbers could not be read by the light of the tail lamp. Glancing at the compass in his hand he saw that the delicate needle was now pointing steadily at the fleeing car, and all doubts as to the power of the instrument were dispelled. He rejoined his men, informed them that DuQuesne had eluded them, and took one of them up the hill to a nearby garage. There he engaged a fast car and set out in pursuit, choosing the path for the chauffeur by means of the compass. His search ended at the residence of Brookings, the General Manager of the great World Steel Corporation. Here he dismissed the car and watched the house while his assistant went to bring out the fast motorcycle used by Prescott when high speed was desirable.

After four hours a small car bearing the license number of a distant state—which was found, by subsequent telegraphing, to be unknown to the authorities of that state—drove under the porte-cochère, and the hidden watcher saw DuQuesne, without the papers, step into it. Knowing now what to expect, Prescott drove his racing motorcycle at full speed out to the Park Road Bridge and concealed himself beneath the structure, in a position commanding a view of the concrete abutment through which the scientist must have come. Soon he heard a car slow down overhead, heard a few rapid footfalls, and saw the dark form of a large man outlined against the gray face of the abutment. He saw the man lift his hand high above his head, and saw a black rectangle appear in the gray, engulf the man, and disappear. After a few minutes he approached the abutment and searched its face with the help of his flash-light. He finally succeeded in tracing the almost imperceptible crack which outlined the door, and the concealed button which DuQuesne had pressed to open it. He did not press the button, as it might be connected to an alarm. Deep in thought, he mounted his motorcycle and made his way to his home to get a few hours of sleep before reporting to Crane, whom

he was scheduled to see at breakfast next morning.

BOTH men were waiting for him when he appeared, and he noticed with pleasure that Shiro, with a heavily-bandaged head, was insisting that he was perfectly able to wait on the table instead of breakfasting in bed. He calmly proceeded to serve breakfast in spite of Crane's remonstrances, having ceremoniously ordered out of the kitchen the colored man who had been secured to take his place.

"Well, gentlemen," the detective began, "part of the mystery is straightened out. I was entirely wrong, and each of you were partly right. It was DuQuesne, in all probability. It is equally probable that a great company—in this case the World Steel Corporation—is backing him, though I don't believe there is a ghost of a show of ever being able to prove it in law. Your 'object-compass' did the trick."

He narrated all the events of the previous night.

"I'd like to send him to the chair for this job," said Seaton with rising anger. "We ought to shoot him anyway, damn him—I'm sorry duels have gone out of fashion, for I can't shoot him off-hand, the way things are now—I sure wish I could."

"No, you cannot shoot him," said Crane, thoughtfully, "and neither can I, worse luck. We are not in his class there. And you must not fight with him, either"—noting that Seaton's powerful hands had doubled into fists, the knuckles showing white through the tanned skin—"though that would be a fight worth watching and I would like to see you give him the beating of his life. A little thing like a beating is not a fraction of what he deserves and it would show him that we have found him out. No, we must do it legally or let him entirely alone. You think there is no hope of proving it, Prescott?"

"Frankly, I see very little chance of it. There is always hope, of course, and if that bunch of pirates ever makes a slip, we'll be right there waiting to catch 'em. While I don't believe in holding out false encouragement, they've never slipped yet. I'll take my men off DuQuesne, now that we've linked him up with Steel. It doesn't make any difference, does it, whether he goes to them every night or only once a week?"

"No."

"Then about all I can do is to get everything I can on that Steel crowd, and that is very much like trying to get blood out of a turnip. I intend to keep after them, of course, for I owe them something for killing two of my men here, as well as for other favors they have done me in the past, but don't expect too much. I have tackled them before, and so have police headquarters and even the Secret Service itself, under cover, and all that any of us has been able to get is an occasional small fish. We could never land the big fellows. In fact, we have never found the slightest material proof of what we are morally certain is the truth, that World Steel is back of a lot of deviltry all over the country. The little fellows who do the work either don't know anything or are afraid to tell. I'll see if I can find out what they are doing with the stuff they stole, but I'm not even sure of doing that. You can't

plant instruments on that bunch—it would be like trying to stick a pin into a sleeping cat without waking him up. They undoubtedly have one of the best corps of detectives in the world. You haven't perfected an instrument which enables you to see into a closed room and hear what is going on there, have you?" And upon being assured that they had not, he took his leave.

"Optimistic cuss, ain't he?" remarked Seaton.

"He has cause to be, Dick. World Steel is a soulless corporation if there ever was one. They have the shrewdest lawyers in the country, and they get away legally with things that are flagrantly illegal, such as freezing out competitors, stealing patents, and the like. Report has it that they do not stop at arson, treason, or murder to attain their ends, but as Prescott said, they never leave any legal proof behind them."

"Well, *we* should fret, anyway. Of course, a monopoly is what they're after, but they can't form one because they can't possibly get the rest of our solution. Even if they should get it, we can get more. It won't be as easy as this last batch was, since the X was undoubtedly present in some particular lot of platinum in extraordinary quantities, but now that I know exactly what to look for, I can find more. So they can't get their monopoly unless they kill us off. . . ."

"Exactly. Go on, I see you are getting the idea: If we should both conveniently die, they could get the solution from the company, and have the monopoly, since no one else can handle it."

"But they couldn't get away with it, Mart—never in a thousand years, even if they wanted to. Of course I am small fry, but you are too big a man for ever Steel to do away with. It can't be done."

"I am not so sure of that. Airplane accidents are numerous, and I am an aviator. Also, has it ever occurred to you that the heavy forging for the Skylark, ordered a while ago, are of steel?"

Seaton paused, dumbfounded, in the act of lighting his pipe.

"But thanks to your object-compass, we are warned," Crane continued, evenly. "Those forgings are going through the most complete set of tests known to the industry, and if they go into the Skylark at all it will be after I am thoroughly convinced that they will not give way on our first trip into space. But we can do nothing until the steel arrives, and with the guard Prescott has here now we are safe enough. Luckily, the enemy knows nothing of the object-compass or the X-plosive, and we must keep them in ignorance. Hereinafter, not even the guards get a look at anything we do."

"They sure don't. Let's get busy!"

DUQUESNE and Brookings met in conference in a private room of the Perkins Café.

"What's the good word, Doctor?"

"So-so," replied the scientist. "The stuff is all they said it was, but we haven't enough of it to build much of a power-plant. We can't go ahead with it, anyway, as long as Seaton and Crane have nearly all their original solution."

"No, we can't. We must find a way of getting it.

I see now that we should have done as you suggested, and taken it before they had warning and put it out of our reach."

"There's no use holding post-mortems. We've got to get it, some way, and everybody that knows anything about that new metal, how to get it or how to handle it, must die. At first, it would have been enough to kill Seaton. Now, however, there is no doubt that Crane knows all about it, and he probably has left complete instructions in case he gets killed in an accident—he's the kind that would. We will have to keep our eyes open and wipe out those instructions and anyone who has seen them. You see that, don't you?"

"Yes, I am afraid that is the only way out. We must have the monopoly, and anyone who might be able to interfere with it must be removed. How has your search for more X prospered?"

"About as well as I expected. We bought up all the platinum wastes we could get, and reworked all the metallic platinum and allied metals we could buy in the open market, and got less than a gram of X out of the whole lot. It's scarcer than radium. Seaton's finding so much of it at once was an accident, pure and simple—it couldn't happen once in a million years."

"Well, have you any suggestions as to how we can get that solution?"

"No. I haven't thought of anything but that very thing ever since I found that they had hidden it, and I can't yet see any good way of getting it. My forte is direct action and that fails in this case, since no amount of force or torture could make Crane reveal the hiding-place of the solution. It's probably in the safest safe-deposit vault in the country. He wouldn't carry the key on him, probably wouldn't have it in the house. Killing Seaton or Crane, or both of them, is easy enough, but it probably wouldn't get us the solution, as I have no doubt that Crane has provided for everything."

"Probably he has. But if he should disappear the stuff would have to come to light, or the Seaton-Crane Company might start their power-plant. In that case, we probably could get it?"

"Possibly, you mean. That method is too slow to suit me, though. It would take months, perhaps years, and would be devilishly uncertain, to boot. They'll know something is in the wind, and the stuff will be surrounded by every safeguard they can think of. There must be some better way than that, but I haven't been able to think of it."

"Neither have I, but your phrase 'direct action' gives me an idea. You say that that method has failed. What do you think of trying indirect action in the shape of Perkins, who is indirection personified?"

"Bring him in. He may be able to figure out something."

PERKINS was called in, and the main phases of the situation laid before him. The three men sat in silence for many minutes while the crafty strategist studied the problem. Finally he spoke.

"There's only one way, gentlemen. We must get a handle on either Seaton or Crane strong enough to

make them give up their bottle of dope, their plans, and everything. . . ."

"Handle!" interrupted DuQuesne, "You talk like a fool! You can't get anything on either of them."

"You misunderstand me, Doctor. You can get a handle of some kind on any living man. Not necessarily in his past, you understand—I know that anything like that is out of the question in this case—but in his future. With some men it is money, with others power, with others fame, with others women or some woman, and so on down the list. What can we use here? Money is out of the question, so are power and fame, as they already have both in plain sight. It seems to me that women would be our best chance."

"Bah!" snorted the chemist. "Crane has been chased by all the women of three continents so long that he's womanproof. Seaton is worse—he's engaged, and wouldn't realize that a woman was on his trail, even if you could find a better looking one to work on him than the girl he's engaged to—which would be a hard job. Cleopatra herself couldn't swing that order."

"Engaged? That makes it simple as A B C."

"Simple? In the devil's name, how?"

"Easy as falling off a log. You have enough of the dope to build a space-car from those plans, haven't you?"

"Yes. What has that to do with the case?"

"It has everything to do with it. I would suggest that we build such a car and use it to carry off the girl. After we have her safe we could tell Seaton that she is marooned on some distant planet, and that she will be returned to earth only after all the solution, all notes, plans, and everything pertaining to the new metal are surrendered. That will bring him, and Crane will consent. Then, afterward, Dr. Seaton may go away indefinitely, and if desirable, Mr. Crane may accompany him."

"But suppose they try to fight?" asked Brookings.

Perkins slid down into his chair in deep thought, his pale eyes under half-closed lids darting here and there, his stubby fingers worrying his watch-chain restlessly.

"Who is the girl?" he asked at last.

"Dorothy Vaneman, the daughter of the lawyer. She's that auburn-haired beauty that the papers were so full of when she came out last year."

"Vaneman is a director in the Seaton-Crane Company. That makes it still better. If they show fight and follow us, that beautiful car we are making for them will collapse and they will be out of the way. Vaneman, as Seaton's prospective father-in-law and a member of his company, probably knows something about the secret. Maybe all of it. With his daughter in a space-car, supposedly out in space, and Seaton and Crane out of the way, Vaneman would listen to reason and let go of the solution, particularly as nobody knows much about it except Seaton and Crane."

"That strikes me as a perfectly feasible plan," said Brookings. "But you wouldn't really take her to another planet, would you? Why not use an automobile or an airplane, and tell Seaton that it was a space-car?"

"I wouldn't advise that. He might not believe it, and they might make a lot of trouble. It must be a

real space-car even if we don't take her out of the city. To make it more impressive, you should take her away in plain sight of Seaton—no, that would be too dangerous, as I have found out from the police that Seaton has a permit to carry arms, and I know that he is one of the fastest men with a pistol in the whole country. Do it in plain sight of her folks, say, or a crowd of people; being masked, of course, or dressed in an aviator's suit, with the hood and goggles on. Take her straight up out of sight, then hide her somewhere until Seaton listens to reason. I know that he *will* listen, but if he doesn't, you might let him see you start out to visit her. He'll be sure to follow you in their rotten car. As soon as he does that, he's our meat. But that raises the question of who is going to drive the car?"

"I am," replied DuQuesne. I will need some help, though, as at least one man must stay with the girl while I bring the car back."

"We don't want to let anybody else in on this if we can help it," cautioned Brookings. "You could go along, couldn't you, Perkins?"

"Is it safe?"

"Absolutely," answered DuQuesne. "They have everything worked out to the queen's taste."

"That's all right, then, I'll take the trip. Also," turning to Brookings, "it will help in another little thing we are doing—the Spencer affair."

"Haven't you got that stuff away from her yet, after having had her locked up in that hell-hole for two months?" asked Brookings.

"No. She's stubborn as a mule. We've given her the third degree time after time, but it's no use."

"WHAT'S this?" asked DuQuesne. "Deviltry in the main office?"

"Yes. This Margaret Spencer claims that we swindled her father out of an invention and indirectly caused his death. She secured a position with us in search of evidence. She is an expert stenographer, and showed such ability that she was promoted until she became my secretary. Our detectives must have been asleep, as she made away with some photographs and drawings before they caught her. She has no real evidence, of course, but she might cause trouble with a jury, especially as she is one of the best-looking women in Washington. Perkins is holding her until she returns the stolen articles."

"Why can't you kill her off?"

"She cannot be disposed of until after we know where the stuff is, because she says, and Perkins believes, that the evidence will show up in her effects. We must do something about her soon, as the search for her is dying down and she will be given up for dead."

"What's the idea about her and the space-car?"

"If the car proves reliable we might actually take her out into space and give her the choice between telling and walking back. She has nerve enough here on earth to die before giving up, but I don't believe any human being would be game to go it alone on a strange world. She'd wilt."

"I believe you're right, Perkins. Your suggestions are the best way out. Don't you think so, Doctor?"

"Yes, I don't see how we can fail—we're sure to win, either way. You are prepared for trouble afterward, of course?"

"Certainly, but I don't think there will be much trouble. They can't possibly link the three of us together. They aren't wise to you, are they, Doctor?"

"Not a chance!" sneered DuQuesne. "They ran themselves ragged trying to get something on me, but they couldn't do it. They have given me up as a bad job. I am still as careful as ever, though—I am merely a pure scientist in the Bureau of Chemistry!"

All three laughed, and Perkins left the room. The talk then turned to the construction of the space-car. It was decided to rush the work on it, so that DuQuesne could familiarize himself with its operation, but not to take any steps in the actual abduction until such time as Seaton and Crane were nearly ready to take their first flight, so that they could pursue the abductors in case Seaton was still obdurate after a few days of his fiancée's absence. DuQuesne insisted that the car should mount a couple of heavy guns, to destroy the pursuing car if the faulty members should happen to hold together long enough to carry it out into space.

After a long discussion, in which every detail of the plan was carefully considered, the two men left the restaurant, by different exits.

CHAPTER VII The Trial Voyage

THE great steel forgings which were to form the framework of the Skylark finally arrived and were hauled into the testing shed. There, behind closed doors, Crane inspected every square inch of the massive members with a lens, but could find nothing wrong. Still unsatisfied, he fitted up an electrical testing apparatus in order to search out flaws which might be hidden beneath the surface. This device revealed flaws in every piece, and after thoroughly testing each one and mapping out the imperfections he turned to Seaton with a grave face.

"Worse than useless, every one of them. They are barely strong enough to stand shipment. They figured that we would go slowly until we were well out of the atmosphere, then put on power—then something would give way and we would never come back."

"That's about the right dope, I guess. But now what'll we do? We can't cancel without letting them know we're onto them, and we certainly can't use this stuff."

"No, but we will go ahead and build this ship, anyway, so that they will think that we are going ahead with it. At the same time we will build another one, about four times this size, in absolute secrecy, and . . ."

"What d'you mean, absolute secrecy? How can you keep steel castings and forgings of that size secret from Steel?"

"I know a chap who owns and operates a small steel plant, so insignificant, relatively, that he has not yet been bought out or frozen out by Steel. I was able to do him a small favor once, and I am sure that he will be glad to return it. We will not be able to oversee

the work, that is a drawback. We can get MacDougall to do it for us, however, and with him doing the work we can rest assured that there will be nothing off color. Even Steel couldn't buy *him*."

"MacDougall! The man who installed the Inter-continental plant? He wouldn't touch a little job like this with a pole!"

"I think he would. He and I are rather friendly, and after I tell him all about it he will be glad to take it. It means building the first interplanetary vessel, you know."

"Wouldn't Steel follow him up if he should go to work on a mysterious project? He's too big to hide."

"No. He will go camping—he often does. I have gone with him several times when we were completely out of touch with civilization for two months at a time. Now, about the ship we want. Have you any ideas?"

"It will cost more than our entire capital."

"That is easily arranged. We do not care how much it costs."

Seaton began to object to drawing so heavily upon the resources of his friend, but was promptly silenced.

"I told you when we started," Crane said flatly, "that your solution and your idea are worth far more than half a million. In fact, they are worth more than everything I have. No more talk of the money end of it, Dick."

"All right. We'll build a regular go-getter. Four times the size—she'll be a bear-cat, Mat. I'm glad this one is on the fritz. She'll carry a two-hundred-pound bar—Zowie! Watch our smoke! And say, why wouldn't it be a good idea to build an attractor—a thing like an object-compass, but mounting a ten-pound bar instead of a needle, so that if they chase us in space we can reach out and grab 'em? We might mount a machine-gun in each quadrant, shooting X-plosive bullets, through pressure gaskets in the walls. We should have something for defense—I don't like the possibility of having that gang of pirates after us, and nothing to fight back with except thought-waves."

"Right. We will do both those things. But we should make the power-plant big enough to avert any possible contingency—say four hundred pounds—and we should have everything in duplicate, from power-plant to push-buttons."

"I don't think that's necessary, Mart. Don't you think that's carrying caution to extremes?"

"Possibly—but I would rather be a live coward than a dead hero, wouldn't you?"

"You chirped it, old scout, I sure would. I never did like the looks of that old guy with the scythe, and I would hate to let DuQuesne feel that he had slipped something over on me at my own game. Besides, I've developed a lot of caution myself, lately. Double she is, with a skin of four-foot Norwegian armor. Let's get busy!"

THEY made the necessary alteration in the plans, and in a few days work was begun upon the huge steel shell in the little mountain steel-plant. The work was done under the constant supervision of the great MacDougall, by men who had been in his employ for

years and who were all above suspicion. While it was being built Seaton and Crane employed a force of men and went ahead with the construction of the space-car in the testing shed. While they did not openly slight the work nearly all their time was spent in the house, perfecting the many essential things which were to go into the real Skylark. There was the attractor, for which they had to perfect a special sighting apparatus so that it could act in any direction, and yet would not focus upon the ship itself nor anything it contained. There were many other things.

It was in this work that the strikingly different temperaments and abilities of the two men were most clearly revealed. Seaton strode up and down the room, puffing great volumes of smoke from his hot and reeking briar, suggesting methods and ideas, his keen mind finding the way over, around, or through the apparently insuperable obstacles which beset their path. Crane, seated calmly at the drafting-table, occasionally inhaling a mouthful of smoke from one of his specially-made cigarettes, mercilessly tore Seaton's suggestions to shreds—pointing out their weaknesses, proving his points with his cold, incisive reasoning and his slide-rule calculations of factors, stresses, and strains. Seaton in turn would find a remedy for every defect, and finally, the idea complete and perfect, Crane would impale it upon the point of his drafting pencil and spread it in every detail upon the paper before him, while Seaton's active mind leaped to the next problem.

Not being vitally interested in the thing being built in the shed, they did not know that to the flawed members were being attached faulty plates, by imperfect welding. Even if they had been interested they could not have found the poor workmanship by any ordinary inspection, for it was being done by a picked crew of experts picked by Perkins. But to make things even, Perkins' crew did not know that the peculiar instruments installed by Seaton and Crane, of which their foreman took many photographs, were not real instruments, and were made only nearly enough like them to pass inspection. They were utterly useless, in design and function far different from the real instruments intended for the Skylark.

Finally, the last dummy instrument was installed in the worthless space-car, which the friends referred to between themselves as "The Cripple," a name which Seaton soon changed to "Old Crip." The construction crew was dismissed after Crane had let the foreman overhear a talk between Seaton and himself in which they decided not to start for a few days, as they had some final experiments to make. Prescott reported that Steel had relaxed its vigilance and was apparently waiting for the first flight. About the same time word was received from MacDougall that the real Skylark was ready for the finishing touches. A huge triplane descended upon Crane Field and was loaded to its capacity with strange looking equipment. When it left Seaton and Crane went with it, "to make the final tests before the first flight," leaving a heavy guard over the house and the testing shed.

A few nights later, in inky blackness, a huge shape descended rapidly in front of the shed, whose ponder-

ous doors opened to receive it and closed quickly after it. The Skylark moved lightly and easily as a wafted feather, betraying its thousands of tons of weight only by the hole it made in the hard-beaten earth of the floor as it settled to rest. Opening one of the heavy doors, Seaton and Crane sprang out into the darkness.

Dorothy and her father, who had been informed that the Skylark was to be brought home that night, were waiting. Seaton caught up his sweetheart in one mighty arm and extended his hand past her to Vaneman, who seized it in both his own. Upon the young man's face was the look of a victorious king returning from conquest. For a few minutes disconnected exclamations were all that any of the party could utter. Then Seaton, loosening slightly his bear's hold upon Dorothy, spoke.

"She flies!" he cried exultantly. "She flies, dearest, like a ray of light for speed and like a bit of thistle-down for lightness. We've been around the moon!"

"Around the moon!" cried the two amazed visitors. "So soon?" asked Vaneman. "When did you start?"

"Almost an hour ago," replied Crane readily; he had already taken out his watch. His voice was calm, his face quiet, but to those who knew him best, a deeper resonance in his voice and a deeper blue sparkle in his eyes betrayed his emotion. Both inventors were moved more than they could have told by their achievement, by the complete success of the great space-cruiser upon which they had labored for months with all the power of their marvelous intellects. Seaton stood now at the summit of his pride. No recognition by the masses, no applause by the multitudes, no praise even from the upper ten of his own profession could equal for him the silent adulation of the two before him. Dorothy's exquisite face was glorified as she looked at her lover. Her eyes wonderful as they told him how high he stood above all others in her world, how much she loved him. Seeing that look; that sweet face, more beautiful than ever in this, his hour of triumph; that perfect, adorable body, Seaton forgot the others and a more profound exaltation than that brought by his flight filled his being—humble thankfulness that he was the man to receive the untold treasure of her great giving.

"Every bit of mechanism we had occasion to use worked perfectly," Crane stated proudly. "We did not find it necessary to change any of our apparatus and we hope to make a longer flight soon. The hour we took on this trip might easily have been only a few minutes, for the Lark did not even begin to pick up speed."

SHIRO looked at Crane with an air of utter devotion and bowed until his head approached the floor.

"Sir," he said in his stilted English, "Honorable Skylark shall be marvelous wonder. If permitting, I shall luxuriate in preparing suitable refreshment."

The permission granted, he trotted away into the house, and the travelers invited their visitors to inspect the new craft. Crane and the older man climbed through the circular doorway, which was at an elevation of several feet above the ground. Seaton and

Dorothy exchanged a brief but enthusiastic caress before he lifted her lightly up to the opening and followed her up a short flight of stairs. Although she knew what to expect, from her lover's descriptions and from her own knowledge of "Old Crip," which she had seen many times, she caught her breath in amazement as she stood up and looked about the brilliantly-lighted interior of the great sky-rover. It was a sight such as had never before been seen upon earth.

She saw a spherical shell of hardened steel armor-plate, fully forty feet in diameter; though its true shape was not readily apparent from the inside, as it was divided into several compartments by horizontal floors or decks. In the exact center of the huge shell was a spherical network of enormous steel beams. Inside this structure could be seen a similar network which, mounted upon universal bearings, was free to revolve in any direction. This inner network was filled with machinery, surrounding a shining copper cylinder. From the outer network radiated six mighty supporting columns. These, branching as they neared the hull of the vessel, supported the power-plant and steering apparatus in the center and so strengthened the shell that the whole structure was nearly as strong as a solid steel ball. She noticed that the floor, perhaps eight feet below the center, was heavily upholstered in leather and did not seem solid; and that the same was true of the dozen or more seats—she could not call them chairs—which were built in various places. She gazed with interest at the two instrument boards, upon which flashed tiny lights and the highly-polished plate glass, condensite, and metal of many instruments, the use of which she could not guess.

After a few minutes of silence both visitors began to ask questions, and Seaton showed them the principal features of the novel craft. Crane accompanied them in silence, enjoying their pleasure, glorying in the mighty vessel. Seaton called attention to the great size and strength of the lateral supporting columns, one of which was immediately above their heads, and then led them over to the vertical column which pierced the middle of the floor. Enormous as the lateral had seemed, it appeared puny in comparison with this monster of fabricated steel. Seaton explained that the two verticals were many times stronger than the four laterals, as the center of gravity of the ship had been made lower than its geometrical center, so that the apparent motion of the vessel and therefore the power of the bar, would usually be merely vertical. Resting one hand caressingly upon the huge column, he exultantly explained that these members were "the last word in strength, made up of many separate I-beams and angles of the strongest known special steel, latticed and braced until no conceivable force could make them yield a millimeter."

"But why such strength?" asked the lawyer doubtfully. "This column alone would hold up Brooklyn Bridge."

"To hold down the power-plant, so that the bar won't tear through the ship when we cut her loose," replied Seaton. "Have you any idea how fast this bird can fly?"

"Well, I have heard you speak of traveling with the velocity of light, but that is overdrawn, isn't it?"

"Not very much. Our figures show that with this four-hundred-pound bar"—pointing to the copper cylinder in the exact center of the inner sphere—"we could develop not only the velocity of light, but an acceleration equal to that velocity, were it not for the increase in mass at high velocities, as shown by Einstein and others. We can't go very fast near the earth, of course, as the friction of the air would melt the whole works in a few minutes. Until we get out of the atmosphere our speed will be limited by the ability of steel to withstand melting by the friction of the air to somewhere in the neighborhood of four or five thousand miles per hour, but out in space we can develop any speed we wish, up to that of light as a limit."

"I studied physics a little in my youth. Wouldn't the mere force of such an acceleration as you mention flatten you on the floor and hold you there? And any sudden jar would certainly kill you."

"THERE can't be any sudden jar. This is a special floor, you notice. It is mounted on long, extremely heavy springs, to take up any possible jar. Also, whenever we are putting on power we won't try to stand up, our legs would crumple up like strings. We will ride securely strapped into those special seats, which are mounted the same as the floor, only a whole lot more so. As to the acceleration . . ."

"That word means picking up speed, doesn't it?" interrupted Dorothy.

"The rate of picking up speed," corrected Seaton. "That is, if you were going forty miles per hour one minute, and fifty the next minute, your acceleration would be ten miles per hour per minute. See? It's acceleration that makes you feel funny when you start up or down in an elevator."

"Then riding in this thing will be like starting up in an elevator so that your heart sinks into your boots and you can't breathe?"

"Yes, only worse. We will pick up speed faster and keep on doing it. . . ."

"Seriously," interrupted the lawyer, "do you think that the human body can stand any such acceleration as that?"

"I don't know. We are going to find out, by starting out slowly and increasing our acceleration to as much as we can stand."

"I see," Vaneman replied. "But how are you going to steer her? How do you keep permanent reference points, since there are no directions in space?"

"That was our hardest problem," explained Seaton, "but Martin solved it perfectly. See the power-plant up there? Notice those big supporting rings and bearings? Well, the power-plant is entirely separate from the ship, as it is inside that inner sphere, about which the outer sphere and the ship itself are free to revolve in any direction. No matter how much the ship rolls and pitches, as she is bound to do every time we come near enough to any star or planet to be influenced by its gravitation, the bar stays where it is pointed. Those six big jackets in the outer sphere, on the six sides of

the bar, cover six pairs of gyroscope wheels, weighing several tons each, turning at a terrific speed in a vacuum. The gyroscopes keep the whole outer sphere in exactly the same position as long as they are kept turning, and afford us not only permanent planes of reference, but also a solid foundation in those planes which can be used in pointing the bar. The bar can be turned instantly to any direction whatever by special electrical instruments on the boards. You see, the outer sphere stays immovably fixed in that position, with the bar at liberty to turn in any direction inside it, and the ship at liberty to do the same thing outside it.

"Now we will show you where we sleep," Seaton continued. "We have eight rooms, four below and four above," leading the way to a narrow, steep steel stairway and down into a very narrow hall, from either side of which two doors opened. "This is my room, the adjoining one is Mart's. Shiro sleeps across the hall. The rest of the rooms are for our guests on future trips."

Sliding back the door, he switched on the light and revealed a small but fully-appointed bedroom, completely furnished with everything necessary, yet everything condensed into the least possible space. The floor, like the one above, was of cushioned leather supported by springs. The bed was a modification of the special seats already referred to. Opening another sliding door, he showed them an equally complete and equally compact bathroom.

"You see, we have all the comforts of home. This bathroom, however, is practical only when we have some force downward, either gravitation or our own acceleration. The same reasoning accounts for the hand-rails you see everywhere on board. Drifting in space, you know, there is no weight, and you can't walk; you must pull yourself around. If you tried to take a step you would bounce up and hit the ceiling, and stay there. That is why the ceilings are so well padded. And if you tried to wash your face you would throw water all over the place, and it would float around in the air instead of falling to the floor. As long as we can walk we can use the bathroom—if I should want to wash my face while we are drifting, I just press this button here, and the pilot will put on enough acceleration to make the correct use of water possible. There are a lot of surprising things about a trip into space."

"I don't doubt it a bit, and I'm simply wild to go for a ride with you. When will you take me, Dicky?" asked Dorothy eagerly.

Very soon, Dottie. As soon as we get her in perfect running condition. You shall be the first to ride with us, I promise you."

"Where do you cook and eat? How do you see out? How about the air and water supply? How do you keep warm, or cool, as the case may be?" asked the girl's father, as though he were cross-examining a witness.

"Shiro has a galley on the main floor, and tables fold up into the wall of the main compartment. The passengers see out by sliding back steel panels, which normally cover the windows. The pilot can see in any

direction from his seat at the instrument-board, by means of special instruments, something like periscopes. The windows are made of optical glass similar to that used in the largest telescopes. They are nearly as thick as the hull and have a compressive resistance almost equal to that of armor steel. Although so thick, they are crystal clear, and a speck of dust on the outer surface is easily seen. We have water enough in tanks to last us three months, or indefinitely if we should have to be careful, as we can automatically distill and purify all our waste water, recovering absolutely pure H₂O. We have compressed air, also in tanks, but we need very little, as the air is constantly being purified. Also, we have oxygen-generating apparatus aboard, in case we should run short. As to keeping warm, we have electric heating coils, run by the practically inexhaustible power of a small metal bar. If we get too near the sun and get too warm, we have a refrigerating machine to cool us off. Anything else?"

"You'd better give up, Dad," laughingly advised his daughter. "You've thought of everything, haven't you, Dick?"

"Mart has, I think. This is all his doing, you know. I wouldn't have thought of a tenth of it, myself."

"I must remind you young folks," said the older man, glancing at his watch, "that it is very late, and high time for Dottie and me to be going home. We would like to stay and see the rest of it, but you know we must be away from here before daylight."

AS they went into the house Vaneman asked: "What does the other side of the moon look like? I have always been curious about it."

"We were not able to see much," replied Crane. "It was too dark and we did not take the time to explore it, but from what we could see by means of our searchlights it is very much like this side—the most barren and desolate place imaginable. After we go to Mars, we intend to explore the moon thoroughly."

"Mars, then, is your first goal? When do you intend to start?"

"We haven't decided definitely. Probably in a day or two. Everything is ready now."

As the Vanemans had come out in the street car, in order to attract as little attention as possible, Seaton volunteered to take them home in one of Crane's cars. As they bade Crane goodnight after enjoying Shiro's "suitable refreshment" the lawyer took the chauffeur's seat, motioning his daughter and Seaton into the closed body of the car. As soon as they had started Dorothy turned in the embrace of her lover's arm.

"Dick," she said fiercely, "I would have been worried sick if I had known that you were way off there?"

"I knew it, sweetheart. That's why I didn't tell you we were going. We both knew the Skylark was perfectly safe, but I knew that you would worry about our first trip. Now that we have been to the moon you won't be uneasy when we go to Mars, will you, dear?"

"I can't help it, boy. I will be afraid that something terrible has happened, every minute. Won't you take me with you? Then, if anything happens, it will happen to both of us, and that is as it should be. You

know that I wouldn't want to keep on living if anything *should* happen to you."

He put both arms around her as his reply, and pressed his cheek to hers.

"Dorothy sweetheart, I know exactly how you feel. I feel the same way myself. I'm awfully sorry, dear, but I can't do it. I know the machine is safe, but I've got to prove it to everybody else before I take you on a long trip with me. Your father will agree with me that you ought not to go, on the first trip or two, anyway. And besides, what would Madam Grundy say?"

"Well, there *is* a way. . . ." she began, and he felt her face turn hot.

His arms tightened around her and his breath came fast.

"I know it, sweetheart, and I would like nothing better in the world than to be married today and take our honeymoon in the Skylark, but I can't do it. After we come back from the first long trip we will be married just as soon as you say ready, and after that we will always be together wherever I go. But I can't take even the millionth part of a chance with anything as valuable as you are—you see that, don't you, Dottie?"

"I suppose so," she returned disconsolately, "but you'll make it a short trip, for my sake? I know I won't rest a minute until you get back."

"I promise you that we won't be gone more than four days. Then for the greatest honeymoon that ever was," and they clung together in the dark body of the car, each busy with solemn and beautiful thoughts of the happiness to come.

They soon reached their destination. As they entered the house Dorothy made one more attempt.

"Dad, Dick is just too perfectly mean. He says he won't take me on the first trip. If you were going out there wouldn't mother want to go along too?"

After listening to Seaton he gave his decision.

"Dick is right, Kitten. He must make the long trip first. Then, after the machine is proved reliable, you may go with him. I can think of no better way of spending a honeymoon—it will be a new one, at least. And you needn't worry about the boys getting back safely. I might not trust either of them alone, but together they are invincible. Good-night, children. I wish you success, Dick," as he turned away.

Seaton took a lover's leave of Dorothy, and went into the lawyer's study, taking an envelope from his pocket.

"Mr. Vaneman," he said in a low voice, "we think the Steel crowd is still camping on our trail. We are ready for them, with a lot of stuff that they never heard of, but in case anything goes wrong, Martin has written between the lines of this legal form, in invisible ink A-36, exactly how to get possession of all our notes and plans, so that the company can go ahead with everything. With those directions any chemist can find and use the stuff safely. Please put this envelope in the safest place you can think of, and then forget it unless they get both Crane and me. There's about one chance in a million of their doing that, but Mart doesn't gamble on even that chance."

"He is right, Dick. I believe that you can outwit them in any situation, but I will keep this paper where no one except myself can ever see it, nevertheless. Good-night, son, and good luck."

"The same to you, sir, and thank you. Good-night."

END OF PART I

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THE HEAD

By Joe Kleier



“Do you have come here to ask me to help you, Jim?” queried Professor Beardsley in a weak voice, as he looked inquiringly at his friend, Dr. James Leeson. “What assistance can you expect from a man who has only a month to live at most?”

Dr. Leeson glanced about the room and shifted uneasily in his chair. For some reason he seemed unwilling to state the nature of the help required.

A faint smile flitted over Professor Beardsley's narrow, shaven face as he observed Dr. Leeson's scrutiny of the room.

“Now don't try to foist a little inconsequential research work or something like that on me, so you can have an excuse to pay me a good price and camouflage your charity,” bantered the Professor. “I'm devilish poor, I know, but doctors are useless to me now, so I dispense with them. As for food,” he added grimly, “in my condition I can hardly eat anything, so that expense is also avoided.”

“I may as well tell you straight out what I came for,” blurted Dr. Leeson. “I want your head!”

“What?” gasped the Professor.

“Listen,” went on Dr. Leeson hurriedly. “We haven't seen each other for some years, but you must have heard that I gave up my practice?”

Professor Beardsley nodded assent. The acquaintances and friends of Dr. Leeson had been astonished when he had abruptly retired some years before without any explanation.

“You may remember how deeply interested I was in biology and plastic surgery when we were students at the university,” continued Dr. Leeson. “I became a surgeon; you became a professor of chemistry. I was a success as a surgeon, but I wanted to be independently rich, so that I could devote my whole time to what I considered my life's work. Having saved some thousands of dollars, I began to speculate in stocks. I was more than lucky. In a short time I was very rich.

“I bought a place in the country not far from here, fitted it up as a laboratory, and withdrew from the world, as you might say.

“I tried for a long time to find a substitute for blood. At last I succeeded in making artificial ape blood, and with a pump that I devised to act as a heart, I have kept a chimpanzee's head alive for over six months!”

“And now you want a human head!” breathed the Professor, wonder and horror in his voice.

“Yes,” replied Dr. Leeson. “I am certain that I can do the same with a human head and my substitute for human blood. A man may lose arms and legs and still live. I intend to prove that the entire trunk can be done away with, and the head and brain can be kept alive and active as long as there is blood and something to act as a heart.

“Some time ago, I put an advertisement in the papers, for persons who were contemplating self-destruction—of course I did not mention what they were wanted for—hoping in this manner to get a subject for my experiments. I received dozens of answers. Quite a few were women, but I don't want a woman for this. Some came out of mere curiosity. Some were reporters hunting for a sensational news item; others were adventurers looking for excitement. One or two of the would-be suicides were really tired of life, but they lacked the intelligence I desire.”

“So you have come to me,” remarked the Professor with a slight sneer. “I must say that I'm flattered.”

“Wait till I have finished,” protested Dr. Leeson, “and then think it over.

“You are as much interested in the progress of science I think—as I am. I need a keen mind in the head I use. By a system of signals we could arrange—for you won't be able to speak—you, or rather your head could communicate with me.

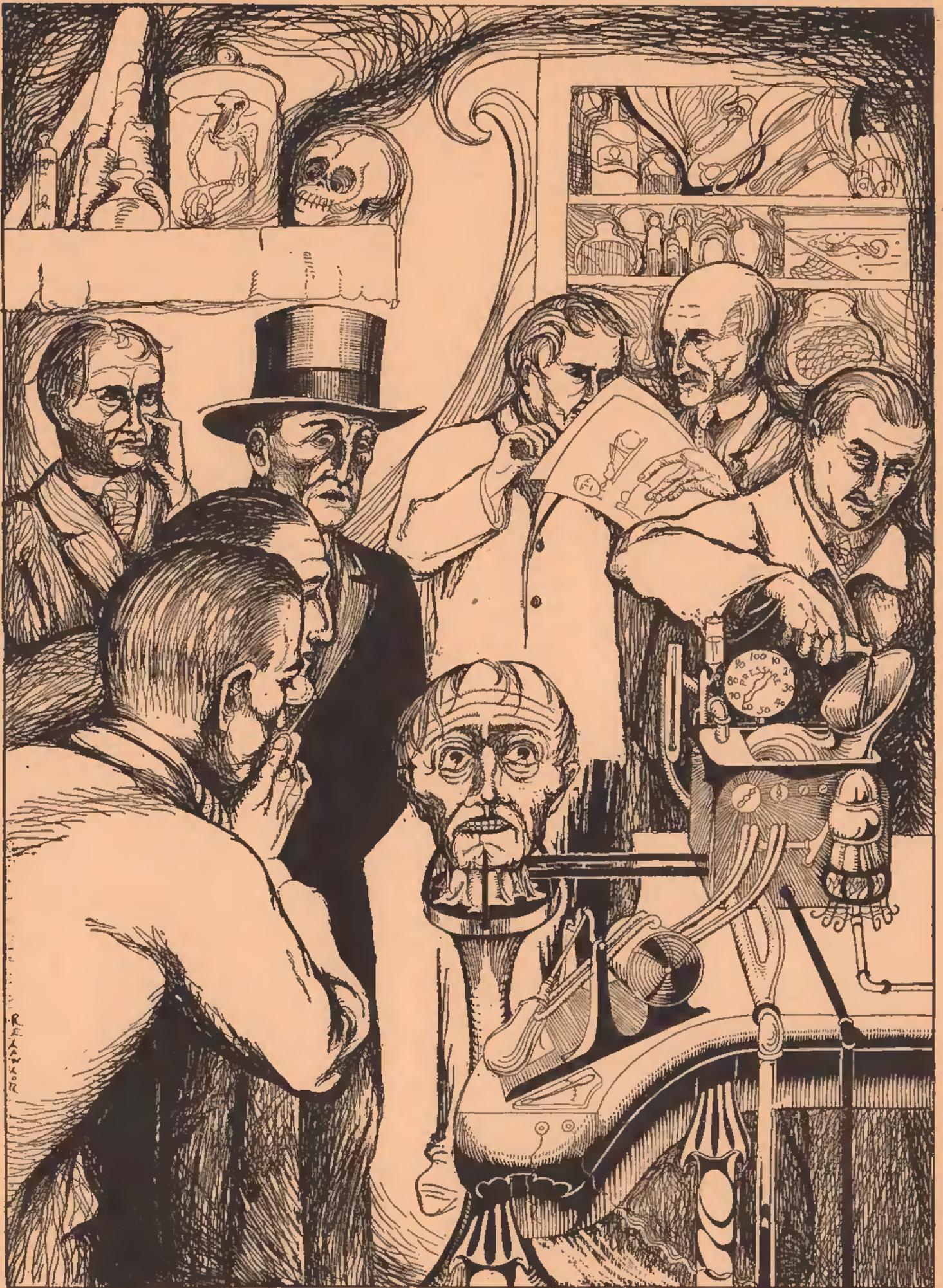
“To be brutally frank, I heard you were dying of cancer, and that you were in bad shape financially. You have a six year old, motherless daughter to think of, and whether you accept my offer or not, I shall see to it that your daughter never wants for anything as long as I live, because you were my boyhood friend. But—if you want to rest assured of her future, I will give you fifty

thousand dollars cash for your live body, which money you can place in trust for her.”

“What about yourself in case I should accept?” asked Professor Beardsley. “If the authorities or some of these pious keepers-of-their-brothers find out what you have done to me, they'll certainly have you brought to trial for murder.”

“Perhaps, if the experiment fails,” smiled Dr. Leeson. “Should your head live, I don't know what they could bring me to trial for, if I can prove that you were a willing collaborator.

If you are at all nervous and given to nightmares, we advise you not to read this story before you go to bed. It gives an excellent thrill, and contains good science as well. Recent experiments in Germany have proven conclusively that it is not only possible to decapitate insects, but to actually transplant heads from one insect to another, and after the heads are healed in place, the insects seem to be no worse for having their heads cut off and exchanged for others. —Of course, it's a far cry from an insect head to a human head, but the thing will not be so improbable a hundred years hence, as it may seem now.



The head heard of all the different aspects of the wrangle. Its eyes held a mute appeal for death, an appeal that no one, now . . . dared to grant.

"You no doubt have read of scientists losing arms and legs fooling with radium and other things; they are never arrested for committing suicide piecemeal, so why should I be accused of murdering piecemeal.

"However, you can let yourself be examined by three specialists. In case of trouble I can have these specialists testify as to your condition. After you have been examined, let it be known that I shall operate on you as a last hope. Should you die, I have a friend who is an undertaker, and he will see to it that you are buried without any questions. Should your head live, I shall preserve the body."

"Do you think I care to have my head live on for I don't know how long?" demanded Professor Beardsley.

"I've thought of that. You must agree to let me keep your head alive for at least two months after the operation, if it is possible. After that you can signal me to let your head die, and it shall be done. Should it be impossible for you to make signs, I promise to let it die within that time."

"This sounds ghoulish! But what about the pain?"

"I have perfected a local anesthetic which heals while it deadens pain. You won't know a knife has touched you during the operation or after."

Dr. Leeson paused and waited for an answer.

"Give me until this time to-morrow to think it over," said Professor Beardsley thoughtfully.

"Good!" exclaimed Dr. Leeson, looking at his watch. "Tomorrow morning at eleven o'clock I'll be here. I'm sure, if you think this matter over, you will see that it is feasible."

With a brisk handshake, Dr. Leeson left the room.

PROFESSOR BEARDSLEY sat in his chair, hour after hour, debating this strange offer with himself. Suffering with cancer of the stomach, he had more than once decided that suicide was the only way to end his agony. But the thought of his daughter had always made him reconsider, for he had clung to the forlorn hope that in some way he could provide for her before he died.

And now Dr. Leeson, who had buried himself in a laboratory for a number of years, popped up like some uncanny genie at this time and made a fantastic proposition. Dawn found Professor Beardsley still in his chair, but his decision was made. His daughter's future could not be left to the vagaries of friendly help, or the mercies of a public orphanage. Then again, he was curious as to the outcome of such an attempt to baffle nature.

Almost eagerly he awaited Dr. Leeson's arrival.

Promptly at eleven o'clock Dr. Leeson knocked, and entered the room.

"Brought my car with me so I can drive you around to see those specialists, and wind up your business," he remarked.

"You're taking me for granted," wanly replied the Professor, "but I'll go through with this thing."

With feeble steps Professor Beardsley walked to the car, turning as he entered it, to take a last look at the shabby exterior of the cheap rooming house that had been his home for several years.

After the specialists had been called upon, they pro-

ceeded to a bank where Professor Beardsley received fifty thousand dollars, and wrote his will.

"I think it the best not to see my daughter," said Professor Beardsley in reply to a question from Dr. Leeson. "I might get squeamish and not fulfil my end of the bargain. She is well taken care of by a kind-hearted woman, whom I paid, whenever I could, for this service."

Late in the afternoon of that day, they drove out to Dr. Leeson's place, which was situated in a quiet, secluded spot far back from the main highway.

"You're too fagged to be shown around today," declared Dr. Leeson. "I'll take you to your room, and give you something, so you can get a little rest."

Professor Beardsley drank the draught prepared for him, and sank into a stupor-like sleep. The morning sun was shining through his bedroom window when he awoke. Dressing slowly, he then stepped out of the room, and found Dr. Leeson pacing up and down the corridor.

"I'll show you about the building," said Dr. Leeson, taking the Professor's arm, "and explain anything you wish to know."

On their way, they met several serious and studious-looking men.

"My assistants," Dr. Leeson informed the Professor. "Every one of them heart and soul with me in this work."

Finally, they stopped in front of a solid-looking door.

"The inner shrine," softly laughed Dr. Leeson, opening the door, and pointing to the center of the room.

Professor Beardsley walked to where Dr. Leeson pointed—and then stood rigid. The live head of an ape lay strapped to a board—with no sign of a body!

On closer examination, the Professor saw that the head ended in the stump of the neck over which skin had been grafted. Several short tubes extended from the neck to an apparatus that supplied the head with life-sustaining fluid.

"This," explained Dr. Leeson, lightly touching with a finger a small pump which was working with regular, exact strokes, "is the heart. That," indicating a box-like affair, "is the filter or lungs, and also the stomach of my artificial blood circulating system.

"The used blood leaves the head, passes through the filter, where it is purified, nutrition added, the right temperature given, and then is ready to be pumped to the head again.

"The whole thing is run by electricity, generated by my own power plant.

"As you may have noticed, there is an auxiliary circulating system here. Two of my assistants are watching here continually. In case of a breakdown, it would hardly take more than a second to start the blood flowing back to the head."

"Isn't there danger of a bursting blood vessel?" ventured Professor Beardsley.

"Hardly. The volume of blood needed by a head at each stroke, and the number of strokes to the minute are determined beforehand."

"Won't the blood corrode the insides of the pump, filter, or tubes, and in this manner carry foreign substances to the head which might prove harmful?"

"Pump, filter, and tubes have a special lining which won't corrode, and is so tough that it takes a great amount of friction to wear it off; what does wear off is a tonic to the blood instead of a poison."

Professor Beardsley suddenly felt nauseated. The head of the ape, that Thing strapped to the board, was a sample of what was to become of him.

And Leeson jokingly called this chamber of horror the inner shrine! The man was mad, inhuman. He was a man or a friend no longer, simply a tool of science to whom a human being, or animal, was valuable only as an object for his probing knife.

WITH tottering steps, the Professor began to walk away.

"What do you think of my work?" asked Dr. Leeson, as he followed the Professor.

"Diabolical!"

Dr. Leeson glanced at him covertly.

"I'm going to keep my word," Professor Beardsley whispered hoarsely, as he caught the glance and stiffened. "You shall have your pound of flesh. What I saw in there kind of upset me. When do you want to begin on me? I'm ready now."

"Well," replied Dr. Leeson after a pause, "the sooner the better. Your body doesn't have to be built up for this operation, and you're liable to die unexpectedly. Shall we say this evening, at six o'clock?"

"Satisfactory with me. It means money for my daughter, and besides, I always wanted to achieve fame, wanted to be first in something, but I have failed. As fate has left me only this choice I shall take it. If my head lives, my name will gain some notoriety at least."

At the request of Dr. Leeson, the Professor prepared a written statement, witnessed by several of the assistants, to the effect that he willingly placed his live body at the disposal of Dr. Leeson.

With the resignation of a condemned man, Professor Beardsley waited for the hour without fear or apprehension.

At six o'clock he was taken to the operating room, where he shook hands with Dr. Leeson, and calmly watched the paraphernalia being arranged.

"Begin!" said Professor Beardsley quietly, after he had been secured to the operating table.

Dr. Leeson and his assistants worked as rapidly as possible. At last the grisly task was accomplished. Artificial human blood was being pumped to the living head of Professor Beardsley, while the dead, headless body was removed!

For a number of days the Head was in a stupor, seemingly from shock. But the wound healed rapidly, and the brain apparently began to function. The Head appeared to notice the anxious faces hovering about it. And when some words were spoken to the Head, it signaled with its eyelids as agreed upon.

"The Head hears—understands!" vibrantly declared Dr. Leeson.

But on the following day Dr. Leeson did not come to see the Head as usual. Another day passed, and then the Head was apprised of the fact that Dr. Leeson had been struck by an automobile and killed while on a trip to the city.

In the days that followed, strange faces came into the room where the Head was placed. It was stared at and questioned. The police, so the Head was informed, had found a memorandum upon Dr. Leeson's body after he was killed, giving a full account of the case. The police had promptly investigated.

The assistants were arrested one at a time and released on bonds, for the authorities realized that no one else could take care of the Head, if the assistants were thrown into jail.

The newspapers avidly printed every item that could be scraped up about the bizarre affair.

The prosecuting attorney was plainly perplexed as to the charge on which the assistants should be tried. Murder was out of the question, for it was a fact that the Head was alive and its mind was normal. The assistants were finally brought to trial on the charge of mayhem.*

But the assistants secured the best legal talent in the country. The three specialists testified as to Professor Beardsley's health. The signed statement of Professor Beardsley, the canceled check for fifty thousand dollars, and the headless body—preserved no doubt by Dr. Leeson for just such an emergency—were offered as evidence.

The result was that the jury disagreed, and the two trials that followed ended in the same manner.

Not only in the courtroom, but all over the country the battle raged. Lawyers, doctors, ministers, and scientists talked and wrote learnedly from one standpoint or the other. One side demanded that the Head's life should be put to an end for humane reasons, the other side argued that this would be the same as murder because the brain really made the man.

The Head heard of all the different aspects of the wrangle. Its eyes held a mute appeal for death, an appeal that no one—now that Dr. Leeson was dead—dared to grant. The Head kept on living, and the authorities were satisfied to let the case lie dormant.

DOCTOR LEESON had willed his entire fortune to his assistants. His formula for artificial blood, which he had entrusted to his assistants, they guarded with jealous care.

The years came and went. The assistants grew bald-headed and gray—and died. New, picked men took their place and guarded the Head from death. It was carefully massaged and washed every day, the hair and beard cut when grown too long.

Centuries passed. Great wars were fought and the country beaten in them. The Head noticed that the progress of science was stopped.

The demeanor and character of those taking care of the Head changed. They formed themselves into a secret clique, and were called priests. The government became a hierarchy, and only these priests had any knowledge of electricity or kindred subjects. The laboratory became a shrine to which the people made pilgrimages.

The common people—the Head learned—were gulled

* A term in law; the maiming of a person by depriving him of the use of any of his members in fighting or in a contest.
(Continued on page 449)

ARMAGEDDON - 2419 A.D.

By Philip Francis Nowlan

Foreword



ELSEWHERE I have set down, for whatever interest they have in this, the 25th Century, my personal recollections of the 20th Century.

Now it occurs to me that my memoirs of the 25th Century may have an equal interest 500 years from now—particularly in view of that unique perspective from which I have seen the 25th Century, entering it as I did, in one leap across a gap of 492 years.

This statement requires elucidation. There are still many in the world who are not familiar with my unique experience. Five centuries from now there may be many more, especially if civilization is fated to endure any worse convulsions than those which have occurred between 1975 A.D. and the present time.

I should state therefore, that I, Anthony Rogers, am, so far as I know, the only man alive whose normal span of eighty-one years of life has been spread over a period of 573 years. To be precise, I lived the first twenty-nine years of my life between 1898 and 1927; the other fifty-two since 2419. The gap between these two, a period of nearly five hundred years, I spent in a state of suspended animation, free from the ravages of katabolic processes, and without any apparent effect on my physical or mental faculties.

When I began my long sleep, man had just begun his real conquest of the air in a sudden series of trans-oceanic flights in airplanes driven by internal combustion motors. He had barely begun to speculate on the possibilities of harnessing sub-atomic forces, and had made no further practical penetration into the field of ethereal pulsations than the primitive radio and television of that day. The United States of America was the most powerful nation in the world, its political, financial, industrial and scientific influence being supreme; and in the arts also it was rapidly climbing into leadership.

I awoke to find the America I knew a total wreck—to find Americans a hunted race in their own land, hiding in the dense forests that covered the shattered and leveled ruins of their once magnificent cities, desperately preserving, and struggling to develop in their secret retreats, the remnants of their culture and science—and the undying flame of their sturdy independence.

World domination was in the hands of Mongolians and the center of world power lay in inland China, with Americans one of the few races of mankind un-subdued—and it must be admitted in fairness to the truth, not worth the trouble of subduing in the eyes of the Han Airlords who ruled North America as titular tributaries of the Most Magnificent.

For they needed not the forests in which the Americans lived, nor the resources of the vast territories these forests covered. With the perfection to which they had reduced the synthetic production of necessities and luxuries, their remarkable development of scientific processes and mechanical accomplishment of work, they had no economic need for the forests, and no economic desire for the enslaved labor of an unruly race.

They had all they needed for their magnificently luxurious and degraded scheme of civilization within the walls of the fifteen cities of sparkling glass they had flung skyward on the sites of ancient American centers, into the bowels of the earth underneath them, and with relatively small surrounding areas of agriculture.

Complete domination of the air rendered communication between these centers a matter of ease and safety. Occasional destructive raids on the waste lands were considered all that was necessary to keep the "wild" Americans on the run within the shelter of their forests, and prevent their becoming a menace to the Han civilization.

But nearly three hundred years of easily maintained security, the last century of which had been nearly sterile in scientific, social and economic progress, had softened and devitalized the Hans.

It had likewise developed, beneath the protecting foliage of the forest, the growth of a vigorous new American civilization, remarkable in the mobility and

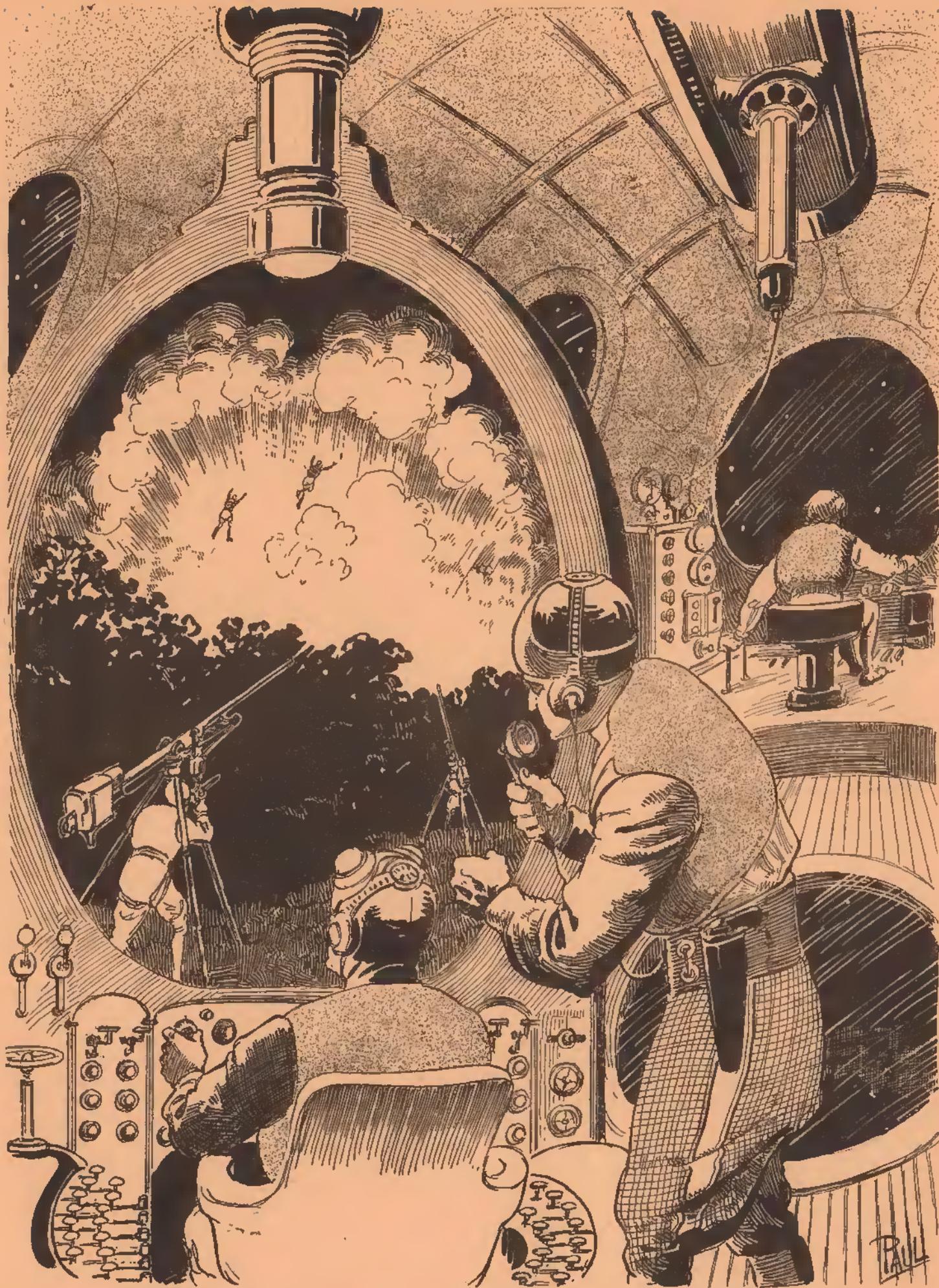
flexibility of its organization, in its conquest of almost insuperable obstacles, in the development and guarding of its industrial and scientific resources, all in anticipation of that "Day of Hope" to which it had been looking forward for generations, when it would be strong enough to burst from the green chrysalis of the forests, soar into the upper air lanes and destroy the yellow incubus.

At the time I awoke, the "Day of Hope" was almost at hand. I shall not attempt to set forth a detailed history of the Second War of Independence, for that has

HERE, once more, is a real scientific story plus. It is a story which will make the heart of many readers leap with joy.

We have rarely printed a story in this magazine that for scientific interest, as well as suspense, could hold its own with this particular story. We prophesy that this story will become more valuable as the years go by. It certainly holds a number of interesting prophecies, of which no doubt, many will come true. For wealth of science, it will be hard to beat for some time to come. It is one of those rare stories that will bear reading and re-reading many times.

This story has impressed us so favorably, that we hope the author may be induced to write a sequel to it soon.



Seen upon the ultrascope viewplate, the battle looked as though it were being fought in daylight, perhaps on a cloudy day, while the explosions of the rockets appeared as flashes of extra brilliance.

been recorded already by better historians than I am. Instead I shall confine myself largely to the part I was fortunate enough to play in this struggle and in the events leading up to it.

It all resulted from my interest in radioactive gases. During the latter part of 1927 my company, the American Radioactive Gas Corporation, had been keeping me busy investigating reports of unusual phenomena observed in certain abandoned coal mines near the Wyoming Valley, in Pennsylvania.

With two assistants and a complete equipment of scientific instruments, I began the exploration of a deserted working in a mountainous district, where several weeks before, a number of mining engineers had reported traces of carnotite* and what they believed to be radioactive gases. Their report was not without foundation, it was apparent from the outset, for in our examination of the upper levels of the mine, our instruments indicated a vigorous radioactivity.

On the morning of December 15th, we descended to one of the lowest levels. To our surprise, we found no water there. Obviously it had drained off through some break in the strata. We noticed too that the rock in the side walls of the shaft was soft, evidently due to the radioactivity, and pieces crumbled under foot rather easily. We made our way cautiously down the shaft, when suddenly the rotted timbers above us gave way.

I jumped ahead, barely escaping the avalanche of coal and soft rock, but my companions, who were several paces behind me, were buried under it, and undoubtedly met instant death.

I was trapped. Return was impossible. With my electric torch I explored the shaft to its end, but could find no other way out. The air became increasingly difficult to breathe, probably from the rapid accumulation of the radioactive gas. In a little while my senses reeled and I lost consciousness.

When I awoke, there was a cool and refreshing circulation of air in the shaft. I had no thought that I had been unconscious more than a few hours, although it seems that the radioactive gas had kept me in a state of suspended animation for something like 500 years. My awakening, I figured out later, had been due to some shifting of the strata which reopened the shaft and cleared the atmosphere in the working. This must have been the case, for I was able to struggle back up the shaft over a pile of debris, and stagger up the long incline to the mouth of the mine, where an entirely different world, overgrown with a vast forest and no visible sign of human habitation, met my eyes.

I shall pass over the days of mental agony that followed in my attempt to grasp the meaning of it all. There were times when I felt that I was on the verge of insanity. I roamed the unfamiliar forest like a lost soul. Had it not been for the necessity of improvising traps and crude clubs with which to slay my food, I believe I should have gone mad.

Suffice it to say, however, that I survived this psychic crisis. I shall begin my narrative proper with my first contact with Americans of the year 2419 A. D.

* A hydrovanadate of uranium, and other metals; used as a source of radium compounds.

CHAPTER I

Floating Men

MY first glimpse of a human being of the 25th Century was obtained through a portion of woodland where the trees were thinly scattered, with a dense forest beyond.

I had been wandering along aimlessly, and hopelessly, musing over my strange fate, when I noticed a figure that cautiously backed out of the dense growth across the glade. I was about to call out joyfully, but there was something furtive about the figure that prevented me. The boy's attention (for it seemed to be a lad of fifteen or sixteen) was centered tensely on the heavy growth of trees from which he had just emerged.

He was clad in rather tight-fitting garments entirely of green, and wore a helmet-like cap of the same color. High around his waist he wore a broad thick belt, which bulked up in the back across the shoulders, into something of the proportions of a knapsack.

As I was taking in these details, there came a vivid flash and heavy detonation, like that of a hand grenade, not far to the left of him. He threw up an arm and staggered a bit in a queer, gliding way; then he recovered himself and slipped cautiously away from the place of the explosion, crouching slightly, and still facing the denser part of the forest. Every few steps he would raise his arm, and point into the forest with something he held in his hand. Wherever he pointed there was a terrific explosion, deeper in among the trees. It came to me then that he was shooting with some form of pistol, though there was neither flash nor detonation from the muzzle of the weapon itself.

After firing several times, he seemed to come to a sudden resolution, and turning in my general direction, leaped—to my amazement sailing through the air between the sparsely scattered trees in such a jump as I had never in my life seen before. That leap must have carried him a full fifty feet, although at the height of his arc, he was not more than ten or twelve feet from the ground.

When he alighted, his foot caught in a projecting root, and he sprawled gently forward. I say "gently" for he did not crash down as I expected him to do. The only thing I could compare it with was a slow-motion cinema, although I had never seen one in which horizontal motions were registered at normal speed and only the vertical movements were slowed down.

Due to my surprise, I suppose my brain did not function with its normal quickness, for I gazed at the prone figure for several seconds before I saw the blood that oozed out from under the tight green cap. Regaining my power of action, I dragged him out of sight back of the big tree. For a few moments I busied myself in an attempt to staunch the flow of blood. The wound was not a deep one. My companion was more dazed than hurt. But what of the pursuers?

I took the weapon from his grasp and examined it hurriedly. It was not unlike the automatic pistol to which I was accustomed, except that it apparently fired with a button instead of a trigger. I inserted several fresh rounds of ammunition into its magazine from my companion's belt, as rapidly as I could, for I soon heard

near us, the suppressed conversation of his pursuers.

There followed a series of explosions round about us, but none very close. They evidently had not spotted our hiding place, and were firing at random.

I waited tensely, balancing the gun in my hand, to accustom myself to its weight and probable throw.

Then I saw a movement in the green foliage of a tree not far away, and the head and face of a man appeared. Like my companion, he was clad entirely in green, which made his figure difficult to distinguish. But his face could be seen clearly. It was an evil face, and had murder in it.

That decided me. I raised the gun and fired. My aim was bad, for there was no kick in the gun, as I had expected, and I hit the trunk of the tree several feet below him. It blew him from his perch like a crumpled bit of paper, and he floated down to the ground, like some limp, dead thing, gently lowered by an invisible hand. The tree, its trunk blown apart by the explosion, crashed down.

There followed another series of explosions around us. These guns we were using made no sound in the firing, and my opponents were evidently as much at sea as to my position as I was to theirs. So I made no attempt to reply to their fire, contenting myself with keeping a sharp lookout in their general direction. And patience had its reward.

Very soon I saw a cautious movement in the top of another tree. Exposing myself as little as possible, I aimed carefully at the tree trunk and fired again. A shriek followed the explosion. I heard the tree crash down; then a groan.

There was silence for a while. Then I heard a faint sound of boughs swishing. I shot three times in its direction, pressing the button as rapidly as I could. Branches crashed down where my shells had exploded, but there was no body.

Then I saw one of them. He was starting one of those amazing leaps from the bough of one tree to another, about forty feet away.

I threw up my gun impulsively and fired. By now I had gotten the feel of the weapon, and my aim was good. I hit him. The "bullet" must have penetrated his body and exploded. For one moment I saw him flying through the air. Then the explosion, and he vanished. He never finished his leap. It was annihilation.

How many more of them there were I don't know. But this must have been too much for them. They used a final round of shells on us, all of which exploded harmlessly, and shortly after I heard them swishing and crashing away from us through the tree tops. Not one of them descended to earth.

Now I had time to give some attention to my companion. She was, I found, a girl, and not a boy. Despite her bulky appearance, due to the peculiar belt strapped around her body high up under the arms, she was very slender, and very pretty.

There was a stream not far away, from which I brought water and bathed her face and wound.

Apparently the mystery of these long leaps, the monkey-like ability to jump from bough to bough, and of the bodies that floated gently down instead of falling,

lay in the belt. The thing was some sort of anti-gravity belt that almost balanced the weight of the wearer, thereby tremendously multiplying the propulsive power of the leg muscles, and the lifting power of the arms.

When the girl came to, she regarded me as curiously as I did her, and promptly began to quiz me. Her accent and intonation puzzled me a lot, but nevertheless we were able to understand each other fairly well, except for certain words and phrases. I explained what had happened while she lay unconscious, and she thanked me simply for saving her life.

"You are a strange exchange," she said, eying my clothing quizzically. Evidently she found it mirth provoking by contrast with her own neatly efficient garb. "Don't you understand what I mean by 'exchange?' I mean ah—let me see—a stranger, somebody from some other gang. What gang do you belong to?" (She pronounced it "gan," with only a suspicion of a nasal sound.)

I laughed. "I'm not a gangster," I said. But she evidently did not understand this word. "I don't belong to any gang," I explained, "and never did. Does everybody belong to a gang nowadays?"

"Naturally," she said, frowning. "If you don't belong to a gang, where and how do you live? Why have you not found and joined a gang? How do you eat? Where do you get your clothing?"

"I've been eating wild game for the past two weeks," I explained, "and this clothing I—er—ah—" I paused, wondering how I could explain that it must be many hundred years old.

In the end I saw I would have to tell my story as well as I could, piecing it together with my assumptions as to what had happened. She listened patiently; incredulously at first, but with more confidence as I went on. When I had finished, she sat thinking for a long time.

"That's hard to believe," she said, "but I believe it." She looked me over with frank interest.

"Were you married when you slipped into unconsciousness down in that mine?" she asked me suddenly. I assured her I had never married. "Well, that simplifies matters," she continued. "You see, if you were technically classed as a family man, I could take you back only as an invited exchange and I, being unmarried, and no relation of yours, couldn't do the inviting."

CHAPTER II

The Forest Gangs

SHE gave me a brief outline of the very peculiar social and economic system under which her people lived. At least it seemed very peculiar from my 20th Century viewpoint.

I learned with amazement that exactly 492 years had passed over my head as I lay unconscious in the mine.

Wilma, for that was her name, did not profess to be a historian, and so could give me only a sketchy outline of the wars that had been fought, and the manner in which such radical changes had come about. It seemed that another war had followed the First World War, in which nearly all the European nations had banded together to break the financial and industrial power of America. They succeeded in their purpose,

though they were beaten, for the war was a terrific one, and left America, like themselves, gasping, bleeding and disorganized, with only the hollow shell of a victory.

This opportunity had been seized by the Russian Soviets, who had made a coalition with the Chinese, to sweep over all Europe and reduce it to a state of chaos.

America, industrially geared to world production and the world trade, collapsed economically, and there ensued a long period of stagnation and desperate attempts at economic reconstruction. But it was impossible to stave off war with the Mongolians, who by now had subjugated the Russians, and were aiming at a world empire.

In about 2109, it seems, the conflict was finally precipitated. The Mongolians, with overwhelming fleets of great airships, and a science that far outstripped that of crippled America, swept in over the Pacific and Atlantic Coasts, and down from Canada, annihilating American aircraft, armies and cities with their terrific *disintegrator* rays. These rays were projected from a machine not unlike a searchlight in appearance, the reflector of which, however, was not material substance, but a complicated balance of interacting electronic forces. This resulted in a terribly destructive beam. Under its influence, material substance melted into "nothingness"; i. e., into electronic vibrations. It destroyed all then known substances, from air to the most dense metals and stone.

They settled down to the establishment of what became known as the Han dynasty in America, as a sort of province in their World Empire.

Those were terrible days for the Americans. They were hunted like wild beasts. Only those survived who finally found refuge in mountains, canyons and forests. Government was at an end among them. Anarchy prevailed for several generations. Most would have been eager to submit to the Hans, even if it meant slavery. But the Hans did not want them, for they themselves had marvelous machinery and scientific process by which all difficult labor was accomplished.

Ultimately they stopped their active search for, and annihilation of the widely scattered groups of now savage Americans. So long as they remained hidden in their forests, and did not venture near the great cities the Hans had built, little attention was paid to them.

Then began the building of the new American civilization. Families and individuals gathered together in clans or "gangs" for mutual protection. For nearly a century they lived a nomadic and primitive life, moving from place to place, in desperate fear of the casual and occasional Hans air raids, and the terrible disintegrator ray. As the frequency of these raids decreased, they began to stay permanently in given localities, organizing upon lines which in many respects were similar to those of the military households of the Norman feudal barons, except that instead of gathering together in castles, their defense tactics necessitated a certain scattering of living quarters for families and individuals. They lived virtually in the open air, in the forests, in green tents, resorting to camouflage tactics that would conceal their presence from air observers. They dug underground factories and laboratories, that they might better be shielded from the electrical detec-

tors of the Hans. They tapped the radio communication lines of the Hans, with crude instruments at first; better ones later on. They bent every effort toward the re-development of science. For many generations they labored as unseen, unknown scholars of the Hans, picking up their knowledge piecemeal, as fast as they were able to.

During the earlier part of this period, there were many deadly wars fought between the various gangs, and occasional courageous but childishly futile attacks upon the Hans, followed by terribly punitive raids.

But as knowledge progressed, the sense of American brotherhood redeveloped. Reciprocal arrangements were made among the gangs over constantly increasing areas. Trade developed to a certain extent, as between one gang and another. But the interchange of knowledge became more important than that of goods, as skill in the handling of synthetic processes developed.

Within the gang, an economy was developed that was a compromise between individual liberty and a military socialism. The right of private property was limited practically to personal possessions, but private privileges were many, and sacredly regarded. Stimulation to achievement lay chiefly in the winning of various kinds of leadership and prerogatives, and only in a very limited degree in the hope of owning anything that might be classified as "wealth," and nothing that might be classified as "resources." Resources of every description, for military safety and efficiency, belonged as a matter of public interest to the community as a whole.

In the meantime, through these many generations, the Hans had developed a luxury economy, and with it the perfection of gilded vice and degradation. The Americans were regarded as "wild men of the woods." And since they neither needed nor wanted the woods or the wild men, they treated them as beasts, and were conscious of no human brotherhood with them. As time went on, and synthetic processes of producing foods and materials were further developed, less and less ground was needed by the Hans for the purposes of agriculture, and finally, even the working of mines was abandoned when it became cheaper to build up metal from electronic vibrations than to dig them out of the ground.

The Hans race, devitalized by its vices and luxuries, with machinery and scientific processes to satisfy its every want, with virtually no necessity of labor, began to assume a defensive attitude toward the Americans.

And quite naturally, the Americans regarded the Hans with a deep, grim hatred. Conscious of individual superiority as men, knowing that latterly they were outstripping the Hans in science and civilization, they longed desperately for the day when they should be powerful enough to rise and annihilate the Yellow Blight that lay over the continent.

At the time of my awakening, the gangs were rather loosely organized, but were considering the establishment of a special military force, whose special business it would be to harry the Hans and bring down their air ships whenever possible without causing general alarm among the Mongolians. This force was destined to become the nucleus of the national force, when the Day of Retribution arrived. But that, however, did not happen for ten years, and is another story.

Wilma told me she was a member of the Wyoming Gang, which claimed the entire Wyoming Valley as its territory, under the leadership of Boss Hart. Her mother and father were dead, and she was unmarried, so she was not a "family member." She lived in a little group of tents known as Camp 17, under a woman Camp Boss, with seven other girls.

Her duties alternated between military or police scouting and factory work. For the two-week period which would end the next day, she had been on "air patrol." This did not mean, as I first imagined, that she was flying, but rather that she was on the lookout for Han ships over this outlying section of the Wyoming territory, and had spent most of her time perched in the tree tops scanning the skies. Had she seen one she would have fired a "drop flare" several miles off to one side, which would ignite when it was floating vertically toward the earth, so that the direction or point from which it had been fired might not be guessed by the airship and bring a blasting play of the disintegrator ray in her vicinity. Other members of the

air patrol would send up rockets on seeing hers, until finally a scout equipped with an ultraphone, which, unlike the ancient radio, operated on the ultronic ethereal vibrations, would pass the warning simultaneously to the headquarters of the Wyoming Gang and other communities within a radius of several hundred miles, not to mention the few American rocketships that might be in the air, and which instantly would duck to cover either through forest clearings or by flattening down to earth in green fields where their coloring would probably protect them from observation. The favorite American method of propulsion was known as "rocketing." The *rocket* is what I would describe, from my 20th Century comprehension of the matter, as an extremely powerful gas blast, atomically produced through the stimulation of chemical action. Scientists of today regard it as a childishly simple reaction, but by that very virtue, most economical and efficient.

But tomorrow, she explained, she would go back to work in the cloth plant, where she would take charge of one of the synthetic processes by which those wonderful substitutes for woven fabrics of wool, cotton and silk are produced. At the end of another two weeks, she would be back on military duty again, perhaps at the same work, or maybe as a "contact guard," on duty where the territory of the Wyomings merged with that of the Delawares, or the "Susquannas" (Susquehannas) or one of the half dozen other "gangs" in that section of the country which I knew as Pennsylvania and New York States.

Wilma cleared up for me the mystery of those flying leaps which she and her assailants had made, and explained in the following manner, how the *inertron* belt balances weight:

"Jumpers" were in common use at the time I "awoke," though they were costly, for at that time *inertron* had not been produced in very great quantity.

They were very useful in the forest. They were belts, strapped high under the arms, containing an amount of *inertron* adjusted to the wearer's weight and purposes. In effect they made a man weigh as little as he desired; two pounds if he liked.

"Floaters" are a later development of "jumpers"—rocket motors encased in *inertron* blocks and strapped to the back in such a way that the wearer floats, when drifting, facing slightly downward. With his motor in operation, he moves like a diver, head-foremost, controlling his direction by twisting his body and by movements of his outstretched arms and hands. Ballast weights locked in the front of the belt adjust weight and lift. Some men prefer a few ounces of weight in floating, using a slight motor thrust to overcome this. Others prefer a buoyance balance of a few ounces. The inadvertent dropping of weight is not a serious matter. The motor thrust always can be used to descend. But as an extra precaution, in case the motor should fail, for any reason, there are built into every belt a number of detachable sections, one or



On the left of the illustration is a Han girl, and on the right is an American girl, who, like all of her race, is equipped with an *inertron* belt and a rocket gun.

more of which can be discarded to balance off any loss in weight.

"But who were your assailants," I asked, "and why were you attacked?"

Her assailants, she told me, were members of an outlaw gang, referred to as "Bad Bloods," a group which for several generations had been under the domination of conscienceless leaders who tried to advance the interests of their clan by tactics which their neighbors had come to regard as unfair, and who in consequence had been virtually boycotted. Their purpose had been to slay her near the Delaware frontier, making it appear that the crime had been committed by Delaware scouts and thus embroil the Delawares and Wyomings in acts of reprisal against each other, or at least cause suspicions.

Fortunately they had not succeeded in surprising her, and she had been successful in dodging them for some two hours before the shooting began, at the moment when I arrived on the scene.

"But we must not stay here talking," Wilma concluded. "I have to take you in, and besides I must report this attack right away. I think we had better slip over to the other side of the mountain. Whoever is on that post will have a phone, and I can make a direct report. But you'll have to have a belt. Mine alone won't help much against our combined weights, and there's little to be gained by jumping heavy. It's almost as bad as walking."

After a little search, we found one of the men I had killed, who had floated down among the trees some distance away and whose belt was not badly damaged. In detaching it from his body, it nearly got away from me and shot up in the air. Wilma caught it, however, and though it reinforced the lift of her own belt so that she had to hook her knee around a branch to hold herself down, she saved it. I climbed the tree, and

with my weight added to hers, we floated down easily.

CHAPTER III

Life in the 25th Century

WE were delayed in starting for quite a while since I had to acquire a few crude ideas about the technique of using these belts. I had been sitting down, for instance, with the belt strapped about me, enjoying an ease similar to that of a comfortable armchair; when I stood up with a natural exertion of muscular effort, I shot ten feet into the air, with a wild instinctive thrashing of arms and legs that amused Wilma greatly.

But after some practice, I began to get the trick of gauging muscular effort to a minimum of vertical and a maximum of horizontal. The correct form, I found, was in a measure comparable to that of skating. I found, also, that in forest work particularly the arms and hands could be used to great advantage in swinging along from branch to branch, so prolonging leaps almost indefinitely at times.

In going up the side of the mountain, I found that my 20th Century muscles did have an advantage, in spite of lack of skill with the belt, and since the slopes were very sharp, and most of our leaps were upward, I could have distanced Wilma easily. But when we crossed the ridge and descended, she outstripped me with her superior technique. Choosing the steepest slopes, she would crouch in the top of a tree, and propel herself outward, literally diving until, with the loss of horizontal momentum, she would assume a more upright position and float downward. In this manner she would sometimes cover as much as a quarter of a mile in a single leap, while I leaped and scrambled clumsily behind, thoroughly enjoying the novel sensation.

Half way down the mountain, we saw another green-clad figure leap out above the tree tops toward us. The three of us perched on an outcropping of rock from which a view for many miles around could be had, while Wilma hastily explained her adventure and my presence to her fellow guard, whose name was Alan. I learned later that this was the modern form of Helen.

"You want to report by phone then, don't you?" Alan took a compact packet about six inches square from a holster attached to her belt and handed it to Wilma.

So far as I could see, it had no special receiver for the ear. Wilma merely threw back a lid, as though she were opening a book, and began to talk. The voice that came back from the machine was as audible as her own.

She was queried closely as to the attack upon her, and at considerable length as to myself, and I could tell from the tone of that voice that its owner was not prepared to take me at my face value as readily as Wilma had. For that matter, neither was the other girl. I could realize it from the suspicious glances she threw my way, when she thought my attention was elsewhere, and the manner in which her hand hovered constantly near her gun holster.

Wilma was ordered to bring me in at once, and informed that another scout would take her place on the

other side of the mountain. So she closed down the lid of the phone and handed it back to Alan, who seemed relieved to see us departing over the tree tops in the direction of the camps.

We had covered perhaps ten miles, in what still seemed to me a surprisingly easy fashion, when Wilma explained, that from here on we would have to keep to the ground. We were nearing the camps, she said, and there was always the possibility that some small Han scoutship, invisible high in the sky, might catch sight of us through a projectoscope and thus find the general location of the camps.

Wilma took me to the Scout office, which proved to be a small building of irregular shape, conforming to the trees around it, and substantially constructed of green sheet like material.

I was received by the assistant Scout Boss, who reported my arrival at once to the historical office, and to officials he called the Psycho Boss and the History Boss, who came in a few minutes later. The attitude of all three men was at first polite but skeptical, and Wilma's ardent advocacy seemed to amuse them secretly.

For the next two hours I talked, explained and answered questions. I had to explain, in detail, the manner of my life in the 20th Century and my understanding of customs, habits, business, science and the history of that period, and about developments in the centuries that had elapsed. Had I been in a classroom, I would have come through the examination with a very poor mark, for I was unable to give any answer to fully half of their questions. But before long I realized that the majority of these questions were designed as traps. Objects, of whose purpose I knew nothing, were casually handed to me, and I was watched keenly as I handled them.

In the end I could see both amazement and belief begin to show in the faces of my inquisitors, and at last the Historical and Psycho Bosses agreed openly that they could find no flaw in my story or reactions, and that unbelievable as it seemed, my story must be accepted as genuine.

They took me at once to Big Boss Hart. He was a portly man with a "poker face." He would probably have been the successful politician even in the 20th Century.

They gave him a brief outline of my story and a report of their examination of me. He made no comment other than to nod his acceptance of it. Then he turned to me.

"How does it feel?" he asked. "Do we look funny to you?"

"A bit strange," I admitted. "But I'm beginning to lose that dazed feeling, though I can see I have an awful lot to learn."

"Maybe we can learn some things from you, too," he said. "So you fought in the First World War. Do you know, we have very little left in the way of records of the details of that war, that is, the precise conditions under which it was fought, and the tactics employed. We forgot many things during the Han terror, and—well, I think you might have a lot of ideas worth thinking over for our raid masters. By the way,

now that you're here, and can't go back to your own century, so to speak, what do you want to do? You're welcome to become one of us. Or perhaps you'd just like to visit with us for a while, and then look around among the other gangs. Maybe you'd like some of the others better. Don't make up your mind now. We'll put you down as an exchange for a while. Let's see. You and Bill Hearn ought to get along well together. He's Camp Boss of Number 34 when he isn't acting as Raid Boss or Scout Boss. There's a vacancy in his camp. Stay with him and think things over as long as you want to. As soon as you make up your mind to anything, let me know."

We all shook hands, for that was one custom that had not died out in five hundred years, and I set out with Bill Hearn.

Bill, like all the others, was clad in green. He was a big man. That is, he was about my own height, five feet eleven. This was considerably above the average now, for the race had lost something in stature, it seemed, through the vicissitudes of five centuries. Most of the women were a bit below five feet, and the men only a trifle above this height.

For a period of two weeks Bill was to confine himself to camp duties, so I had a good chance to familiarize myself with the community life. It was not easy. There were so many marvels to absorb. I never ceased to wonder at the strange combination of rustic social life and feverish industrial activity. At least, it was strange to me. For in my experience, industrial development meant crowded cities, tenements, paved streets, profusion of vehicles, noise, hurrying men and women with strained or dull faces, vast structures and ornate public works.

Here, however, was rustic simplicity, apparently isolated families and groups, living in the heart of the forest, with a quarter of a mile or more between households, a total absence of crowds, no means of conveyance other than the belts called jumpers, almost constantly worn by everybody, and an occasional rocket ship, used only for longer journeys, and underground plants or factories that were to my mind more like laboratories and engine rooms; many of them were excavations as deep as mines, with well finished, lighted and comfortable interiors. These people were adepts at camouflage against air observation. Not only would their activity have been unsuspected by an airship passing over the center of the community, but even by an enemy who might happen to drop through the screen of the upper branches to the floor of the forest. The camps, or household structures, were all irregular in shape and of colors that blended with the great trees among which they were hidden.

There were 724 dwellings or "camps" among the Wyomings, located within an area of about fifteen square miles. The total population was 8,688, every man, woman and child, whether member or "exchange," being listed.

The plants were widely scattered through the territory also. Nowhere was anything like congestion permitted. So far as possible, families and individuals were assigned to living quarters, not too far from the plants or offices in which their work lay.

All able-bodied men and women alternated in two-week periods between military and industrial service, except those who were needed for household work. Since working conditions in the plants and offices were ideal, and everybody thus had plenty of healthy outdoor activity in addition, the population was sturdy and active. Laziness was regarded as nearly the greatest of social offences. Hard work and general merit were variously rewarded with extra privileges, advancement to positions of authority, and with various items of personal equipment for convenience and luxury.

In leisure moments, I got great enjoyment from sitting outside the dwelling in which I was quartered with Bill Hearn and ten other men, watching the occasional passers-by, as with leisurely, but swift movements, they swung up and down the forest trail, rising from the ground in long almost-horizontal leaps, occasionally swinging from one convenient branch overhead to another before "sliding" back to the ground farther on. Normal traveling pace, where these trails were straight enough, was about twenty miles an hour. Such things as automobiles and railroad trains (the memory of them not more than a month old in my mind) seemed inexplicably silly and futile compared with such convenience as these belts or jumpers offered.

Bill suggested that I wander around for several days, from plant to plant, to observe and study what I could. The entire community had been apprised of my coming, my rating as an "exchange" reaching every building and post in the community, by means of ultronic broadcast. Everywhere I was welcomed in an interested and helpful spirit.

I visited the plants where ultronic vibrations were isolated from the ether and through slow processes built up into sub-electronic, electronic and atomic forms into the two great synthetic elements, ultron and inertron. I learned something, superficially at least, of the processes of combined chemical and mechanical action through which were produced the various forms of synthetic cloth. I watched the manufacture of the machines which were used at locations of construction to produce the various forms of building materials. But I was particularly interested in the munitions plants and the rocket ship shops.

Ultron is a solid of great molecular density and moderate elasticity, which has the property of being 100 percent conductive to those pulsations known as light, electricity and heat. Since it is completely permeable to light vibrations, it is therefore *absolutely invisible and non-reflective*. Its magnetic response is almost, but not quite, 100 percent also. It is therefore very heavy under normal conditions but extremely responsive to the *repellor* or anti-gravity rays, such as the Hans use as "*legs*" for their airships.

"Inertron is the second great triumph of American research and experimentation with ultronic forces. It was developed just a few years before my awakening in the abandoned mine. It is a synthetic element, built up, through a complicated heterodyning of ultronic pulsations, from "infra balanced" subionic forms. It is completely inert to both electric and magnetic forces in all the orders above the *ultronic*; that is to say, the *sub-electronic*, the *electronic*, the *atomic* and the *molecular*.

In consequence it has a number of amazing and valuable properties. One of these is *the total lack of weight*. Another is a total lack of heat. It has no molecular vibration whatever. It reflects 100 percent of the heat and light impinging upon it. It does not feel cold to the touch, of course, since it will not absorb the heat of the hand. It is a solid, very dense in molecular structure despite its lack of weight, of great strength and considerable elasticity. It is a perfect shield against the disintegrator rays.

Rocket guns are very simple contrivances so far as the mechanism of launching the bullet is concerned. They are simple light tubes, closed at the rear end, with a trigger actuated pin for piercing the thin skin at the base of the cartridge. This piercing of the skin starts the chemical and atomic reaction. The entire cartridge leaves the tube under its own power, at a very easy initial velocity, just enough to insure accuracy of aim; so the tube does not have to be of heavy construction. The bullet increases in velocity as it goes. It may be solid or explosive. It may explode on contact or on time, or a combination of these two.

Bill and I talked mostly of weapons, military tactics and strategy. Strangely enough he had no idea whatever of the possibilities of the barrage, though the tremendous effect of a "curtain of fire" with such high-explosive projectiles as these modern rocket guns used was obvious to me. But the barrage idea, it seemed, has been lost track of completely in the air wars that followed the First World War, and in the peculiar guerilla tactics developed by Americans in the later period of operations from the ground against Han airships, and in the gang wars which until a few generations ago I learned, had been almost continuous.

"I wonder," said Bill one day, "if we couldn't work up some form of barrage to spring on the Bad Bloods. The Big Boss told me today that he's been in communication with the other gangs, and all are agreed that the Bad Bloods might as well be wiped out for good. That attempt on Wilma Deering's life and their evident desire to make trouble among the gangs, has stirred up every community east of the Alleghanies. The Boss says that none of the others will object if we go after them. So I imagine that before long we will. Now show me again how you worked that business in the Argonne forest. The conditions ought to be pretty much the same."

I went over it with him in detail, and gradually we worked out a modified plan that would be better adapted to our more powerful weapons, and the use of jumpers.

"It will be easy," Bill exulted. "I'll slide down and talk it over with the Boss tomorrow."

During the first two weeks of my stay with the Wynnings, Wilma Deering and I saw a great deal of each other. I naturally felt a little closer friendship for her, in view of the fact that she was the first human being I saw after waking from my long sleep; her appreciation of my saving her life, though I could not have

done otherwise than I did in that matter, and most of all my own appreciation of the fact that she had not found it as difficult as the others to believe my story, operated in the same direction. I could easily imagine my story must have sounded incredible.

It was natural enough too, that she should feel an unusual interest in me. In the first place, I was her personal discovery. In the second, she was a girl of studious and reflective turn of mind. She never got tired of my stories and descriptions of the 20th Century.

The others of the community, however, seemed to find our friendship a bit amusing. It seemed that Wilma had a reputation for being cold toward the opposite sex, and so others, not being able to appreciate some of her fine qualities as I did, misinterpreted her attitude, much to their own delight. Wilma and I, however, ignored this as much as we could.

CHAPTER IV

A Han Air Raid

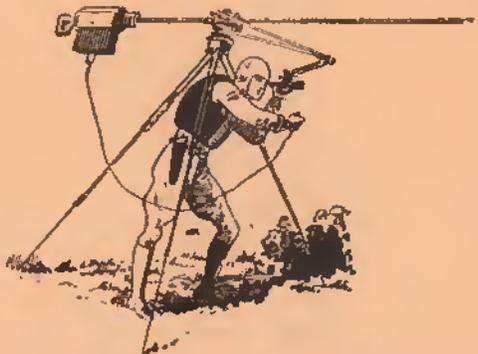
THERE was a girl in Wilma's camp named Gerdi Mann, with whom Bill Hearn was desperately in love, and the four of us used to go around a lot together. Gerdi was a distinct type. Whereas Wilma had the usual dark brown hair and hazel eyes that marked nearly every member of the community, Gerdi had red hair, blue eyes and very fair skin. She has been dead many years now, but I remember her vividly because she was a throwback in physical appearance to a certain 20th Century type which I have found very rare among modern Americans; also because the four of us were engaged one day in a discussion of this very point, when I obtained my first experience of a Han air raid.

We were sitting high on the side of a hill overlooking the valley that teemed with human activity, invisible beneath its blanket of foliage.

The other three, who knew of the Irish but vaguely and indefinitely, as a race on the other side of the globe, which, like ourselves, had succeeded in maintaining a precarious and fugitive existence in rebellion against the Mongolian domination of the earth, were listening with interest to my theory that Gerdi's ancestors of several hundred years ago must have been Irish. I explained that Gerdi was an Irish type, evidently a throwback, and that her surname might well have been McMann, or McMahan, and still more anciently "mac Mathghamhain." They were interested too in my surmise that "Gerdi" was the same name as that which had been "Gerty" or "Gertrude" in the 20th Century.

In the middle of our discussion, we were startled by an alarm rocket that burst high in the air, far to the north, spreading a pall of red smoke that drifted like a cloud. It was followed by others at scattered points in the Northern sky.

"A Han raid!" Bill exclaimed in amazement. "The first in seven years!"



Setting his rocket gun for a long distance shot.

"Maybe it's just one of their ships off its course," I ventured.

"No," said Wilma in some agitation. "That would be green rockets. Red means only one thing, Tony. They're sweeping the countryside with their dis beams. Can you see anything, Bill?"

"We had better get under cover," Gerdi said nervously. "The four of us are bunched here in the open. For all we know they may be twelve miles up, out of sight, yet looking at us with a projecto'."

Bill had been sweeping the horizon hastily with his glass, but apparently saw nothing.

"We had better scatter, at that," he said finally. "It's orders, you know. See!" He pointed to the valley.

Here and there a tiny human figure shot for a moment above the foliage of the treetops.

"That's bad," Wilma commented, as she counted the jumpers. "No less than fifteen people visible, and all clearly radiating from a central point. Do they want to give away our location?"

The standard orders covering air raids were that the population was to scatter individually. There should be no grouping, or even pairing, in view of the destructiveness of the disintegrator rays. Experience of generations had proved that if this were done, and everybody remained hidden beneath the tree screens, the Hans would have to sweep mile after mile of territory, foot by foot, to catch more than a small percentage of the community.

Gerdi, however, refused to leave Bill, and Wilma developed an equal obstinacy against quitting my side. I was inexperienced at this sort of thing, she explained, quite ignoring the fact that she was too; she was only thirteen or fourteen years old at the time of the last air raid.

However, since I could not argue her out of it, we leaped together about a quarter of a mile to the right, while Bill and Gerdi disappeared down the hillside among the trees.

Wilma and I both wanted a point of vantage from which we might overlook the valley and the sky to the North, and we found it near the top of the ridge, where, protected from visibility by thick branches, we could look out between the tree trunks, and get a good view of the valley.

No more rockets went up. Except for a few of those warning red clouds, drifting lazily in a blue sky, there was no visible indication of man's past or present existence anywhere in the sky or on the ground.

Then Wilma gripped my arm and pointed. I saw it; away off in the distance; looking like a phantom dirigible airship, in its coat of low-visibility paint, a bare spectre.

"Seven thousand feet up," Wilma whispered, crouching close to me. "Watch."

The ship was about the same shape as the great dirigibles of the 20th Century that I had seen, but without the suspended control car, engines, propellers, rudders or elevating planes. As it loomed rapidly nearer, I saw that it was wider and somewhat flatter than I had supposed.

Now I could see the repeller rays that held the ship aloft, like searchlight beams faintly visible in the bright

daylight (and still faintly visible to the human eye at night). Actually, I had been informed by my instructors, there were two rays; the visible one generated by the ship's apparatus, and directed toward the ground as a beam of "carrier" impulses; and the true repeller ray, the complement of the other in one sense, induced by the action of the "carrier" and reacting in a concentrating upward direction from the mass of the earth, becoming successively electronic, atomic and finally molecular, in its nature, according to various ratios of distance between earth mass and "carrier" source, until, in the last analysis, the ship itself actually is supported on an upward rushing column of air, much like a ball continuously supported on a fountain jet.

The raider neared with incredible speed. Its rays were both slanted astern at a sharp angle, so that it slid forward with tremendous momentum.

The ship was operating two disintegrator rays, though only in a casual, intermittent fashion. But whenever they flashed downward with blinding brilliancy, forest, rocks and ground melted instantaneously into nothing, where they played upon them.

When later I inspected the scars left by these rays I found them some five feet deep and thirty feet wide, the exposed surfaces being lava-like in texture, but of a pale, iridescent, greenish hue.

No systematic use of the rays was made by the ship, however, until it reached a point over the center of the valley—the center of the community's activities. There it came to a sudden stop by shooting its repeller beams sharply forward and easing them back gradually to the vertical, holding the ship floating and motionless. Then the work of destruction began systematically.

Back and forth traveled the destroying rays, ploughing parallel furrows from hillside to hillside. We gasped in dismay, Wilma and I, as time after time we saw it plough through sections where we knew camps or plants were located.

"This is awful" she moaned, a terrified question in her eyes. "How could they know the location so exactly, Tony? Did you see? They were never in doubt. They stalled at a predetermined spot—and—and it was exactly the right spot."

We did not talk of what might happen if the rays were turned in our direction. We both knew. We would simply disintegrate in a split second into mere scattered electronic vibrations. Strangely enough, it was this self-reliant girl of the 25th Century, who clung to me, a relatively primitive man of the 20th, less familiar than she with the thought of this terrifying possibility, for moral support.

We knew that many of our companions must have been whisked into absolute non-existence before our eyes in these few moments. The whole thing paralyzed us into mental and physical immobility for I do not know how long.

It couldn't have been long, however, for the rays had not ploughed more than thirty of their twenty-foot furrows or so across the valley, when I regained control of myself, and brought Wilma to herself by shaking her roughly.

"How far will this rocket gun shoot, Wilma?" I demanded, drawing my pistol.

"It depends on your rocket, Tony. It will take even the longest range rocket, but you could shoot more accurately from a longer tube. But why? You couldn't penetrate the shell of that ship with rocket force, even if you could reach it."

I fumbled clumsily with my rocket pouch, for I was excited. I had an idea I wanted to try; a "hunch" I called it, forgetting that Wilma could not understand my ancient slang. But finally, with her help, I selected the longest range explosive rocket in my pouch, and fitted it to my pistol.

"It won't carry seven thousand feet, Tony," Wilma objected. But I took aim carefully. It was another thought that I had in my mind. The supporting repeller ray, I had been told, became molecular in character at what was called a logarithmic level of five (below that it was a purely electronic "flow" or pulsation between the source of the "carrier" and the average mass of the earth). Below that level if I could project my explosive bullet into this stream where it began to carry material substance upward, might it not rise with the air column, gathering speed and hitting the ship with enough impact to carry it through the shell? It was worth trying anyhow. Wilma became greatly excited, too, when she grasped the nature of my inspiration.

Feverishly I looked around for some formation of branches against which I could rest the pistol, for I had to aim most carefully. At last I found one. Patiently I sighted on the hulk of the ship far above us, aiming at the far side of it, at such an angle as would, so far as I could estimate, bring my bullet path through the forward repeller beam. At last the sights wavered across the point I sought and I pressed the button gently.

For a moment we gazed breathlessly.

Suddenly the ship swung bow down, as on a pivot, and swayed like a pendulum. Wilma screamed in her excitement.

"Oh Tony, you hit it! You hit it! Do it again; bring it down!"

We had only one more rocket of extreme range between us, and we dropped it three times in our excitement in inserting it in my gun. Then, forcing myself to be calm by sheer will power, while Wilma stuffed her little fist into her mouth to keep from shrieking, I sighted carefully again and fired. In a flash, Wilma had grasped the hope that this discovery of mine might lead to the end of the Han domination.

The elapsed time of the rocket's invisible flight seemed an age.

Then we saw the ship falling. It seemed to plunge lazily, but actually it fell with terrific acceleration, turning end over end, its disintegrator rays, out of control, describing vast, wild arcs, and once cutting a gash through the forest less than two hundred feet from where we stood.

The crash with which the heavy craft hit the ground reverberated from the hills—the momentum of eighteen or twenty thousand tons, in a sheer drop of seven thousand feet. A mangled mass of metal, it buried itself in the ground, with poetic justice, in the middle of the smoking, semi-molten field of destruction it had been so deliberately ploughing.

The silence, the vacuity of the landscape, was oppressive, as the last echoes died away.

Then far down the hillside, a single figure leaped exultantly above the foliage screen. And in the distance another, and another.

In a moment the sky was punctured by signal rockets. One after another the little red puffs became drifting clouds.

"Scatter! Scatter!" Wilma exclaimed. "In half an hour there'll be an entire Han fleet here from Nu-yok, and another from Bah-flo. They'll get this instantly on their recordographs and location finders. They'll blast the whole valley and the country for miles beyond. Come, Tony. There's no time for the gang to rally. See the signals. We've got to jump. Oh, I'm so proud of you!"

Over the ridge we went, in long leaps towards the east, the country of the Delawares.

From time to time signal rockets puffed in the sky. Most of them were the "red warnings," the "scatter" signals. But from certain of the others, which Wilma identified as Wyoming rockets, she gathered that whoever was in command (we did not know whether the Boss was alive or not) was ordering an ultimate rally toward the south, and so we changed our course.

It was a great pity, I thought, that the clan had not been equipped throughout its membership with ultraphones, but Wilma explained to me, that not enough of these had been built for distribution as yet, although general distribution had been contemplated within a couple of months.

We traveled far before nightfall overtook us, trying only to put as much distance as possible between ourselves and the valley.

When gathering dusk made jumping too dangerous, we sought a comfortable spot beneath the trees, and consumed part of our emergency rations. It was the first time I had tasted the stuff—a highly nutritive synthetic substance called "concentro," which was, however, a bit bitter and unpalatable. But as only a mouthful or so was needed, it did not matter.

Neither of us had a cloak, but we were both thoroughly tired and happy, so we curled up together for warmth. I remember Wilma making some sleepy remark about our mating, as she cuddled up, as though the matter were all settled, and my surprise at my own instant acceptance of the idea, for I had not consciously thought of her that way before. But we both fell asleep at once.

In the morning we found little time for love making. The practical problem facing us was too great. Wilma felt that the Wyoming plan must be to rally in the Susquanna territory, but she had her doubts about the wisdom of this plan. In my elation at my success in bringing down the Han ship, and my newly found interest in my charming companion, who was, from my viewpoint of another century, at once more highly civilized and yet more primitive than myself, I had forgotten the ominous fact that the Han ship I had destroyed must have known the exact location of the Wyoming Works.

This meant, to Wilma's logical mind, either that the Hans had perfected new instruments as yet unknown

to us, or that somewhere, among the Wyomings or some other nearby gang, there were traitors so degraded as to commit that unthinkable act of trafficking in information with the Hans. In either contingency, she argued, other Han raids would follow, and since the Susquannas had a highly developed organization and more than usually productive plants, the next raid might be expected to strike them.

But at any rate it was clearly our business to get in touch with the other fugitives as quickly as possible, so in spite of muscles that were sore from the excessive leaping of the day before, we continued on our way.

We traveled for only a couple of hours when we saw a multi-colored rocket in the sky, some ten miles ahead of us.

"Bear to the left, Tony," Wilma said, "and listen for the whistle."

"Why?" I asked.

"Haven't they given you the rocket code yet?" she replied. "That's what the green, followed by yellow and purple means; to concentrate five miles east of the rocket position. You know the rocket position itself might draw a play of disintegrator beams."

It did not take us long to reach the neighborhood of the indicated rallying, though we were now traveling beneath the trees, with but an occasional leap to a top branch to see if any more rocket smoke was floating above. And soon we heard a distant whistle.

We found about half the Gang already there, in a spot where the trees met high above a little stream. The Big Boss and Raidbosses were busy reorganizing the remnants.

We reported to Boss Hart at once. He was silent, but interested, when he heard our story.

"You two stick close to me," he said, adding grimly, "I'm going back to the valley at once with a hundred picked men, and I'll need you."

CHAPTER V Setting the Trap

INSIDE of fifteen minutes we were on our way. A certain amount of caution was sacrificed for the sake of speed, and the men leaped away either across the forest top, or over open spaces of ground, but concentration was forbidden. The Big Boss named the spot on the hillside as the rallying point.

"We'll have to take a chance on being seen, so long as we don't group," he declared, "at least until within five miles of the rallying spot. From then on I want every man to disappear from sight and to travel under cover. And keep your ultraphones open, and tuned on ten-four-seven-six."

Wilma and I had received our battle equipment from the Gear boss. It consisted of a long-gun, a hand-gun, with a special case of ammunition constructed of inertron, which made the load weigh but a few ounces, and a short sword. This gear we strapped over each other's shoulders, on top of our jumping belts. In addition, we each received an ultraphone, and a light inertron blanket rolled into a cylinder about six inches long by two or three in diameter. This fabric was exceedingly thin and light, but it had considerable warmth, be-



The Han raider neared with incredible speed. Its rays were both slanted astern at a sharp angle, so that it slid forward with tremendous momentum . . . Whenever the disintegrator rays flashed downward with blinding brilliancy, forest, rocks and ground melted instantaneously into nothing, where they played upon them.

cause of the mixture of inertron in its composition.

"This looks like business," Wilma remarked to me with sparkling eyes. (And I might mention a curious thing here. The word "business" had survived from the 20th Century American vocabulary, but not with any meaning of "industry" or "trade," for such things being purely community activities were spoken of as "work" and "clearing." Business simply meant fighting; and that was all.)

"Did you bring all this equipment from the valley?" I asked the Gear boss.

"No," he said. "There was no time to gather anything. All this stuff we cleared from the Susquannas a few hours ago. I was with the Boss on the way down, and he had me jump on ahead and arrange it. But you two had better be moving. He's beckoning you now."

Hart was about to call us on our phones when we looked up. As soon as we did so, he leaped away, waving us to follow closely.

He was a powerful man, and he darted ahead in long, swift, low leaps up the banks of the stream, which followed a fairly straight course at this point. By extending ourselves, however, Wilma and I were able to catch up to him.

As we gradually synchronized our leaps with his, he outlined to us, between the grunts that accompanied each leap, his plan of action.

"We have to start the big business—unh—sooner or later," he said. "And if—unh—the Hans have found any way of locating our positions—unh—it's time to start now, although the Council of Bosses—unh—had intended waiting a few years until enough rocket ships have been—unh—built. But no matter what the sacrifice—unh—we can't afford to let them get us on the run—unh—. We'll set a trap for the yellow devils in the—unh—valley if they come back for their wreckage—unh—and if they don't, we'll go rocketing for some of their liners—unh—on the Nu-yok, Clec-lan, Si-ka-ga course. We can use—unh—that idea of yours of shooting up the repellor—unh—beams. Want you to give us a demonstration."

With further admonition to follow him closely, he increased his pace, and Wilma and I were taxed to our utmost to keep up with him. It was only in ascending the slopes that my tougher muscles overbalanced his greater skill, and I was able to set the pace for him, as I had for Wilma.

We slept in greater comfort that night, under our inertron blankets, and were off with the dawn, leaping cautiously to the top of the ridge overlooking the valley which Wilma and I had left.

The Boss scanned the sky with his ultroscope, patiently taking some fifteen minutes to the task, and then swung his phone into use, calling the roll and giving the men their instructions.

His first order was for us all to slip our ear and chest discs into permanent position.

These ultrophones were quite different from the one used by Wilma's companion scout the day I saved her from the vicious attack of the bandit Gang. That one was contained entirely in a small pocket case. These, with which we were now equipped, consisted of a pair of ear discs, each a separate and self-contained receiving

set. They slipped into little pockets over our ears in the fabric helmets we wore, and shut out virtually all extraneous sounds. The chest discs were likewise self-contained sending sets, strapped to the chest a few inches below the neck and actuated by the vibrations from the vocal cords through the body tissues. The total range of these sets was about eighteen miles. Reception was remarkably clear, quite free from the static that so marked the 20th Century radios, and of a strength in direct proportion to the distance of the speaker.

The Boss' set was triple powered, so that his orders would cut in on any local conversations, which were indulged in, however, with great restraint, and only for the purpose of maintaining contacts.

I marveled at the efficiency of this modern method of battle communication in contrast to the clumsy signaling devices of more ancient times; and also at other military contrasts in which the 20th and 25th Century methods were the reverse of each other in efficiency. These modern Americans, for instance, knew little of hand to hand fighting, and nothing, naturally, of trench warfare. Of barrages they were quite ignorant, although they possessed weapons of terrific power. And until my recent flash of inspiration, no one among them, apparently, had ever thought of the scheme of shooting a rocket into a repellor beam and letting the beam itself hurl it upward into the most vital part of the Han ship.

Hart patiently placed his men, first giving his instructions to the campmasters, and then remaining silent, while they placed the individuals.

In the end, the hundred men were ringed about the valley, on the hillsides and tops, each in a position from which he had a good view of the wreckage of the Han ship. But not a man had come in view, so far as I could see, in the whole process.

The Boss explained to me that it was his idea that he, Wilma and I should investigate the wreck. If Han ships should appear in the sky, we would leap for the hillsides.

I suggested to him to have the men set up their long-guns trained on an imaginary circle surrounding the wreck. He busied himself with this after the three of us leaped down to the Han ship, serving as a target himself, while he called on the men individually to aim their pieces and lock them in position.

In the meantime Wilma and I climbed into the wreckage, but did not find much. Practically all of the instruments and machinery had been twisted out of all recognizable shape, or utterly destroyed by the ship's disintegrator rays which apparently had continued to operate in the midst of its warped remains for some moments after the crash.

It was unpleasant work searching the mangled bodies of the crew. But it had to be done. The Han clothing, I observed, was quite different from that of the Americans, and in many respects more like the garb to which I had been accustomed in the earlier part of my life. It was made of synthetic fabrics like silks, loose and comfortable trousers of knee length, and sleeveless shirts.

No protection, except that against drafts, was

needed, Wilma explained to me, for the Han cities were entirely enclosed, with splendid arrangements for ventilation and heating. These arrangements of course were equally adequate in their airships. The Hans, indeed, had quite a distaste for unshaded daylight, since their lighting apparatus diffused a controlled amount of violet rays, making the unmodified sunlight unnecessary for health, and undesirable for comfort. Since the Hans did not have the secret of inerton, none of them wore anti-gravity belts. Yet in spite of the fact that they had to bear their own full weights at all times, they were physically far inferior to the Americans, for they lived lives of degenerative physical inertia, having machinery of every description for the performance of all labor, and convenient conveyances for any movement of more than a few steps.

Even from the twisted wreckage of this ship I could see that seats, chairs and couches played an extremely important part in their scheme of existence.

But none of the bodies were overweight. They seemed to have been the bodies of men in good health, but muscularly much underdeveloped. Wilma explained to me that they had mastered the science of gland control, and of course dietetics, to the point where men and women among them not uncommonly reached the age of a hundred years with arteries and general health in splendid condition.

I did not have time to study the ship and its contents as carefully as I would have liked, however. Time pressed, and it was our business to discover some clue to the deadly accuracy with which the ship had spotted the Wyoming Works.

The Boss had hardly finished his arrangements for the ring barrage, when one of the scouts on an eminence to the north, announced the approach of seven Han ships, spread out in a great semicircle.

Hart leaped for the hillside, calling to us to do likewise, but Wilma and I had raised the flaps of our helmets and switched off our "speakers" for conversation between ourselves, and by the time we discovered what had happened, the ships were clearly visible, so fast were they approaching.

"Jump!" we heard the Boss order, "Deering to the north. Rogers to the east."

But Wilma looked at me meaningly and pointed to where the twisted plates of the ship, projecting from the ground, offered a shelter.

"Too late, Boss," she said. "They'd see us. Besides I think there's something here we ought to look at. It's probably their magnetic graph."

"You're signing your death warrant," Hart warned.

"We'll risk it" said Wilma and I together.

"Good for you," replied the Boss. "Take command then, Rogers, for the present. Do you all know his voice, boys?"

A chorus of assent rang in our ears, and I began to do some fast thinking as the girl and I ducked into the twisted mass of metal.

"Wilma, hunt for that record," I said, knowing that by the simple process of talking I could keep the entire command continuously informed as to the situation. "On the hillsides, keep your guns trained on the circles and stand by. On the hilltops, how many of you are

there? Speak in rotation from Bald Knob around to the east, north, west."

In turn the men called their names. There were twenty of them.

I assigned them by name to cover the various Han ships, numbering the latter from left to right.

"Train your rockets on their repellor rays about three-quarters of the way up, between ships and ground. Aim is more important than elevation. Follow those rays with your aim continuously. Shoot when I tell you, not before. Deering has the record. The Hans probably have not seen us, or at least think there are but two of us in the valley, since they're settling without opening up disintegrators. Any opinions?"

My ear discs remained silent.

"Deering and I remain here until they land and debark. Stand by and keep alert."

Rapidly and easily the largest of the Han ships settled to the earth. Three scouted sharply to the south, rising to a higher level. The others floated motionless about a thousand feet above.

Peeping through a small fissure between two plates, I saw the vast hulk of the ship come to rest full on the line of our prospective ring barrage. A door clanged open a couple of feet from the ground, and one by one the crew emerged.

CHAPTER VI

The "Wyoming Massacre"

THEY'RE coming out of the ship." I spoke quietly, with my hand over my mouth, for fear they might hear me. "One—two—three—four—five—six—seven—eight—nine. That seems to be all. Who knows how many men a ship like that is likely to carry?"

"About ten, if there are no passengers," replied one of my men, probably one of those on the hillside.

"How are they armed?" I asked.

"Just knives," came the reply. "They never permit hand-rays on the ships. Afraid of accidents. Have a ruling against it."

"Leave them to us then," I said, for I had a hastily formed plan in my mind. You, on the hillsides, take the ships above. Abandon the ring target. Divide up in training on those repellor rays. You on the hilltops, all train on the repellors of the ships to the south. Shoot at the word, but not before.

"Wilma, crawl over to your left where you can make a straight leap for the door in that ship. These men are all walking around the wreck in a bunch. When they're on the far side, I'll give the word and you leap through that door in one bound. I'll follow. Maybe we won't be seen. We'll overpower the guard inside, but don't shoot. We may escape being seen by both this crew and ships above. They can't see over this wreck."

It was so easy that it seemed too good to be true. The Hans who had emerged from the ship walked round the wreckage lazily, talking in guttural tones, keenly interested in the wreck, but quite unsuspecting.

At last they were on the far side. In a moment they would be picking their way into the wreck.

"Wilma, leap!" I almost whispered the order.

The distance between Wilma's hiding place and the door in the side of the Han ship was not more than fifteen feet. She was already crouched with her feet braced against a metal beam. Taking the lift of that wonderful inertron belt into her calculation, she dove headforemost, like a green projectile, through the door. I followed in a split second, more clumsily, but no less speedily, bruising my shoulder painfully, as I ricocheted from the edge of the opening and brought up sliding against the unconscious girl; for she evidently had hit her head against the partition within the ship into which she had crashed.

We had made some noise within the ship. Shuffling footsteps were approaching down a well lit gangway.

"Any signs we have been observed?" I asked my men on the hillsides.

"Not yet," I heard the Boss reply, "Ships overhead still standing. No beams have been broken out. Men on ground absorbed in wreck. Most of them have crawled into it out of sight."

"Good," I said quickly. "Deering hit her head. Knocked out. One or more members of the crew approaching. We're not discovered yet. I'll take care of them. Stand a bit longer, but be ready."

I think my last words must have been heard by the man who was approaching, for he stopped suddenly.

I crouched at the far side of the compartment, motionless. I would not draw my sword if there were only one of them. He would be a weakling, I figured, and I should easily overcome him with my bare hands.

Apparently reassured at the absence of any further sound, a man came around a sort of bulkhead—and I leaped.

I swung my legs up in front of me as I did so, catching him full in the stomach and knocked him cold.

I ran forward along the keel gangway, searching for the control room. I found it well up in the nose of the ship. And it was deserted. What could I do to jam the controls of the ships that would not register on the recording instruments of the other ships? I gazed at the mass of controls. Levers and wheels galore. In the center of the compartment, on a massively braced universal joint mounting, was what I took for the repellor generator. A dial on it glowed and a faint hum came from within its shielding metallic case. But I had no time to study it.

Above all else, I was afraid that some automatic telephone apparatus existed in the room, through which I might be heard on the other ships. The risk of trying to jam the controls was too great. I abandoned the idea and withdrew softly. I would have to take a chance that there was no other member of the crew aboard.

I ran back to the entrance compartment. Wilma still lay where she had slumped down. I heard the voices of the Hans approaching. It was time to act. The next few seconds would tell whether the ships in the air would try or be able to melt us into nothingness. I spoke.

"Are you boys all ready?" I asked, creeping to a position opposite the door and drawing my hand-gun.

Again there was a chorus of assent.

"Then on the count of three, shoot up those repellor rays—all of them—and for God's sake, don't miss." And I counted.

I think my "three" was a bit weak. I know it took all the courage I had to utter it.

For an agonizing instant nothing happened, except that the landing party from the ship strolled into my range of vision.

Then startled, they turned their eyes upward. For an instant they stood frozen with horror at whatever they saw.

One hurled his knife at me. It grazed my cheek. Then a couple of them made a break for the doorway. The rest followed. But I fired pointblank with my hand-gun, pressing the button as fast as I could and aiming at their feet to make sure my explosive rockets would make contact and do their work.

The detonations of my rockets were deafening. The spot on which the Hans stood flashed into a blinding glare. Then there was nothing there except their torn and mutilated corpses. They had been fairly bunched, and I got them all.

I ran to the door, expecting any instant to be hurled into infinity by the sweep of a disintegrator ray.

Some eighth of a mile away I saw one of the ships crash to earth. A disintegrator ray came into my line of vision, wavered uncertainly for a moment and then began to sweep directly toward the ship in which I stood. But it never reached it. Suddenly, like a light switched off, it shot to one side, and a moment later another vast hulk crashed to earth. I looked out, then stepped out on the ground.

The only Han ships in the sky were two of the scouts to the south which were hanging perpendicularly, and sagging slowly down. The others must have crashed down while I was deafened by the sound of the explosion of my own rockets.

Somebody hit the other repellor ray of one of the two remaining ships and it fell out of sight beyond a hilltop. The other, farther away, drifted down diagonally, its disintegrator ray playing viciously over the ground below it.

I shouted with exultation and relief.

"Take back the command, Boss!" I yelled.

His commands, sending out jumpers in pursuit of the descending ship, rang in my ears, but I paid no attention to them. I leaped back into the compartment of the Han ship and knelt beside my Wilma. Her padded helmet had absorbed much of the blow, I thought; otherwise, her skull might have been fractured.

"Oh, my head!" she groaned, coming to as I lifted her gently in my arms and strode out in the open with her. "We must have won, dearest, did we?"

"We most certainly did," I reassured her. "All but one crashed and that one is drifting down toward the south; we've captured this one we're in intact. There was only one member of the crew aboard when we dove in."

Less than an hour afterwards the Big Boss ordered the outfit to tune in ultraphones on three-twenty-three to pick up a translated broadcast of the Han intelligence

office in Nu-yok from the Susquanna station. It was in the form of a public warning and news item, and read as follows;

"This is Public Intelligence Office, Nu-Yok, broadcasting warning to navigators of private ships, and news of public interest. The squadron of seven ships which left Nu-Yok this morning to investigate the recent destruction of the GK-984 in the Wyoming Valley, has been destroyed by a series of mysterious explosions similar to those which wrecked the GK-984.

"The phones, viewplates, and all other signaling devices of fire of the seven ships ceased operating suddenly at approximately the same moment, about seven-four-nine." (According to the Han system of reckoning time, seven and forty-nine one hundredths after midnight.) After violent disturbances the location finders went out of operation. Electroactivity registers applied to the territory of the Wyoming Valley remain dead.

"The Intelligence Office has no indication of the kind of disaster which overtook the squadron except certain evidences of explosive phenomena similar to those in the case of the GK-984, which recently went dead while beaming the valley in a systematic effort to wipe out the works and camps of the tribesmen. The Office considers, as obvious, the deduction that the tribesmen have developed a new, and as yet undetermined, technique of attack on airships, and has recommended to the Heaven-Born that immediate and unlimited authority be given the Navigation Intelligence Division to make an investigation of this technique and develop a defense against it.

"In the meantime it urges that private navigators avoid this territory in particular, and in general hold as closely as possible to the official inter-city routes, which now are being patrolled by the entire force of the Military Office, which is beaming the routes generously to a width of ten miles. The Military Office reports that it is at present considering no retaliatory raids against the tribesmen. With the Navigation Intelligence Division, it holds that unless further evidence of the nature of the disaster is developed in the near future, the public interest will be better served, and at smaller cost of life, by a scientific research than by attempts at retaliation, which may bring destruction on all ships engaging therein. So unless further evidence actually is developed, or the Heaven-Born orders to the contrary, the Military will hold to a defensive policy.

"Unofficial intimations from Lo-Tan are to the effect that the Heaven-Council has the matter under consideration.

"The Navigation Intelligence Office permits the broadcast of the following condensation of its detailed observations:

"The squadron proceeded to a position above the Wyoming Valley where the wreck of the GK-984 was known to be, from the record of its location finder be-

fore it went dead recently. There the bottom projectoscope relays of all ships registered the wreck of the GK-984. Teleprojectoscope views of the wreck and the bowl of the valley showed no evidence of the presence of tribesmen. Neither ship registers nor base registers showed any indication of electroactivity except from the squadron itself. On orders from the

Base Squadron Commander, the LD-248, LK-745 and LG-25 scouted southward at 3,000 feet. The GK-43, GK-981 and GK-220 stood above at 2,500 feet, and the GK-18 landed to permit personal inspection of the wreck by the science committee. The party debarked, leaving one man on board in the control cabin. He set all projectoscopes at universal focus except RB-3," (this meant the third projectoscope from the bow of the ship, on the right-hand side of the lower deck) "with which he fol-

lowed the landing group as it walked around the wreck.

"The first abnormal phenomenon recorded by any of the instruments at Base was that relayed automatically from projectoscope RB-4 of the GK-18, which as the party disappeared from view in back of the wreck, recorded two green missiles of roughly cylindrical shape, projected from the wreckage into the landing compartment of the ship. At such close range these were not clearly defined, owing to the universal focus at which the projectoscope was set. The Base Captain of GK-18 at once ordered the man in the control room to investigate, and saw him leave the control room in compliance with this order. An instant later confused sounds reached the control-room electrophone, such as might be made by a man falling heavily, and footsteps reapproached the control room, a figure entering and leaving the control room hurriedly. The Base Captain now believes, and the stills of the photorecord support his belief, that this was not the crew member who had been left in the control room. Before the Base Captain could speak to him he left the room, nor was any response given to the attention signal the Captain flashed throughout the ship.

"At this point projectoscope RB-3 of the ship now out of focus control, dimly showed the landing party walking back toward the ship. RB-4 showed it more clearly. Then on both these instruments, a number of blinding explosives in rapid succession were seen and the electrophone relays registered terrific concussions; the ship's electronic apparatus and projectoscopes apparatus went dead.

"Reports of the other ships' Base Observers and Executives, backed by the photorecords, show the explosions as taking place in the midst of the landing party as it returned, evidently unsuspecting, to the ship. Then in rapid succession they indicate that terrific explosions occurred inside and outside the three ships standing above close to their rep ray generators, and all signals from these ships thereupon went dead.

"Of the three ships scouting to the south, the LD-248 suffered an identical fate, at the same moment.



As the American leaped, he swung his legs up in front of him, catching the Han full in the stomach.

Its records add little to the knowledge of the disaster. But with the LK-745 and the LG-25 it was different.

"The relay instruments of the LK-745 indicated the destruction by an explosion of the rear rep-ray generator, and that the ship hung stern down for a short space, swinging like a pendulum. The forward viewplates and indicators did not cease functioning, but their records are chaotic, except for one projectoscope still, which shows the bowl of the valley, and the GK-981 falling, but no visible evidence of tribesmen. The control-room viewplate is also a chaotic record of the ship's crew tumbling and falling to the rear wall. Then the forward rep-ray generator exploded, and all signals went dead.

"The fate of the LG-25 was somewhat similar, except that this ship hung nose down, and drifted on the wind southward as it slowly descended out of control.

"As its control room was shattered, verbal report from its Action Captain was precluded. The record of the interior rear viewplate shows members of the crew climbing toward the rear rep-ray generator in an attempt to establish manual control of it, and increase the lift. The projectoscope relays, swinging in wide arcs, recorded little of value except at the ends of their swings. One of these, from a machine which happened to be set in telescopic focus, shows several views of great value in picturing the falls of the other ships, and all of the rear projectoscope records enable the reconstruction in detail of the pendulum and torsional movements of the ship, and its sag toward the earth. But none of the views showing the forest below contain any indication of tribesmen's presence. A final explosion put this ship out of commission at a height of 1,000 feet, and at a point four miles S. by E. of the center of the valley."

The message ended with a repetition of the warning to other airmen to avoid the valley.

CHAPTER VII

Incredible Treason

AFTER receiving this report, and reassurances of support from the Big Bosses of the neighboring Gangs, Hart determined to reestablish the Wyoming Valley community.

A careful survey of the territory showed that it was only the northern sections and slopes that had been "beamed" by the first Han ship.

The synthetic fabrics plant had been partially wiped out, though the lower levels underground had not been reached by the dis ray. The forest screen above it, however, had been annihilated, and it was determined to abandon it, after removing all usable machinery and evidences of the processes that might be of interest to the Han scientists, should they return to the valley in the future.

The ammunition plant, and the rocketship plant, which had just been about to start operation at the time of the raid, were intact, as were the other important plants.

Hart brought the Camboss up from the Susquanna Works, and laid out new camp locations, scattering them farther to the south, and avoiding ground

which had been seared by the Han beams and the immediate locations of the Han wrecks.

During this period, a sharp check was kept upon Han messages, for the phone plant had been one of the first to be put in operation, and when it became evident that the Hans did not intend any immediate reprisals, the entire membership of the community was summoned back, and normal life was resumed.

Wilma and I had been married the day after the destruction of the ships, and spent this intervening period in a delightful honeymoon, camping high in the mountains. On our return, we had a camp of our own, of course. We were assigned to location 1017. And as might be expected, we had a great deal of banter over which one of us was Camp Boss. The title stood after my name on the Big Boss' records, and those of the Big Camboss, of course, but Wilma airily held that this meant nothing at all—and generally succeeded in making me admit it whenever she chose.

I found myself a full-fledged member of the Gang now, for I had elected to search no farther for a permanent alliance, much as I would have liked to familiarize myself with this 25th Century life in other sections of the country. The Wyomings had a high morale, and had prospered under the rule of Big Boss Hart for many years. But many of the gangs, I found, were badly organized, lacked strong hands in authority, and were rife with intrigue. On the whole, I thought I would be wise to stay with a group which had already proved its friendliness, and in which I seemed to have prospects of advancement. Under these modern social and economic conditions, the kind of individual freedom to which I had been accustomed in the 20th Century was impossible. I would have been as much of a nonentity in every phase of human relationship by attempting to avoid alliances, as any man of the 20th Century would have been politically, who aligned himself with no political party.

This entire modern life, it appeared to me, judging from my ancient viewpoint, was organized along what I called "political" lines. And in this connection, it amused me to notice how universal had become the use of the word "boss." The leader, the person in charge or authority over anything, was a "boss." There was as little formality in his relations with his followers as there was in the case of the 20th Century political boss, and the same high respect paid him by his followers as well as the same high consideration by him of their interests. He was just as much of an autocrat, and just as much dependent upon the general popularity of his actions for the ability to maintain his autocracy.

The sub-boss who could not command the loyalty of his followers was as quickly deposed, either by them or by his superiors, as the ancient ward leader of the 20th Century who lost control of his votes.

As society was organized in the 20th Century, I do not believe the system could have worked in anything but politics. I tremble to think what would have happened, had the attempt been made to handle the A. E. F. this way during the First World War, instead of by that rigid military discipline and complete assumption of the individual as a mere standardized cog in the machine.

But owing to the centuries of desperate suffering the people had endured at the hands of the Hans, there developed a spirit of self-sacrifice and consideration for the common good that made the scheme applicable and efficient in all forms of human cooperation.

I have a little heresy about all this, however. My associates regard the thought with as much horror as many worthy people of the 20th Century felt in regard to any heretical suggestion that the original outline of government as laid down in the First Constitution did not apply as well to 20th Century conditions as to those of the early 19th.

In later years, I felt that there was a certain softening of moral fiber among the people, since the Hans had been finally destroyed with all their works; and Americans have developed a new luxury economy. I have seen signs of the reawakening of greed, of selfishness. The eternal cycle seems to be at work. I fear that slowly, though surely, private wealth is reappearing, codes of inflexibility are developing; they will be followed by corruption, degradation; and in the end some cataclysmic event will end this era and usher in a new one.

All this, however, is wandering afar from my story, which concerns our early battles against the Hans, and not our more modern problems of self-control.

Our victory over the seven Han ships had set the country ablaze. The secret had been carefully communicated to the other gangs, and the country was agog from one end to the other. There was feverish activity in the ammunition plants, and the hunting of stray Han ships became an enthusiastic sport. The results were disastrous to our hereditary enemies.

From the Pacific Coast came the report of a great Transpacific liner of 75,000 tons "lift" being brought to earth from a position of invisibility above the clouds. A dozen Sacramentos had caught the hazy outlines of its rep-rays approaching them, head-on, in the twilight, like ghostly pillars reaching into the sky. They had fired rockets into it with ease, whereas they would have had difficulty in hitting it if it had been moving at right angles to their position. They got one rep-ray. The other was not strong enough to hold it up. It floated to earth, nose down, and since it was unarmed and unarmored, they had no difficulty in shooting it to pieces and massacring its crew and passengers. It seemed barbarous to me. But then I did not have centuries of bitter persecution in my blood.

From the Jersey Beaches we received news of the destruction of a Nu-yok-A-lan-a liner. The Sand-snipers, practically invisible in their sand colored clothing, and half buried along the beaches, lay in wait for days, risking the play of dis beams along the route, and finally registering four hits within a week. The Hans discontinued their service along this route, and as evidence that they were badly shaken by our success, sent no raiders down the Beaches.

It was a few weeks later that Big Boss Hart sent for me.

"Tony," he said, "There are two things I want to talk to you about. One of them will become public property in a few days, I think. We aren't going to get any more Han ships by shooting up their repellor

rays unless we use much larger rockets. They are wise to us now. They're putting armor of great thickness in the hulls of their ships below the rep-ray machines. Near Bah-flo this morning a party of Eries shot one without success. The explosions staggered her, but did not penetrate. As near as we can gather from their reports, their laboratories have developed a new alloy of great tensile strength and elasticity which nevertheless lets the rep-rays through like a sieve. Our reports indicate that the Eries' rockets bounced off harmlessly. Most of the party was wiped out as the dis rays went into action on them.

"This is going to mean real business for all of the gangs before long. The Big Bosses have just held a national ultraphone council. It was decided that America must organize on a national basis. The first move is to develop sectional organization by Zones. I have been made Superboss of the Midatlantic Zone.

"We're in for it now. The Hans are sure to launch reprisal expeditions. If we're to save the race we must keep them away from our camps and plants. I'm thinking of developing a permanent field force, along the lines of the regular armies of the 20th Century you told me about. Its business will be twofold; to carry the warfare as much as possible to the Hans, and to serve as a decoy, to keep their attention from our plants. I'm going to need your help in this.

"The other thing I wanted to talk to you about is this: Amazing and impossible as it seems, there is a group, or perhaps an entire gang, somewhere among us, that is betraying us to the Hans. It may be the Bad Bloods, or it may be one of those gangs who live near one of the Han cities. You know, a hundred and fifteen or twenty years ago there were certain of these people's ancestors who actually degraded themselves by mating with the Hans, sometimes even serving them as slaves, in the days before they brought all their service machinery to perfection.

"There is such a gang, called the Nagras, up near Bah-flo, and another in Mid-Jersey that men call the Pineys. But I hardly suspect the Pineys. There is little intelligence among them. They wouldn't have the information to give the Hans, nor would they be capable of imparting it. They're absolute savages."

"Just what evidence is there that anybody has been clearing information to the Hans?" I asked.

"Well," he replied, "first of all there was that raid upon us. That first Han ship knew the location of our plants exactly. You remember it floated directly into position above the valley and began a systematic beaming. Then, the Hans quite obviously have learned that we are picking up their electrophone waves, for they've gone back to their old, but extremely accurate, system of directional control. But we've been getting them for the past week by installing automatic re-broadcast units along the scar paths. This is what the Americans called those strips of country directly under the regular ship routes of the Hans, who as a matter of precaution frequently blasted them with their dis beams to prevent the growth of foliage which might give shelter to the Americans. But they've been beaming those paths so hard, it looks as though they even had information of this strategy. And in addition,

they've been using code. Finally, we've picked up three of their messages in which they discuss, with some nervousness, the existence of our 'mysterious' ultraphone."

"But they still have no knowledge of the nature and control of ultronic activity?" I asked.

"No," said the Big Boss thoughtfully, "they don't seem to have a bit of information about it."

"Then it's quite clear," I ventured, "that whoever is 'clearing' us to them is doing it piecemeal. It sounds like a bit of occasional barter, rather than an out and out alliance. They're holding back as much information as possible for future bartering, perhaps."

"Yes," Hart said, "and it isn't information the Hans are giving in return, but some form of goods, or privilege. The trick would be to locate the goods. I guess I'll have to make a personal trip around among the Big Bosses."

CHAPTER VIII

The Han City

THIS conversation set me thinking. All of the Han electrophone inter-communication had been an open record to the Americans for a good many years, and the Hans were just finding it out. For centuries they had not regarded us as any sort of a menace. Unquestionably it had never occurred to them to secrete their own records. Somewhere in Nu-Yok or Bah-flo, or possibly in Lo-Tan itself, the record of this traitorous transaction would be more or less openly filed. If we could only get at it! I wondered if a raid might not be possible.

Bill Hearn and I talked it over with our Han-affairs Boss and his experts. There ensued several days of research, in which the Han records of the entire decade were scanned and analyzed. In the end they picked out a mass of detail, and fitted it together into a very definite picture of the great central filing office of the Hans in Nu-Yok, where the entire mass of official records was kept, constantly available for instant projectoscoping to any of the city's offices, and of the system by which the information was filed.

The attempt began to look feasible, though Hart instantly turned the idea down when I first presented it to him. It was unthinkable, he said. Sheer suicide. But in the end I persuaded him.

"I will need," I said, "Blash, who is thoroughly familiar with the Han library system; Bert Gaunt, who for years has specialized on their military offices; Bill Barker, the ray specialist, and the best swooper pilot we have." *Swoopers* are one-man and two-man ships, developed by the Americans, with skeleton backbones of inertron (during the war painted green for invisibility against the green forests below) and "bellies" of clear ultron.

"That will be Mort Gibbons," said Hart. "We've only got three swoopers left, Tony, but I'll risk one of them if you and the others will voluntarily risk your existences. But mind, I won't urge or order one of you to go. I'll spread the word to every Plant Boss at once to give you anything and everything you need in the way of equipment."

When I told Wilma of the plan, I expected her to raise violent and tearful objections, but she didn't. She was made of far sterner stuff than the women of the 20th Century. Not that she couldn't weep as copiously or be just as whimsical on occasion; but she wouldn't weep for the same reasons.

She just gave me an unfathomable look, in which there seemed to be a bit of pride, and asked eagerly for the details. I confess I was somewhat disappointed that she could so courageously risk my loss, even though I was amazed at her fortitude. But later I was to learn how little I knew her then.

We were ready to slide off at dawn the next morning. I had kissed Wilma good-bye at our camp, and after a final conference over our plans, we boarded our craft and gently glided away over the tree tops on a course, which, after crossing three routes of the Han ships, would take us out over the Atlantic, off the Jersey coast, whence we would come up on Nu-Yok from the ocean.

Twice we had to nose down and lie motionless on the ground near a route while Han ships passed. Those were tense moments. Had the green back of our ship been observed, we would have been disintegrated in a second. But it wasn't.

Once over the water, however, we climbed in a great spiral, ten miles in diameter, until our altimeter registered ten miles. Here Gibbons shut off his rocket motor, and we floated, far above the level of the Atlantic liners, whose course was well to the north of us anyhow, and waited for nightfall.

Then Gibbons turned from his control long enough to grin at me.

"I have a surprise for you, Tony," he said throwing back the lid of what I had supposed was a big supply case. And with a sigh of relief, Wilma stepped out of the case.

"If you 'go into zero' (a common expression of the day for being annihilated by the disintegrator ray), you don't think I'm going to let you go alone, do you, Tony? I couldn't believe my ears last night when you spoke of going without me, until I realized that you are still five hundred years behind the times in lots of ways. Don't you know, dear heart, that you offered me the greatest insult a husband could give a wife? You didn't, of course."

The others, it seemed, had all been in on the secret, and now they would have kidded me unmercifully, except that Wilma's eyes blazed dangerously.

At nightfall, we maneuvered to a position directly above the city. This took some time and calculation on the part of Bill Barker, who explained to me that he had to determine our point by ultronic bearings. The slightest resort to an electronic instrument, he feared, might be detected by our enemies' locaters. In fact, we did not dare bring our swooper any lower than five miles for fear that its capacity might be reflected in their instruments.

Finally, however, he succeeded in locating above the central tower of the city.

"If my calculations are as much as ten feet off," he remarked with confidence, "I'll eat the tower. Now the rest is up to you, Mort. See what you can do to

hold her steady. No—here, watch this indicator—the red beam, not the green one. See—if you keep it exactly centered on the needle, you're O.K. The width of the beam represents seventeen feet. The tower platform is fifty feet square, so we've got a good margin to work on."

For several moments we watched as Gibbons bent over his levers, constantly adjusting them with deft touches of his fingers. After a bit of wavering, the beam remained centered on the needle.

"Now," I said, "let's drop."

I opened the trap and looked down, but quickly shut it again when I felt the air rushing out of the ship into the rarefied atmosphere in a torrent. Gibbons literally yelled a protest from his instrument board.

"I forgot," I mumbled. "Silly of me. Of course, we'll have to drop out of compartment."

The compartment, to which I referred, was similar to those in some of the 20th Century submarines. We all entered it. There was barely room for us to stand, shoulder to shoulder. With some struggles, we got into our special air helmets and adjusted the pressure. At our signal, Gibbons exhausted the air in the compartment, pumping it into the body of the ship, and as the little signal light flashed, Wilma threw open the hatch.

Setting the ultron wire reel, I climbed through, and began to slide down gently.

We all had our belts on, of course, adjusted to a weight balance of but a few ounces. And the five-mile reel of ultron wire that was to be our guide, was of gossamer fineness, though, anyway, I believe it would have lifted the full weight of the five of us, so strong and tough was this invisible metal. As an extra precaution, since the wire was of the purest metal, and therefore totally invisible, even in daylight, we all had our belts hooked on small rings that slid down the wire.

I went down with the end of the wire. Wilma followed a few feet above me, then Barker, Gaunt and Blash. Gibbons, of course, stayed behind to hold the ship in position and control the paying out of the line. We all had our ultraphones in place inside our air helmets, and so could converse with one another and with Gibbons. But at Wilma's suggestion, although we would have liked to let the Big Boss listen in, we kept them adjusted to short-range work, for fear that those who had been clearing with the Hans, and against whom we were on a raid for evidence, might also pick up our conversation. We had no fear that the Hans would hear us. In fact, we had the added advantage that, even after we landed, we could converse freely without danger of their hearing our voices through our air helmets.

For a while I could see nothing below but utter darkness. Then I realized, from the feel of the air as much as from anything, that we were sinking through a cloud layer. We passed through two more cloud layers before anything was visible to us.

Then there came under my gaze, about two miles below, one of the most beautiful sights I have ever seen; the soft, yet brilliant, radiance of the great Han city of Nu-Yok. Every foot of its structural members seemed to glow with a wonderful incandescence, tower

piled up on tower, and all built on the vast base-mass of the city, which, so I had been told, sheered upward from the surface of the rivers to a height of 728 levels.

The city, I noticed with some surprise, did not cover anything like the same area as the New York of the 20th Century. It occupied, as a matter of fact, only the lower half of Manhattan Island, with one section straddling the East River and spreading out sufficiently over what once had been Brooklyn, to provide berths for the great liners and other air craft.

Straight beneath my feet was a tiny dark patch. It seemed the only spot in the entire city that was not aflame with radiance. This was the central tower, in the top floors of which were housed the vast library of record files and the main projectoscope plant.

"You can shoot the wire now," I ultraphoned Gibbons, and let go the little weighted knob. It dropped like a plummet, and we followed with considerable speed, but braking our descent with gloved hands sufficiently to see whether the knob, on which a faint light glowed as a signal for ourselves, might be observed by any Han guard or night prowler. Apparently it was not, and we again shot down with accelerated speed.

We landed on the roof of the tower without any mishap, and fortunately for our plan, in darkness. Since there was nothing above it on which it would have been worth while to shed illumination, or from which there was any need to observe it, the Hans had neglected to light the tower roof, or indeed to occupy it at all. This was the reason we had selected it as our landing place.

As soon as Gibbons had our word, he extinguished the knob light, and the knob, as well as the wire, became totally invisible. At our ultraphoned word, he would light it again.

"No gun play now," I warned. "Swords only, and then only if absolutely necessary."

Closely bunched, and treading as lightly as only intertron-belted people could, we made our way cautiously through a door and down an inclined plane to the floor below, where Gaunt and Blash assured us the military offices were located.

Twice Barker cautioned us to stop as we were about to pass in front of mirror-like "windows" in the passage wall, and flattening ourselves to the floor, we crawled past them.

"Projectoscopes" he said. "Probably on automatic record only, at this time of night. Still, we don't want to leave any records for them to study after we're gone."

"Were you ever here before?" I asked.

"No," he replied, "but I haven't been studying their electrophone communications for seven years without being able to recognize these machines when I run across them."

CHAPTER IX

The Fight in the Tower

SO far we had not laid eyes on a Han. The tower seemed deserted. Blash and Gaunt, however, assured me that there would be at least one man on "duty" in the military offices, though he would

probably be asleep, and two or three in the library proper and the projectoscope plant.

"We've got to put them out of commission," I said. "Did you bring the 'dope' cans, Wilma?"

"Yes," she said, "two for each. Here," and she distributed them.

We were now two levels below the roof, and at the point where we were to separate.

I did not want to let Wilma out of my sight, but it was necessary.

According to our plan, Barker was to make his way to the projectoscope plant, Blash and I to the library, and Wilma and Gaunt to the military office.

Blash and I traversed a long corridor, and paused at the great arched doorway of the library. Cautiously we peered in. Seated at three great switchboards were library operatives. Occasionally one of them would reach lazily for a lever, or sleepily push a button, as little numbered lights winked on and off. They were answering calls for electrograph and viewplate records on all sorts of subjects from all sections of the city.

I apprised my companions of the situation.

"Better wait a bit," Blash added. "The calls will lessen shortly."

Wilma reported an officer in the military office sound asleep.

"Give him the can, then," I said.

Barker was to do nothing more than keep watch in the projectoscope plant, and a few moments later he reported himself well concealed, with a splendid view of the floor.

"I think we can take a chance now," Blash said to me, and at my nod, he opened the lid of his dope can. Of course, the fumes did not affect us, through our helmets. They were absolutely without odor or visibility, and in a few seconds the librarians were unconscious. We stepped into the room.

There ensued considerable cautious observation and experiment on the part of Gaunt, working from the military office, and Blash in the library; while Wilma and I, with drawn swords and sharply attuned microphones, stood guard, and occasionally patrolled nearby corridors.

"I hear something approaching," Wilma said after a bit, with excitement in her voice. "It's a soft, gliding sound."

"That's an elevator somewhere," Barker cut in from the projectoscope floor. "Can you locate it? I can't hear it."

"It's to the east of me," she replied.

"And to my west," said I, faintly catching it. "It's between us, Wilma, and nearer you than me. Be careful. Have you got any information yet, Blash and Gaunt?"

"Getting it now," one of them replied. "Give us two minutes more."

"Keep at it then," I said. "We'll guard."

The soft, gliding sound ceased.

"I think it's very close to me," Wilma almost whispered. "Come closer Tony. I have a feeling something is going to happen. I've never known my nerves to get taut like this without reason."

In some alarm, I launched myself down the corridor

in a great leap toward the intersection whence I knew I could see her.

In the middle of my leap my ultraphone registered her gasp of alarm. The next instant I glided to a stop at the intersection to see Wilma backing toward the door of the military office, her sword red with blood, and an inert form on the corridor floor. Two other Hans were circling to either side of her with wicked looking knives, while a third evidently a high officer, judging by the resplendence of his garb tugged desperately to get an electrophone instrument out of a bulky pocket. If he ever gave the alarm, there was no telling what might happen to us.

I was at least seventy feet away, but I crouched low and sprang with every bit of strength in my legs. It would be more correct to say that I dived, for I reached the fellow head on, with no attempt to draw my legs beneath me.

Some instinct must have warned him, for he turned suddenly as I hurtled close to him. But by this time I had sunk close to the floor, and had stiffened myself rigidly, lest a dragging knee or foot might just prevent my reaching him. I brought my blade upward and over. It was a vicious slash that laid him open, bisecting him from groin to chin, and his dead body toppled down on me, as I slid to a tangled stop.

The other two startled, turned. Wilma leaped at one and struck him down with a side slash. I looked up at this instant, and the dazed fear on his face at the length of her leap, registered vividly. The Hans knew nothing of our inertron belts, it seemed, and these leaps and dives of ours filled them with terror.

As I rose to my feet, a gory mess, Wilma, with a poise and speed which I found time to admire even in this crisis, again leaped. This time she dove head first at I had done, and with a beautifully executed thrust, ran the last Han through the throat.

Uncertainly, she scrambled to her feet, staggered queerly, and then sank gently prone on the corridor. She had fainted.

At this juncture, Blash and Gaunt reported with elation that they had the record we wanted.

"Back to the roof, everybody!" I ordered, as I picked Wilma up in my arms. With her inertron belt, she felt as light as a feather.

Gaunt joined me at once from the military office, and at the intersection of the corridor, we came upon Blash waiting for us. Barker, however, was not in evidence.

"Where are you, Barker?" I called.

"Go ahead," he replied. "I'll be with you on the roof at once."

We came out in the open without any further mishap, and I instructed Gibbons in the ship to light the knob on the end of the ultron wire. It flashed dully a few feet away from us. Just how he had maneuvered the ship to keep our end of the line in position, without its swinging in a tremendous arc, I have never been able to understand. Had not the night been an unusually still one, he could not have checked the initial pendulum-like movements. As it was, there was considerable air current at certain of the levels, and in different directions too. But Gibbons was an expert of rare ability and sensitivity in the handling of a rocket

ship, and he managed, with the aid of his delicate instruments, to sense the drifts almost before they affected the fine ultron wire, and to neutralize them with little shifts in the position of the ship.

Blash and Gaunt fastened their rings to the wire, and I hooked my own and Wilma's on, too. But on looking around, I found Barker was still missing.

"Barker, come!" I called. "We're waiting."

"Coming!" he replied, and indeed, at that instant, his figure appeared up the ramp. He chuckled as he fastened his ring to the wire and said something about a little surprise he had left for the Hans.

"Don't reel in the wire more than a few hundred feet," I instructed Gibbons. "It will take too long to wind it in. We'll float up, and when we're aboard, we can drop it."

In order to float up, we had to dispense with a pound or two of weight apiece. We hurled our swords from us, and kicked off our shoes as Gibbons reeled up the line a bit, and then letting go of the wire, began to hum upward on our rings with increasing velocity.

The rush of air brought Wilma to, and I hastily explained to her that we had been successful. Receding far below us now, I could see our dully shining knob swinging to and fro in an ever widening arc, as it crossed and recrossed the black square of the tower roof. As an extra precaution, I ordered Gibbons to shut off the light, and to show one from the belly of the ship, for so great was our speed now, that I began to fear we would have difficulty in checking ourselves. We were literally falling upward, and with terrific acceleration.

Fortunately, we had several minutes in which to solve this difficulty, which none of us, strangely enough, had foreseen. It was Gibbons who found the answer.

"You'll be all right if all of you grab the wire tight when I give the word," he said. "First I'll start reeling it in at full speed. You won't get much of a jar, and then I'll decrease its speed again gradually, and its weight will hold you back. Are you ready? One—two—three!"

We all grabbed tightly with our gloved hands as he gave the word. We must have been rising a good bit faster than he figured, however, for it wrenched our arms considerably, and the maneuver set up a sickening pendulum motion.

For a while all we could do was swing there in an arc that may have been a quarter of a mile across, about three and a half miles above the city, and still more than a mile from our ship.

Gibbons skilfully took up the slack as our momentum pulled up the line. Then at last we had ourselves under control again, and continued our upward journey, checking our speed somewhat with our gloves.

There was not one of us who did not breathe a big sigh of relief when we scrambled through the hatch safely into the ship again, cast off the ultron line and slammed the trap shut.

Little realizing that we had a still more terrible experience to go through, we discussed the information Blash and Gaunt had between them extracted from the Han records, and the advisability of ultraphoning Hart at once.

CHAPTER X

The Walls of Hell

THE traitors were, it seemed, a degenerate gang of Americans, located a few miles north of Nu-Yok on the wooded banks of the Hudson, the Sinsings. They had exchanged scraps of information to the Hans in return for several old repeilor ray machines, and the privilege of tuning in on the Han electronic power broadcast for their operation, provided their ships agreed to subject themselves to the orders of the Han traffic office, while aloft.

The rest wanted to ultraphone their news at once, since there was always danger that we might never get back to the gang with it.

I objected, however. The Sinsings would be likely to pick up our message. Even if we used the directional projector, they might have scouts out to the west and south in the big inter-gang stretches of country. They would flee to Nu-Yok and escape the punishment they merited. It seemed to be vitally important that they should not, for the sake of example to other weak groups among the American gangs, as well as to prevent a crisis in which they might clear more vital information to the enemy.

"Out to sea again," I ordered Gibbons. "They'll be less likely to look for us in that direction."

"Easy, Boss, easy," he replied. "Wait until we get up a mile or two more. They must have discovered evidences of our raid by now, and their dis ray wall may go in operation any moment."

Even as he spoke, the ship lurched downward and to one side.

"There it is!" he shouted. "Hang on, everybody. We're going to nose straight up!" And he flipped the rocket motor control wide open.

Looking through one of the rear ports, I could see a nebulous, luminous ring, and on all sides the atmosphere took on a faint iridescence.

We were almost over the destructive range of the disintegrator ray wall, a hollow cylinder of annihilation shooting upward from a solid ring of generators surrounding the city. It was the main defense system of the Hans, which had never been used except in periodic tests. They may or may not have suspected that an American rocket ship was within the cylinder; probably they had turned on their generators more as a precaution to prevent any reaching a position above the city.

But even at our present great height, we were in great danger. It was a question how much we might have been harmed by the rays themselves, for their effective range was not much more than seven or eight miles. The greater danger lay in the terrific downward rush of air within the cylinder to replace that which was being burned into nothingness by the continual play of the disintegrators. The air fell into the cylinder with the force of a gale. It would be rushing toward the wall from the outside with terrific force also, but, naturally, the effect was intensified on the interior.

Our ship vibrated and trembled. We had only one chance of escape—to fight our way well above the current. To drift down with it meant ultimately, and in-

evitably, to be sucked into the destruction wall at some lower level.

But very gradually and jerkily our upward movement, as shown on the indicators, began to increase, and after an hour of desperate struggle we were free of the maelstrom and into the rarefied upper levels. The terror beneath us was now invisible through several layers of cloud formations.

Gibbons brought the ship back to an even keel, and drove her eastward into one of the most brilliantly gorgeous sunrises I have ever seen.

We described a great circle to the south and west, in a long easy dive, for he had cut out his rocket motors to save them as much as possible. We had drawn terrifically on their fuel reserves in our battle with the elements. For the moment, the atmosphere below cleared, and we could see the Jersey coast far beneath, like a great map.

"We're not through yet," remarked Gibbons suddenly, pointing at his periscope, and adjusting it to telescopic focus. "A Han ship, and a 'drop ship' at that—and he's seen us. If he whips that beam of his on us, we're done."

I gazed, fascinated, at the viewplate. What I saw was a cigar shaped ship not dissimilar to our own in design, and from the proportional size of its ports, of about the same size as our swoopers. We learned later that they carried crews, for the most part of not more than three or four men. They had streamline hulls and tails that embodied universal-jointed double fish-tail rudders. In operation they rose to great heights on their powerful repeller rays, then gathered speed either by a straight nose dive, or an inclined dive in which they sometimes used the repeller ray slanted at a sharp angle. He was already above us, though several miles to the north. He could, of course, try to get on our tail and "spear" us with his beam as he dropped at us from a great height.

Suddenly his beam blazed forth in a blinding flash, whipping downward slowly to our right. He went through a peculiar corkscrew-like evolution, evidently maneuvering to bring his beam to bear on us with a spiral motion.

Gibbons instantly sent our ship into a series of evolutions that must have looked like those of a frightened hen. Alternately, he used the forward and the reverse rocket blasts, and in varying degree. We fluttered, we shot suddenly to right and left, and dropped like a plummet in uncertain movements. But all the time the Han scout dropped toward us, determinedly whipping the air around us with his beam. Once it sliced across beneath us, not more than a hundred feet, and we dropped with a jar into the pocket formed by the destruction of the air.

He had dropped to within a mile of us, and was coming with the speed of a projectile, when the end came. Gibbons always swore it was sheer luck. Maybe it was, but I like pilots who are lucky that way.

In the midst of a dizzy, fluttering maneuver of our own, with the Han ship enlarging to our gaze with terrifying rapidity, and its beam slowly slicing toward us in what looked like certain destruction within the second, I saw Gibbons' fingers flick at the lever of his

rocket gun and a split second later the Han ship flew apart like a clay pigeon.

We staggered, and fluttered crazily for several moments while Gibbons struggled to bring our ship into balance, and a section of about four square feet in the side of the ship near the stern slowly crumbled like rusted metal. His beam actually had touched us, but our explosive rocket had got him a thousandth of a second sooner.

Part of our rudder had been annihilated, and our motor damaged. But we were able to swoop gently back across Jersey, fortunately crossing the ship lanes without sighting any more Han craft, and finally settling to rest in the little glade beneath the trees, near Hart's camp.

CHAPTER XI

The New Boss

WE had ultrophoned our arrival and the Big Boss himself, surrounded by the Council, was on hand to welcome us and learn our news. In turn we were informed that during the night a band of raiding Bad Bloods, disguised under the insignia of the Altoonas, a gang some distance to the west of us, had destroyed several of our camps before our people had rallied and driven them off. Their purpose, evidently, had been to embroil us with the Altoonas, but fortunately, one of our exchanges recognized the Bad Blood leader, who had been slain.

The Big Boss had mobilized the full raiding force of the Gang, and was on the point of heading an expedition for the extermination of the Bad Bloods.

I looked around the grim circle of the sub-bosses, and realized the fate of America, at this moment, lay in their hands. Their temper demanded the immediate expenditure of our full effort in revenging ourselves for this raid. But the strategic exigencies, to my mind, quite clearly demanded the instant and absolute extermination of the Sinsings. It might be only a matter of hours, for all we knew, before these degraded people would barter clues to the American ultronic secrets to the Hays.

"How large a force have we?" I asked Hart.

"Every man and maid who can be spared," he replied. "That gives us seven hundred married and unmarried men, and three hundred girls, more than the entire Bad Blood Gang. Every one is equipped with belts, ultrophones, rocket guns and swords, and all fighting mad."

I meditated how I might put the matter to these determined men, and was vaguely conscious that they were awaiting my words.

Finally I began to speak. I do not remember to this day just what I said. I talked calmly, with due regard for their passion, but with deep conviction. I went over the information we had collected, point by point, building my case logically, and painting a lurid picture of the danger impending in that half-alliance between the Sinsings and the Hays of Nu-yok. I became impassioned, culminating, I believe, with a vow to proceed single handed against the hereditary enemies of our race, "if the Wyomings were blindly set on placing a

gang feud ahead of honor and duty and the hopes of all America."

As I concluded, a great calm came over me, as of one detached. I had felt much the same way during several crises in the First World War. I gazed from face to face, striving to read their expressions, and in a mood to make good my threat without any further heroics, if the decision was against me.

But it was Hart who sensed the temper of the Council more quickly than I did, and looked beyond it into the future.

He arose from the tree trunk on which he had been sitting.

"That settles it," he said, looking around the ring. "I have felt this thing coming on for some time now. I'm sure the Council agrees with me that there is among us a man more capable than I, to boss the Wyoming Gang, despite his handicap of having had all too short a time in which to familiarize himself with our modern ways and facilities. Whatever I can do to support his effective leadership, at any cost, I pledge myself to do."

As he concluded, he advanced to where I stood, and taking from his head the green crested helmet that constituted his badge of office, to my surprise he placed it in my mechanically extended hand.

The roar of approval that went up from the Council members left me dazed. Somebody ultraphoned the news to the rest of the Gang, and even though the earflaps of my helmet were turned up, I could hear the cheers with which my invisible followers greeted me, from near and distant hillsides, camps and plants.

My first move was to make sure that the Phone Boss, in communicating this news to the members of the Gang, had not re-broadcast my talk nor mentioned my plan of shifting the attack from the Bad Bloods to the Sinsings. I was relieved by his assurance that he had not, for it would have wrecked the whole plan. Everything depended upon our ability to surprise the Sinsings.

So I pledged the Council and my companions to secrecy, and allowed it to be believed that we were about to take to the air and the trees against the Bad Bloods.

That outfit must have been badly scared, the way they were "burning" the ether with ultraphone alibis and propaganda for the benefit of the more distant gangs. It was their old game, and the only method by which they had avoided extermination long ago from their immediate neighbors—these appeals to the spirit of American brotherhood, addressed to gangs too far away to have had the sort of experience with them that had fallen to our lot.

I chuckled. Here was another good reason for the shift in my plans. Were we actually to undertake the exterminations of the Bad Bloods at once, it would have been a hard job to convince some of the gangs that we had not been precipitate and unjustified. Jealousies and prejudices existed. There were gangs which would give the benefit of the doubt to the Bad Bloods, rather than to ourselves, and the issue was now hopelessly beclouded with the clever lies that were being broadcast in an unceasing stream.

But the extermination of the Sinsings would be another thing. In the first place, there would be no warning of our action until it was all over, I hoped. In the second place, we would have indisputable proof, in the form of their rep ray ships and other paraphernalia, of their traffic with the Hans; and the state of American prejudice, at the time of which I write held trafficking with the Hans a far more heinous thing than even a vicious gang feud.

I called an executive session of the Council at once. I wanted to inventory our military resources.

I created a new office on the spot, that of "Control Boss," and appointed Ned Garlin to the post, turning over his former responsibility as Plants Boss to his assistant. I needed someone, I felt, to tie in the records of the various functional activities of the campaign, and take over from me the task of keeping the records of them up to the minute.

I received reports from the bosses of the ultraphone unit, and those of food, transportation, fighting gear, chemistry, electronic activity and electrophone intelligence, ultrasopes, air patrol and contact guard.

My ideas for the campaign, of course, were somewhat tinged with my 20th Century experience, and I found myself faced with the task of working out a staff organization that was a composite of the best and most easily applied principles of business and military efficiency, as I knew them from the viewpoint of immediate practicality.

What I wanted was an organization that would be specialized, functionally, not as that indicated above, but from the angles of: intelligence as to the Sinsings activities: intelligence as to Han activities: perfection of communication with my own units: co-operation of field command: and perfect mobilization of emergency supplies and resources.

It took several hours of hard work with the Council to map out the plan. First we assigned functional experts and equipment to each "Division" in accordance with its needs. Then these in turn were reassigned by the new Division Bosses to the Field Commands as needed, or as Independent or Headquarters Units. The two intelligence divisions were named the White and the Yellow, indicating that one specialized on the American enemy and the other on the Mongolians.

The division in charge of our own communications, the assignment of ultraphone frequencies and strengths, and the maintenance of operators and equipment, I called "Communications."

I named Bill Hearn to the post of Field Boss, in charge of the main or undetached fighting units, and to the Resources Division, I assigned all responsibility for what few aircraft we had; and all transportation and supply problems, I assigned to "Resources." The functional bosses stayed with this division.

We finally completed our organization with the assignment of liaison representatives among the various divisions as needed.

Thus I had a "Headquarters Staff" composed of the Division Bosses who reported directly to Ned Garlin as Control Boss, or to Wilma as my personal assistant. And each of the Division Bosses had a small staff of his own.

In the final summing up of our personnel and resources, I found we had roughly a thousand "troops," of whom some three hundred and fifty were, in what I called the Service Divisions, the rest being in Bill Hearn's Field Division. This latter number, however, was cut down somewhat by the assignment of numerous small units to detached service. Altogether, the actual available fighting force, I figured, would number about five hundred, by the time we actually went into action.

We had only six small swoopers, but I had an ingenious plan in my mind, as the result of our little raid on Nu-yok, that would make this sufficient, since the reserves of inertron blocks were larger than I expected to find them. The Resources Division, by packing its supply cases a bit tight, or by slipping in extra blocks of inertron, was able to reduce each to a weight of a few ounces. These easily could be floated and towed by the swoopers in any quantity. Hitched to ultron lines, it would be a virtual impossibility for them to break loose.

The entire personnel, of course, was supplied with jumpers, and if each man and girl was careful to adjust balances properly, the entire number could also be towed along through the air, grasping wires of ultron, swinging below the swoopers, or stringing out behind them.

There would be nothing tiring about this, because the strain would be no greater than that of carrying a one or two pound weight in the hand, except for air friction at high speeds. But to make doubly sure that we should lose none of our personnel, I gave strict orders that the belts and tow lines should be equipped with rings and hooks.

So great was the efficiency of the fundamental organization and discipline of the Gang, that we got under way at nightfall.

One by one the swoopers eased into the air, each followed by its long train or "kite-tail" of humanity and supply cases hanging lightly from its tow line. For convenience, the tow lines were made of an alloy of ultron which, unlike the metal itself, is visible.

At first these "tails" hung downward, but as the ships swung into formation and headed eastward toward the Bad Blood territory, gathering speed, they began to string out behind. And swinging low from each ship on heavily weighted lines, ultroscope, ultrophone, and straight-vision observers keenly scanned the countryside, while intelligence men in the swoopers above bent over their instrument boards and viewplates.

Leaving Control Boss Ned Garlin temporarily in charge of affairs, Wilma and I dropped a weighted line from our ship, and slid down about half way to the under lookouts, that is to say, about a thousand feet. The sensation of floating swiftly through the air like this, in the absolute security of one's confidence in the inertron belt, was one of never-ending delight to me.

We reascended into the swooper as the expedition approached the territory of the Bad Bloods, and directed the preparations for the bombardment. It was part of my plan to appear to carry out the attack as originally planned.

About fifteen miles from their camps our ships came

to a halt and maintained their positions for a while with the idling blasts of their rocket motors, to give the ultroscope operators a chance to make a thorough examination of the territory below us, for it was very important that this next step in our program should be carried out with all secrecy.

At length they reported the ground below us entirely clear of any appearance of human occupation, and a gun unit of long-range specialists was lowered with a dozen rocket guns, equipped with special automatic devices that the Resources Division had developed at my request, a few hours before our departure. These were aiming and timing devices. After calculating the range, elevation and rocket charges carefully, the guns were left, concealed in a ravine, and the men were hauled up into the ship again. At the predetermined hour, those unmanned rocket guns would begin automatically to bombard the Bad Bloods' hillsides, shifting their aim and elevation slightly with each shot, as did many of our artillery pieces in the First World War.

In the meantime, we turned south about twenty miles, and grounded, waiting for the bombardment to begin before we attempted to sneak across the Han ship lane. I was relying for security on the distraction that the bombardment might furnish the Han observers.

It was tense work waiting, but the affair went through as planned, our squadron drifting across the route high enough to enable the ships' tails of troops and supply cases to clear the ground.

In crossing the second ship route, out along the Beaches of Jersey, we were not so successful in escaping observation. A Han ship came speeding along at a very low elevation. We caught it on our electronic location and direction finders, and also located it with our ultrosopes, but it came so fast and so low that I thought it best to remain where we had grounded the second time, and lie quiet, rather than get under way and cross in front of it.

The point was this. While the Hans had no such devices as our ultrosopes, with which we could see in the dark (within certain limitations of course), and their electronic instruments would be virtually useless in uncovering our presence, since all but natural electronic activities were carefully eliminated from our apparatus, except electrophone receivers (which are not easily spotted), the Hans did have some very highly sensitive sound devices which operated with great efficiency in calm weather, so far as sounds emanating from the air were concerned. But the "ground roar" greatly confused their use of these instruments in the location of specific sounds floating up from the surface of the earth.

This ship must have caught some slight noise of ours, however, in its sensitive instruments, for we heard its electronic devices go into play, and picked up the routine report of the noise to its Base Ship Commander. But from the nature of the conversation, I judged they had not identified it, and were, in fact, more curious about the detonations they were picking up now from the Bad Blood lands some sixty miles or so to the west.

Immediately after this ship had shot by, we took the air again, and following much the same route that I

had taken the previous night, climbed in a long semi-circle out over the ocean, swung toward the north and finally the west. We set our course, however, for the Sinsings land north of Nu-yok, instead of for the city itself.

CHAPTER XII

The Finger of Doom

AS we crossed the Hudson River, a few miles north of the city, we dropped several units of the Yellow Intelligence Division, with full instrumental equipment. Their apparatus cases were nicely balanced at only a few ounces weight each, and the men used their chute capes to ease their drops.

We recrossed the river a little distance above and began dropping White Intelligence units and a few long and short range gun units. Then we held our position until we began to get reports. Gradually we ringed the territory of the Sinsings, our observation units working busily and patiently at their locaters and scopes, both aloft and aground, until Garlin finally turned to me with the remark,

"The map circle is complete now, Boss. We've got clear locations all the way around them."

"Let me see it," I replied, and studied the illuminated viewplate map, with its little overlapping circles of light that indicated spots proved clear of the enemy by ultrascopic observation.

I nodded to Bill Hearn. "Go ahead now, Hearn," I said, "and place your barrage men."

He spoke into his ultraphone, and three of the ships began to glide in a wide ring around the enemy territory. Every few seconds, at the word from his Unit Boss, a gunner would drop off the wire, and slipping the clasp of his chute cape, drift down into the darkness below.

Bill formed two lines, parallel to and facing the river, and enclosing the entire territory of the enemy between them. Above and below, straddling the river, were two defensive lines. These latter were merely to hold their positions. The others were to close in toward each other, pushing a high-explosive barrage five miles ahead of them. When the two barrages met, both lines were to switch to short-vision-range barrage and continue to close in on any of the enemy who might have drifted through the previous curtain of fire.

In the meantime Bill kept his reserves, a picked corps of a hundred men (the same that had accompanied Hart and myself in our fight with the Hand squadron) in the air, divided about equally among the "kite tails" of four ships.

A final roll call, by units, companies, divisions and functions, established the fact that all our forces were in position. No Han activity was reported, and no Han broadcasts indicated any suspicion of our expedition. Nor was there any indication that the Sinsings had any knowledge of the fate in store for them. The idling of rep ray generators was reported from the center of their camp, obviously those of the ships the Hans had given them—the price of their treason to their race.

Again I gave the word, and Hearn passed on the order to his subordinates.

Far below us, and several miles to the right and left, the two barrage lines made their appearance. From the great height to which we had risen, they appeared like lines of brilliant, winking lights, and the detonations were muffled by the distances into a sort of rumbling, distant thunder. Hearn and his assistants were very busy; measuring, calculating, and snapping out ultraphone orders to unit commanders that resulted in the straightening of lines and the closing of gaps in the barrage.

The White Division Boss reported the utmost confusion in the Sinsing organization. (They were, as might be expected, an inefficient, loosely disciplined gang), and repeated broadcasts for help to neighboring gangs. Ignoring the fact that the Mongolians had not used explosives for many generations, they nevertheless jumped at the conclusion that they were being raided by the Hans. Their frantic broadcasts persisted in this thought, despite the nervous electrophonic inquiries of the Hans themselves, to whom the sound of the battle was evidently audible, and who were trying to locate the trouble.

At this point, the swooper I had sent South toward the city went into action as a diversion, to keep the Hans at home. Its "kite tail" loaded with long-range gunners, using the most highly explosive rockets we had, hung invisible in the darkness of the sky and bombarded the city from a distance of about five miles. With an entire city to shoot at, and the object of creating as much commotion therein as possible, regardless of actual damage, the gunners had no difficulty in hitting the mark. I could see the glow of the city and the stabbing flashes of exploding rockets. In the end, the Hans, uncertain as to what was going on, fell back on a defensive policy, and shot their "hell cylinder," or wall of upturned disintegrator rays into operation. That, of course, ended our bombardment of them. The rays were a perfect defense, disintegrating our rockets as they were reached.

If they had not sent out ships before turning on the rays, and if they had none within sufficient radius already in the air, all would be well.

I queried Garlin on this, but he assured me Yellow Intelligence reported no indications of Han ships nearer than 800 miles. This would probably give us a free hand for a while, since most of their instruments recorded only imperfectly or not at all, through the death wall.

Requisitioning one of the viewplates of the headquarters ship, and the services of an expert operator, I instructed him to focus on our lines below. I wanted a close-up of the men in action.

He began to manipulate his controls and chaotic shadows moved rapidly across the plate, fading in and out of focus, until he reached an adjustment that gave me a picture of the forest floor, apparently 100 feet wide, with the intervening branches and foliage of the trees appearing like shadows that melted into reality a few feet above the ground.

I watched one man setting up his long-gun with skillful speed. His lips pursed slightly as though he

were whistling, as he adjusted the tall tripod on which the long tube was balanced. Swiftly he twirled the knobs controlling the aim and elevation of his piece. Then, lifting a belt of ammunition from the big box, which itself looked heavy enough to break down the spindly tripod, he inserted the end of it in the lock of his tube and touched the proper combination of buttons.

Then he stepped aside, and occupied himself with peering carefully through the trees ahead. Not even a tremor shook the tube, but I knew that at intervals of something less than a second, it was discharging small projectiles which, traveling under their own continuously reduced power, were arching into the air, to fall precisely five miles ahead and explode with the force of eight-inch shells, such as we used in the First World War.

Another gunner, fifty feet to the right of him, waved a hand and called out something to him. Then, picking up his own tube and tripod, he gauged the distance between the trees ahead of him, and the height of their lowest branches, and bending forward a bit, flexed his muscles and leaped lightly, some twenty-five feet. Another leap took him another twenty feet or so, where he began to set up his piece.

I ordered my observer then to switch to the barrage itself. He got a close focus on it, but this showed little except a continuous series of blinding flashes, which, from the viewplate, lit up the entire interior of the ship. An eight-hundred-foot focus proved better. I had thought that some of our French and American artillery of the 20th Century had achieved the ultimate in mathematical precision of fire, but I had never seen anything to equal the accuracy of that line of terrific explosions as it moved steadily forward, mowing down trees as a scythe cuts grass (or used to 500 years ago), literally churning up the earth and the splintered, blasted remains of the forest giants, to a depth of from ten to twenty feet.

By now the two curtains of fire were nearing each other, lines of vibrant, shimmering, continuous, brilliant destruction, inevitably squeezing the panic-stricken Sinsings between them.

Even as I watched, a group of them, who had been making a futile effort to get their three rep ray machines into the air, abandoned their efforts, and rushed forth into the milling mob.

I queried the Control Boss sharply on the futility of this attempt of theirs, and learned that the Hans, apparently in doubt as to what was going on, had continued to "play safe," and broken off their power broadcast, after ordering all their own ships East of the Alleghenies to the ground, for fear these ships they had traded to the Sinsings might be used against them.

Again I turned to my viewplate, which was still focussed on the central section of the Sinsing works. The confusion of the traitors was entirely that of fear, for our barrage had not yet reached them.

Some of them set up their long-guns and fired at random over the barrage line, then gave it up. They realized that they had no target to shoot at, no way of knowing whether our gunners were a few hundred feet or several miles beyond it.

Their ultraphone men, of whom they did not have

many, stood around in tense attitudes, their helmet phones strapped around their ears, nervously fingering the tuning controls at their belts. Unquestionably they must have located some of our frequencies, and overheard many of our reports and orders. But they were confused and disorganized. If they had an Ultraphone Boss they evidently were not reporting to him in an organized way.

They were beginning to draw back now before our advancing fire. With intermittent desperation, they began to shoot over our barrage again, and the explosions of their rockets flashed at widely scattered points beyond. A few took distance "pot shots."

Oddly enough it was our own forces that suffered the first casualties in the battle. Some of these distance shots by chance registered hits, while our men were under strict orders not to exceed their barrage distances.

Seen upon the ultrascopes viewplate, the battle looked as though it were being fought in daylight, perhaps on a cloudy day, while the explosions of the rockets appeared as flashes of extra brilliance.

The two barrage lines were not more than five hundred feet apart when the Sinsings resorted to tactics we had not foreseen. We noticed first that they began to lighten themselves by throwing away extra equipment. A few of them in their excitement threw away too much, and shot suddenly into the air. Then a scattering few floated up gently, followed by increasing numbers, while still others, preserving a weight balance, jumped toward the closing barrages and leaped high, hoping to clear them. Some succeeded. We saw others blown about like leaves in a windstorm, to crumple and drift slowly down, or else to fall into the barrage, their belts blown from their bodies.

However, it was not part of our plan to allow a single one of them to escape and find his way to the Hans. I quickly passed the word to Bill Hearn to have the alternate men in his line raise their barrages and heard him bark out a mathematical formula to the Unit Bosses.

We backed off our ships as the explosions climbed into the air in stagger formation until they reached a height of three miles. I don't believe any of the Sinsings who tried to float away to freedom succeeded.

But we did know later, that a few who leaped the barrage got away and ultimately reached Nu-yok.

It was those who managed to jump the barrage who gave us the most trouble. With half of our long-guns turned aloft, I foresaw we would not have enough to establish successive ground barrages and so ordered the barrage back two miles, from which positions our "curtains" began to close in again, this time, however, gauged to explode, not on contact, but thirty feet in the air. This left little chance for the Sinsings to leap either over or under it.

Gradually, the two barrages approached each other until they finally met, and in the grey dawn the battle ended.

Our own casualties amounted to forty-seven men in the ground forces, eighteen of whom had been slain in hand to hand fighting with the few of the enemy who managed to reach our lines, and sixty-two in the crew and "kite tail" force of swooper No. 4, which had

been located by one of the enemy's ultrasopes and brought down with long-gun fire.

Since nearly every member of the Sinsing Gand had, so far as we knew, been killed, we considered the raid a great success.

It had, however, a far greater significance than this. To all of us who took part in the expedition, the effectiveness of our barrage tactics definitely established a confidence in our ability to overcome the Hans.

As I pointed out to Wilma:

"It has been my belief all along, dear, that the American explosive rocket is a far more efficient weapon than the disintegrator ray of the Hans, once we can train all our gangs to use it systematically and in co-ordinated fashion. As a weapon in the hands of a single individual, shooting at a mark in direct line of vision, the rocket-gun is inferior in destructive power to the dis ray, except as its range may be a little greater. The trouble is that to date it has been used only as we used our rifles and shot guns in the 20th Century. The possibilities of its use as artillery, in

laying barrages that advance along the ground, or climb into the air, are tremendous.

"The dis ray inevitably reveals its source of emanation. The rocket gun does not. The dis ray can reach its target only in a straight line. The rocket may be made to travel in an arc, over intervening obstacles, to an unseen target.

"Nor must we forget that our ultronists now are promising us a perfect shield against the dis ray in inertron."

"I tremble though, Tony dear, when I think of the horrors that are ahead of us. The Hans are clever. They will develop defenses against our new tactics. And they are sure to mass against us not only the full force of their power in America, but the united forces of the World Empire. They are a cowardly race in one sense, but clever as the very Devils in Hell, and inheritors of a calm, ruthless, vicious persistency."

"Nevertheless," I prophesied, "the Finger of Doom points squarely at them today, and unless you and I are killed in the struggle, we shall live to see America blast the Yellow Blight from the face of the Earth."

THE END.

THE HEAD

By Joe Kleier

(Concluded from page 421)

into the belief that it was a Godhead sent from on high to instruct and rule through the medium of the self-proclaimed priests. So low was the intelligence of the masses fallen, that they paid fabulous sums for the privilege of gazing on the miraculous Head.

On state occasions the Head was ostensibly interviewed as an oracle as to what ought to be done. The Head's lips having writhed into a sneer of disgust, the priests interpreted the expression to their advantage—and profit.

Involved in another war, the country was invaded.

Great crowds implored the leering Head for deliverance from the foe.

But the enemy swept up to the temple gates—and entered. The priests fought bravely. The last to die was the high priest, whose blood, as he fell, spattered over the Head.

A dark-skinned invader strode up to the Head, and addressing it with a jeering epithet raised a club to strike.

A look of utter content came over the Head's features as the blow that meant oblivion descended!

THE END

NOTICE

The final results of the SCIENTIFICTION contest will be announced in the September number. We are sorry to thus disappoint our readers once more, but due to the fact that this magazine is prepared so far in advance, and inasmuch as our cover drawings go to press practically two months before date of issue, it was not possible for us to make the announcement this month.

The main reason is, that we wished to feature the prize winning announcement on the cover of AMAZING STORIES, but for reasons explained above, in connection with the time element involved, this was impossible. The editors, therefore, ask your indulgence.

HICKS' INVENTIONS WITH A KICK

By Henry Hugh Simmons

The PERAMBULATING HOME

IT was six months after the episode of the Electro-Hydraulic Bank Protector, and I was still in Los Angeles. As you will remember, I had gone West right after that event—in fact immediately after; to be exact, I had left within less than an hour after I had marathoned home, departing with a small bag containing two collars and a tooth brush, and leaving my housekeeper to forward my trunks. Los Angeles seemed the logical place to stay. For one thing, the climate was fine—they have got climate there—just ask 'em. Then, it's a big city—something doing all the time. And finally—well, it's the most distant point, I found by actual measurement, from Morrystown, Massachusetts, and Smith. It may sound like an obsession, but I'll tell you now that that fellow is a violent-tempered man—and I didn't want to have to hurt him. Three times in succession I talked him into disaster, each time on account of one of Hicks' nut inventions. But the last time was infinitely worst of them all, you will admit, when you recall that event. So why take chances, I reasoned, when I wanted to stay in Los Angeles anyway? I'll take chances any time, but only when it's necessary. So I stayed.

Even on the train coming out West, I had read that the hold-up men that robbed the whole bunch of us in the Hicks' system protected bank did not get far with their swag. They were captured within a day, and almost all the booty was recovered. Less than a month after my arrival in Los, the police forwarded me my watch and golden cigarette case, together with a draft for one hundred and fifty dollars, which was nearly all that I had been robbed of. The same, I read, happened in the case of the other members of the party. And as for the hundred thousand dollars in banknotes taken from Croffit's safe, they were restored in toto.

So that part of the affair wound up pretty well, after all, for everybody except the yeggs. Only the mayhem that was done to the company would never be forgotten.

Anyway, here I was in Los Angeles, with lots of time, nothing to do, and the good old boat to help me do it. It was a fine morning, and I decided to run down to La Junta beach and enjoy the ocean breezes. By eleven o'clock the salt air told me I was nearing the Pacific. A broad streamer, stretched across the highway, done in glaring colors and letters three feet tall, greeted my eye; "La Junta Beach, The

Heart of Art. Meet your friends in La Junta."

I grinned as I read. Anyway, I was pretty sure not to meet *my* friends in the Heart of Arts. They were far away—and Smith among them.

I rode through a couple of blocks of nondescript shack town of unmitigated ugliness, with little tent restaurants, dwarf shops, hole-in-the-wall real estate offices, and then turned upward toward the bluff on the right to "La Junta Slopes, the Home of Beautiful Homes." As I emerged on the bluff, the Pacific for the first time hove into view. With mixed feelings I gazed on the great expanse of deep-blue ocean with the graceful, shimmering line of the beach, broken by rocky groves, stretching out into the blue mist south, and the miscellany of ugly cottages, interspersed by a choice collection of architectural atrocities which disfigured the patient face of nature. I drove on a little ways, then parked the car, to get out and have a look around.

AS my gaze returned from a deep drink of the beauties of the landscape and its poetry to the sober fact of man-made ugliness which surrounded me on all sides, my eye was arrested by what seemed a movement among the buildings a couple of blocks distant and lying higher up on a fairly steep slope. My eyes narrowed. I looked again, harder. There was no mistaking it—a house was moving. I could see the main part of it plainly through the trees and other buildings which partly hid it. Impelled by curiosity, I looked in that direction, inwardly reflecting that if that was a house being moved, it was the funniest way I

had ever seen it done. For one thing, it was moving too fast, and for another, it was rotating instead of traveling on. As I strode along, some buildings intervened, so that for a little I could see nothing. Then suddenly I emerged almost in front of it. There it

was. Now that I saw it closely, I found that it offered a glad relief from the constructional horrors that distinguished the "Home of Beautiful Homes." It was a fair-sized colonial home, neatly painted in white, and standing on grounds which, like the house itself, bore evidence of only recent completion. Back of it, the slope rose rapidly toward the hills, and in front it stretched in an expanse unbroken for any building down to the low, steep bluff above the water's edge. And the house *was* moving—it was turning slowly, revolving, as it seemed, on a pivot! By now the part

*I*N this story, our well-known author has outdone himself in describing the latest Hicks' invention. The author has a knack for describing mechanical inventions in a most unusual manner, and it is surprising that some of these inventions are not actually in use. We know of a good many that are in use now, that often turn out to be far more comical than some of the author's.



And so, rolling and tumbling ever and over at a more and more rapid pace, the periods of hesitancy ever shorter and more abrupt, with ever louder creaking, crashing, clattering, tinkling, crunching noises, with people, furniture and a hundred other objects mixed up in an ever more helpless tangle . . . the Perambulating Home proceeded on its way.

which had been fronting south when I first saw it, was turned due west.

All at once, without a shock or as much as a click, the house stood still. I rubbed my eyes. Was I asleep and merely dreaming? I looked around me. No, it couldn't be. Over there was my car, and I was here, awake, and in full possession of my senses. I stepped up a few paces. Now I could see that the ground around the house was all level, a circular stretch of gravel apparently surrounding it on all sides and this again being bordered by a concentric ring of recently set-out flowers and shrubs. I noticed, too, that the kitchen steps were raised some two inches above the gravel expanse. Another thing struck me as kind of funny—I am of an observing turn of mind, as I may have mentioned before—and that was that in three of four internal corners formed by projections in the building, flower boxes on a large scale were built right in; these also were raised about two or three inches above the smooth gravel surface. Many pretty flowers were planted in these small "hanging gardens," as I called them mentally. About the whole thing there was a look of clean, tasty neatness that was refreshing.

With all this unforeseen wonder, I felt like the enchanted prince in an Arabian Nights tale. I thought I could hear melodious voices within. Perhaps now, if I were to knock at the door, some beautiful lady might appear on the threshold, and bid me view the treasures inside. I am romantic as a kid, you know—always was, and I guess always will remain that way. The fancy seemed to rise out of my boyhood days and bid me knock. On sudden impulse, I walked up along the gravel, round to a side porch, mounted the steps and rapped at the door, my heart beating a little in pleasant anticipation.

The door opened and I recoiled three feet. . . . Hicks! A sudden wild thought seared my brain; I *had* gone mad! The hot day, the long drive, being so much by myself—I had had a stroke or something. That's why I had seen the house revolve, the miniature hanging gardens—the idea anyway! And now the crowning madness—Hicks! Hanging gardens!—the sweat broke out on my forehead. Maybe I'd see elephants with peacock feathers next! Gasping for breath, I reeled and sat down heavily on the porch rail.

"Well, of all people! O'Keefe!" a cheery voice, a real voice—Hicks' voice—came through the encircling gloom of utter mental confusion. "Had been expecting you long before, haw, haw!" and the figure stepped forward.

The squeeze my hand got woke me up and convinced me at one sudden lick that I was not asleep. Confound that man's grip, anyway. I felt my teeth begin to rattle—that was Hicks' handshake—no dream about that. I have said before that the way that man has of making personal contact with you is an abomination to me.

"Well, say something, old boy," Hicks was saying. "You look as if you'd seen a ghost, haw, haw!" and again he ground my hand in his vise-like grip. "Why don't you say something?"

At last I found my voice. "Ouch!" I said. "Where

—what, how—why, I didn't know you were here?"

"Why, have been here almost as long as you, O'Keefe. Knew all the time where you were living here, too. Wanted to look you up, today, in fact. Why, man, I *am* glad to see you. But come in—don't stay out in the cold. Come in, and let me introduce you to the bunch."

I WAS too bewildered to offer any resistance, had I wanted to, as Hicks drew me through the door and into a den into which the porch door opened. Nobody was in there, but the voices I thought I had heard before—the voices of a number of people conversing—not melodiously, as I had at first thought, but vociferously conversing—could be heard through the door to the adjoining room.

And then the door opened and . . . ! Smith entered. Did you ever get struck by lightning, or touch a ten-thousand-volt wire? Well, I never did either. But I think it must feel the way I felt that moment when I suddenly faced the man whom I particularly did *not* wish to meet. When conscious thought returned, I was sitting in a rocker ten feet from where I had been standing, my hypnotized gaze riveted on Smith's countenance. I was braced for a shock, and strangely cool now, entirely cool—in fact, cold—merely wondering, in a detached way, what would come next.

Surely there must be something wrong with the world today, or I *was* dreaming. For instead of breaking into a sudden and aggressive action, Smith stepped forward and heartily wrung my hand. There was no doubt about it—it was real. He seemed glad to see me! Seemed real glad, even—enthusiastic. His face was even flushed with pleasure. I had observed Hicks' face was, too.

"Well, now, I'll be . . . ! Just talking of you. Why, come on and shake! You've got no grudge against me, have you, O'Keefe? Didn't mean anything when I started after you that time—I'm kinda hot-headed, you know, you mustn't mind!" Thus the flow of eloquence from Smith's lips.

Now I'll say that I can pride myself on my presence of mind. One thing was clear—Smith had no hostile designs against me. I decided to forgive him—pretend that nothing of importance had happened, in fact. With a sudden inward effort, I recovered my mental balance.

"Why, Smith," I said, "I'll say I am surprised. You two surely were the last persons in the world, you and Hicks—I figured on meeting here. And as for a grudge against you—cut it. Thought I'd lead you a chase. And if I had had a grudge, I happened to have my pistol in my pocket that morning—and you know my standing with the Morristown Short Arms Club, haw, haw! Kind of a joke all around, isn't it?"

That was a happy thought. I could see Smith's jaw fall, and his pleasurable flushed face slightly whiten. You know my pistol shooting is one thing that is no joke. For three years I have held the record in the southern half of my state, and Smith knew it as well as everybody else. That I hadn't any gun along that fatal morning was one trifling detail which I felt the

situation required by way of addition and anyway, if I had had it, the hold-up men would have got it. But that thought did not seem to enter Smith's mind.

I seemed to discover a new light in the glance with which Smith regarded me. "Well, as I said," he observed, "everything's forgotten and we're friends. Eh, Hicks?"

"Why, of course," said Hicks. "It was all funny as the devil anyway. Haw, haw! Wasn't it?" and laughing uproariously, he slapped Smith on the shoulder.

"I'll say it was. Ho, ho, ho," roared Smith, and both of them laughed loud and long.

"Let's take him in and introduce him to the company and make him acquainted with the Perambulator," was Hicks' next cryptic remark.

"Sure, no use standing around here. They'll be glad to see him, and La Junta is 'The Place Where You Meet Your Frineds,' haw, haw!" quoted Smith.

A MERRY company revealed itself to my eye as the door was opened and I was led into the large living room. A haze of cigarette smoke partly obscured the place. There were some ten or twelve people. All of them were smoking, and most of them were talking, and I noted the same air of hilarious good feeling about them that I had noticed in the other two. That thought struck me with considerable force. Yet the strangest thing of all was that the entire company was arranged around an almost perfect circle about eight feet in diameter—a bare circle with nothing in it, just as if they had been sitting at a big round table, and the table had been suddenly spirited away.

"Ladies and gentlemen," roared Hicks, above the din of conversation, "meet our new member and old friend, Mr. Daniel O'Keefe!"

Two of the men who had been sitting with their backs toward the door through which we entered, turned. Irvine! And, as I live, E. F. Croffit, of the Suburban National Bank of Morristown!

With my mind again showing signs of revolving on its axis, I shook hands with both. Next Mrs. Smith came forward and volubly gushed over me. And, would you believe it—there was Kragg, the other banker from Morristown. And Mrs. Kragg! Six people from my home town, all assembled in La Junta, as far away as it was possible to get from Morristown!

"And those who have not met our friend—Mrs. Rust—Mr. O'Keefe. Miss Sneek—Mr. O'Keefe. Mr. Matsuhiro—Mr. Quest—Mr. Olsen—Mrs. Wimple—Mr. O'Keefe." Thus the flood of introductory perfunction.

I bowed and mechanically shook hands all around, and was then pushed home into an overstuffed easy chair by Hicks.

For a few minutes I became the center of interest of the animated group, and again I was subconsciously aware of wonder at the somewhat flushed faces of every member of the happy family, of their excited way of talking, and their boisterous laughter. Still there was not the slightest evidence of liquor—a natural thought these days. Could it be that the cigarettes they were smoking were doped? Or was something the matter

with me? The thought of the revolving house and the hanging gardens flashed across my brain, and for a moment the sweat started to break out on me. No—I was all right. But something was the matter, that was sure. Even as these thoughts came and flickered and passed through my mind, my eyes roved about the room. It was large and long and entirely finished in oak. At one end there was a beautiful mahogany buffet, built into the wall, with a door to each side of it. The other end, the one through which I had come, had a large window at each side of the door which led out to the porch. The inner long wall was broken only for a door, and the opposite outer wall had only a small window at each end. As I leaned back in my overstuffed chair, vaguely beginning to enjoy the fragrance of the very fine cigarette Hicks had offered me, my roving glance was caught by a large circular panel formed centrally in the ceiling. It formed a striking central ornamentation in the beautiful panel. It was so artistically done and at the same time so unusual, I could not help commenting on it. I only remembered afterwards, conversation dying down and a general bating of breaths, and a feeling of expectancy among the crowd. A few subdued chuckles, too, but I paid no attention to them. But when I asked the question, to my shocked surprise, everybody broke out into uproarious laughter.

Something was the matter with them! And that thought was confirmed by Hicks' reply:

"That, my dear O'Keefe, is the circular entrance to the Temple of those of the Mystic Circle." Renewed boisterous laughter accompanied this remark. I felt I was being fooled, and that is a thing I resent. I guess Hicks must have felt something of the sort, for he said:

"WELL, now, no doubt you will think something is the matter with us, O'Keefe. But I will prove that I am right. Did you not notice how happy we all are? It is because we are all members of the Mystic Circle—notice that we are all sitting in a circle, with only carpet between us?" And then I recalled again that fact which had struck me as strange before—that the entire company was disposed around the periphery of a circle, as it were, in entire symmetry, and with nothing between them on the floor, as one naturally would have expected. Only a couple of very small smoking stands interrupted the monotony of the line of chairs drawn up in this circular fashion.

"There is a reason," as the 'ad' says," the inventor continued, "and you will see it. Watch!" Silence settled over the company, punctuated only by a few chuckles. "Watch the panel" again said Hicks, and touched a button on the little smoking stand beside me.

As I was looking, still half believing that I was merely being strung along, I noticed a crack appearing all around the panel, and the next fraction of a moment I knew this phenomenon was due to the fact that the panel had started to settle. In another half second, the heavy panel noiselessly dropped with such swiftness that I hastily rose, upsetting my chair and backing away. Loud laughter greeted this action, just as the panel, rapidly decelerating its motion, came to a noise-

less stop, two feet and a half from the floor. To my astounded gaze it now revealed itself as a large hanging table, suspended by six ornamental chains concentrically grouped about two feet away from the rim. And on the table, artfully arranged in the middle, were half a dozen bottles that bore a look indisputably alcoholic, while a dozen glasses, filled to a greater or lesser degree, faced the guests.

With the merriment of the company ringing in my ears and my wits slightly reeling, I leaned heavily on the table for support, only to draw away as if stung—the thing was only suspended on chains. Now I had done it. And then an instant later the realization came that nothing had happened—the table had stood the impact of my weight against it without a tremble or even the slightest movement!

A little weak in my knees, I sat down in the overstuffed chair.

"Sip some of this lemonade and recover your balance," admonished Hicks, as he poured a glass for me from one of the No-Volsteadery bottles and pushed it toward me.

Mechanically, I took the glass and tasted it. Holy Jumping Junipers! One million volt liquor! With one final illuminating flash, I abandoned what still remained of any wonder at what I had seen—even about the unprecedented humanness of Croffit in joining the loud laughter. As Hicks had said, there was a reason!

"You behold here," said Hicks, after he had set his own glass down on the table, "one of the special features of my latest invention—of the Hicks' Perambulating Home." I took another drink from my glass, and remembered that I had seen the house turning.

"The Vanishing Table," continued Hicks, "was the invention of my esteemed friend and co-worker, Mr. Atanake Matsuhiro, to whose genius it owes its conception, and who perfected it. . . ."

"After longitudinal experiment," observed the Japanese, a broad expanse of grinning teeth forming in his yellow countenance, "Mr. Hicks' perfect Honorable perambulator home of eternal sunshine. But what are sunshine outside without sunshine within? What would life be without sake*? This questionnaire I oppose to dissolve. After longitudinal consternation arrive brain-flash of corruscating power—Honorable vanishing table are result."

With this lucid explanation, the Japanese resumed his broad grin and his glass, to emerge with an even broader grin.

"I should mention in passing, O'Keefe," the inventor said, "that none of us are given to drink, but we all like company, and as citizens of this great land we resent the unwarranted interference of the Volstead act with our pursuit of happiness. Yet in these troublous times, it is hard to hide the stuff. Raids into the sacredness of our homes occur daily. The situation must be met. I admit that for once I was nonplussed. Then one day when I was in troublesome thought pondering the problem, my friend and neighbor, Mr. Matsuhiro,

came in. To make a long story short, with truly oriental inventiveness, he found the solution.

"THIS table, as you have noted, gives the unquestionable illusion of a ceiling panel. Snooping spies might suspect the floor, but would they look at the ceiling? No! Well, you will say, what is ceiling below is floor upstairs—but we went a little out of our way to make the thing complete. A large low tank of the diameter of the ceiling panel, and holding five thousand four hundred gallons of water, is built into the attic just over where the Vanishing Table comes. At a height of forty-two inches maximum water level, a tank of a diameter of seventy-two inches will, as you will readily see, be required to hold this quantity of water." I leaned back and took a luxurious pull at my cigarette. Did I mention before that technical stuff always interests me?

"The diameter of the table corresponds exactly to the diameter of the tank," said Hicks, continuing. "The maximum water level, however, is forty-seven inches above the floor of the attic. You will naturally ask why that is. It is because, though the height of the water column is, indeed, forty-two inches, the tank has a slightly raised bottom, so as to provide additional space for the tall bottles of liquid cheer when the panel is in place.

"The unlooked-for rigidity of the chain-suspended table which almost startled you," went on Hicks, "is due to a very simple mechanism—four disappearing legs rise from the floor at the same time that the table descends when I push the button on this smoking stand from which the mechanism is controlled. Holes are provided in the carpet for these, the cut-out pads covering the ends of the legs, and as you will see—I followed his pointing finger—and I did see—the carpet itself has the design of an eight foot circle, with four rosettes for the table legs worked into it, so that the members of the Magic Circle may know where to sit when they are about to offer incense at their shrine."

Merry acclamation greeted the end of his remarks. Hicks wore a pleased flush that was not entirely due to pride in his achievements. Seizing his glass, he proposed a toast to the inventor of the wonderful Vanishing Table, Mr. Atanake Matsuhiro. Glasses clinked and were drained. Mr. Matsuhiro's grin extended half around his head.

"Now, however," said Hicks as soon as the excitement had died down, "it is time to explain to you that this house does not, as you might perhaps be led to think, exist for the sake of the Vanishing Table. That was one thought—a happy, but a minor thought, incorporated in the Home of the Future—the Hicks Patented Perambulating Home—a home which, as the name implies, moves. As my distinguished Japanese friend has hinted, what I wanted—what we all have wanted—was a house of sunshine—a house where the morning sun would come into every room, on all sides of the house. As you will have found out since you have lived in California, just because the climate is dry and warm is no reason why you would not need sunshine in the rooms. Everybody who lives here

* The chief alcoholic beverage of Japan, a sort of beer, made from rice; usually imbibed hot. The final "e" is slightly accentuated in pronouncing it.

realizes that. And especially the morning sunshine. We want it in the bedrooms, in the breakfast room, in the kitchen, in the bath, in the living room—everywhere, in fact. But to build an ordinary house to fulfil this condition would be impossible. All the rooms would have to face one way, and the architecture would suffer, become clumsy, unsightly, expensive. Besides, even with the rooms facing all one way, we could not get the sunshine in at the angle we wanted, all the time. Then again, you might want to get away from sunshine on a certain hot day in the summer, in any room. The ordinary house could give you no relief. For decades architects have wrestled with the question, have exerted their utmost powers to solve it, but no solution was found. The trouble is they were mere architects—and it required the effort of an inventor. So I had not lived here for three months before the solution of the problem was plain to me. If we cannot *build* the home so there will be sunshine in every room, and as plainly, we cannot turn the sun to suit the home, then we must so construct the house that we can turn it relative to the sun. In other words, we introduce locomotion to the home."

HICKS paused, a pleased smile diffusing his flushed face. Some of the company clapped their hands at the neat reasoning of the inventor.

"So in two months of hard work, two months of intense concentration, I evolved the Hicks' Perambulating Home, in which you are now my guest. As you came up, perhaps you saw it move?"

I nodded assent, and Hicks went on:

"Well, the idea itself is very simple. The building has a basement of special design. The floor construction is stronger and differs from that of ordinary houses. Six small, low, two-wheel trucks attached under the foundation frame, run on a single circular track, which is entirely covered by the building, its diameter being less than that of the smallest distance across. It was then only necessary to provide one of these trucks with a motor controlled by a switch in here, and to arrange such details as articulated electric and water connections, to realize the dream of decades—the Home of Sunshine in Every Room—of any view from any window. You may have noticed the circular gravel patch around the house and the suspended flower boxes—these are all details in the main scheme, the great idea of giving locomotion to the home. No matter where the wind comes from, in the Hicks' Perambulating Home you can always sit on the sheltered side without leaving the porch you want to sit on. You can have the warmth of our sun when you want it, and escape its heat whenever you wish. What architecture was unable to solve in six thousand years, it took Modern Invention just two months to accomplish."

Prolonged and vociferous applause greeted the termination of this discourse. There was a merry clinking of glasses. Everybody was feeling good. I had been careful, but I could feel the stuff slightly mounting—that stuff had some power! I looked around me. The others were feeling even better—they had been there before me. Irvine did not seem quite firm on his

legs. Banker Croffit wore a strange set smile together with a solemn stare in his fishy eyes. Mrs. Smith was full of giggles, while her husband's speech was slightly halting and thick. Most of the others exhibited similar symptoms of good feeling and companionship. Among the least affected was the inventor. He now rapped the table with his cigarette case and cleared the air for some further remarks.

"To complete my explanation, I will observe that I incorporated every known modern convenience in this house, and some new ones of my own invention. Not only is there a washing machine, an ice-machine, and every kind of electrical device for the kitchen, and . . ."

"But also a Vanishing Table," interposed Smith. "I beg your pardon, but—hic—don't forget that." Loud roars of happy laughter greeted this sally, in which Hicks heartily joined. Mr. Matsuhira's smile expanded until it threatened to burst the upper two-thirds of his head clear off his anatomy. "The result of longitudinal endeavor," he pronounced—"Longitudinal efforts are required before I realize results of perspired dreams—longitudinal experiment." With which remark he settled back in his chair and surveyed the company with grinning countenance.

"Before we go further," proposed Irvine, "let's give the inventor of the Vanishing Table a toast. And as the war's over now, and we admit that the German people have contributed so much to the practical science of alcohol, let's do it the way we used to when I studied in Germany. Now all rise and together:

"Hoch sol er leben, hoch sol er leben, dreimal hoch!"

The merry company sang, and with ever increasing laughter, they clinked their glasses and toasted the happy Japanese.

"This hour are heavenly decomposition for corroding effect of persecuting mental studies of elongated nature resulting in invention of Honorable Whisky Hide-and-Seek." In this tortured phrase the beaming disciple of the mechanical arts from Nippon voiced his thanks.

"**B**UT now," resumed the inventor after this happy interlude, "to finish my remarks. As I was saying, I have provided for every known convenience and some unprecedented new ones. As you know, I have made this house independent of failing water supply—there is always water under pressure. I have also, I may add, insured against a failing supply of electricity, by installing, at some expense, it is true, a large storage battery capable of furnishing light and power for twenty-four hours. I have gone further. You all know it gets hot in southern California when the desert winds blow—hot even at the beach. And it's mainly a matter of the hot air that can't get from under the roof fast enough. Some of you may have noticed a large circular opening in each of the gables. A powerful electric fan is set in each—one to suck dead air out, and the other to pull fresh air in, thereby constantly renewing the air in the attic, preventing the accumulation of foul air and stuffy smells at the same time that they take away the heat from where it is most necessary—from under the roof. And finally, I have installed some of

our old friends—haw, haw—in the dining room and kitchen. None of you have seen those so far—but come in and look. Only first let us cause the evidence to disappear.”

So saying, Hicks touched a button on the smoking stand. Like a bat starting on its noiseless flight, the Vanishing Table rose swiftly into the air. As it neared the ceiling it slowed down as if an unseen brake were acting. With a positive, yet hardly audible click, it merged into the ceiling at the same time that the legs sank down flush with the floor, their covered tips blending perfectly with the carpet. Hicks now led the way to a door at the end of the room. The company, vociferously hilarious, crowded after him.

“Here,” said Hicks, “are some of my inventions many of you will remember,” and he opened a door leading into a large and beautifully furnished kitchen. “See the perforated ceiling and floor, O’Keefe? Remember them, Smith? It’s the Self-Cleaning Floor and Ceiling. It didn’t work just right that time when I first demonstrated the Automatic Apartment, ha, ha, ha, but it works like a peach now. And here is the Automatic Shoe Shiner—it works right now—you don’t need to be afraid of going near it, Irvine. But the best of all is here,” and Hicks led the company through another door into what clearly was a spacious dining room, beautifully done in red mahogany and red wall paper.

“Can you recall this, Smith?” and he pointed at a large, heavy-looking circular table in the middle of the room, surmounted by a sort of a pyramid of three smaller tables, or large circular shelves.

I instantly recognized the Automatic Dining Table.

“This,” said Hicks, “is the improved form of my Automatic Self-Serving Dining Table. As most of you will know, they are being turned out now by a company of which I am the president. We had a little trouble there, too, boys, didn’t we?” laughed Hicks, as he slapped Smith on the shoulder with his right, while he grabbed me with the left. “How about it, Irvine?” And we all laughed heartily. In fact, we laughed almost immoderately. Smith could hardly stop laughing. And all the company laughed with us.

“THIS dining table,” continued Hicks, “is now made in a different way. The main trouble was with that steam drive. I use a motor to rotate it now. I have made the design heavy, too. As you will note, the foot of the table is broad, and this rests on an even broader base screwed to the floor. Here I have adopted the same construction as for the means for rotating the house. The table is not pivoted, but it runs on a large circular thrust ball bearing, of which the foot of the table proper forms the upper race, while the base forms the lower one. I attain stability by the heavy weight of the table itself. In this I am following a modern trend in the construction of machines, whereby weight is now used to accomplish what was formerly attempted, but never fully realized, by purely mechanical means. I have an example of what I mean in the motor car and the Pullman. At one time there was a tendency to make everything as light as possible, and insure good riding by springs, rebound snubbers, and other me-

chanical contrivances. But it is now realized that weight, properly applied, is something which cannot be replaced by any mechanical agent. So by this construction,” Hicks continued with the air of a professor of engineering, “we obtain besides stability, a coefficient of friction which, so long as the speed is unchanged, remains practically constant and unaffected by wear, and wholly independent of the results of expansion due to heating such as is a well-known cause of trouble in bearings.”

“But aren’t you afraid the thing will upset?” Mrs. Smith giggled, and then tried to look serious. Only a woman could voice a remark like that—anybody with half a mechanical eye could see that that table could not be upset. But Hicks was there with the answer.

“There is no danger of that, because of the distribution of the weight in that table.” As I hinted, this table is heavy, it weighs fully a ton—a fact which slightly adds to its cost when shipped over a long distance, but which is of inestimable benefit once the table is set up in the home.”

“And you say it is electrically driven?” asked Irvine. “What kind of a motor has it, constant or—hic—variable speed?” Irvine once took a correspondence course in electricity, and though he never finished more than the first ten lessons, he likes to show off his knowledge.

“A variable speed motor,” replied Hicks, “is used in this particular one, because before it was set up I used it experimentally to test out the best speed, as well as the safe maximum *RPM** the table would stand. In the new tables we are getting out, a constant speed motor, imparting, by means of a belt transmission, a maximum speed of thirty-five revolutions a minute is built into the base. To this one here a more powerful variable-speed motor which I happened to have on hand is connected, so that the table could be run as high as four hundred and fifty revolutions a minute. Of course, I never use such a speed, and anyway the table is entirely safe in my hands.

“The shaft which ends at the base in the male member of the clutch through which the table is driven is connected to the motor by a belt at a ratio of 5 to 1, the entire drive, including the motor, of course, being placed below the floor. The motor runs constantly while the dinner is in progress. The controls of the table are, as you will note, in the shape of levers beside each place, each lever, when slightly pressed forward throwing the clutch in and when released returning and instantly putting on a brake, thereby bringing the table to an instant stop at exactly the desired place. I will now, with your permission, show you the table in operation. I will let it run at 150 *RPM*, just to show you”—he smiled at Mrs. Smith—“that since it is, as you will see, safe at that excessive speed, it will be entirely safe—safe plus—at the rated speed of 35 *RPM*, or revolutions per minute the maximum speed at which the tables we are now putting out run.

“This indicator arm,” said the inventor, placing his hand on an affair built into the wall, “looks something like the motorman’s control on a street car. That is

* Symbol of revolutions per minute.

exactly what it is—it is the speed control of the variable speed motor. I turn it on—so—” A protesting whine issued as we heard the motor start. “I move it another notch—another—and yet another—it is now set for a speed of 750 revolutions, which will give the table a speed of 150 RPM. Now,” he continued, walking over to the table and taking hold of one of the levers, “I throw this lever in—so.” There was a click as he did so.

INSTANTLY, the howl of the motor could be heard as the clutch took hold and the table slowly started to turn. He had jammed the lever down pretty hard, I thought. I looked over at Hicks. He did not seem to worry, so of course it must be all right. Anyway, nothing could happen, I reflected—there was the switch right in the room to turn it off.

In a moment, anyway, the protesting howl of the motor had died down, and the table was spinning smoothly, with a speed which I could see was steadily rising. Not a tremble or vibration could be observed, just as Hicks had said. Now a soft, low hum, gradually assuming a higher pitch, could be heard—the noise of the rollers in the bearing revolving, I figured. Rapidly the speed rose, the hum grew higher, and the periphery of the table assumed that hazy, liquid look which things have when they revolve at high surface speed. A steady low drone could now be heard, and I thought I could just feel the suggestion of a vibration.

“This,” came the calm voice of the inventor, “is the table revolving at the rate of 150 revolutions per minute. Now we will give it just another fifty for good measure, and see what the motor will do to the table, and then I will show you the action we get from my new patented brake—the Hicks Instant, as I have called it.” He turned the switch up another notch, and then returned to his position at the starting lever at the table. There was a renewed whine, and the rim began to look more hazy. A vibration, quickly growing in intensity, now made itself felt. Hicks reached for his lever. “Two hundred,” he said. “Now we stop,” and he pulled.

The lever did not budge. In another moment, the vibration of the table had become a noticeable oscillating movement which, even as Hicks gave three or four hard tugs, gained in intensity until the table rocked and the room began to shake in a terrifying manner.

“Switch off, quick!” commanded the inventor. Smith, who had been standing near, with his glass half-filled in one hand, reached over and gave the switch arm one mighty pull. When his hand came away, the handle was in it. At the same moment, there was a fierce, complaining whine as the motor suddenly picked up. Smith had turned it up to 400 instead of down to zero, and he was looking at the handle with a glassy stare.

“Turn her back the other way!” Hicks screamed, jumping for the switchboard, while the house began to rock with a reverberating noise that sounded like the coming of doom. The guests were beginning to sober rapidly. Kragg was as pale as cheese, and Smith showed signs of losing his cheer. Somebody was making for the door—it was Irvine. In another second, walls, floor

and ceiling shook as with an earthquake, while a thunderous rattle drowned articulate speech.

Hicks gave one wild, uncomprehending look at the switchboard. Then his eye fell on Smith, who stood there as if transfixed contemplating the lever in his hand. In that instant he understood.

“Get out!” he yelled, making his voice pierce the infernal racket. “Everybody get out! She’s going to topple! Centrifugal force—she’ll kill us all!”

He spoke the truth, and we knew it. With shouts, shrieks and curses, men and women made for the door—veritably fought for it. Hicks and I were the last to leave. As I backed out, clutching the door frame for support from the terrible racking that shook the whole house and made every part of the room look as if it were undulating, my eye beheld the table suddenly make one mighty jump, careen sideways, and like a giant top spin toward the front of the house—the side I had come from. The back kick as it left its base threw the walls over six inches toward the hill side. The next instant the table, its base and top looking like a pair of overgrown and mismatched railroad car wheels connected by a stubby axle, jumped, and with a tremendous impact hit the front wall. There was a shivering, splintering crash as plaster and lath were crushed and studding shattered, but the wall held. Thank goodness, it was all over!

EVEN as I was mentally ejaculating this lightning prayer of thanks I felt that it was premature. Trouble was not over. It was only beginning. With a mighty heave, as if propelled by an unseen giant hand, the whole house started to lean forward, the floor inclined at an angle of fifteen degrees. I could not understand the reason then, but it became plain to me later when I remembered the tons of water in the attic tanks, to which a rhythmic rocking motion had been imparted which now reacted on the house. For one agonizing, horrible second, the Perambulating Home seemed to debate whether to perambulate or not. While it did, I had presence of mind enough to try to get out. In two leaps I gained the living room. Though it has taken minutes to tell, not more than three seconds could have passed since the time the table started to tip, for I almost stumbled over the heels of the last refugees. They were all there in the living room, holding on to each other, to chairs, to the wall, a pale, breathless, confused assemblage. It was only later that I knew why they stayed—every door and window in the room had become hopelessly jammed by the racking the building had received.

“Get out! Don’t stand there staring! She’s going to topple!” I roared, waving my arms. And just then there was the shove of the invisible hand again, followed by a heavy swish, and the floor rose at a deeper incline. With a mighty swing, the house began to topple.

“Sit down!” I yelled. It was good advice, but it was unnecessary. As the building lurched forward, under the impulse, everybody automatically sat down backward. Steeper and steeper became the angle of the floor, and the company started to slide down, mixed

with chairs and smoking stands, carpets, cushions, and miscellaneous other objects. A small, heavily framed picture dropped from the wall behind on Croffit. His bald head pierced the canvas and he had it around his neck like a collar, but he was too busy sliding to bother. It is funny, as I have frequently observed, what trivial incidents will photograph themselves on the memory in a crisis. Shrieks, screams, curses, cries for help, filled the air, partially drowning the innumerable bumping, crashing, tinkling, clattering, rattling, rending noises as china, crockery, tinware, lamps, books and a hundred other footloose things began to break and tumble, and beds, chairs, tables and other furniture were upset. And then, suddenly, there was a tremendous, dull, heavy crash, and we all landed on the side-wall with a thud, a conglomerate of struggling humanity intermingled with a mess of inanimate objects. There was an earsplitting echo as a bed in the adjoining room turned over on its face, and then a rushing, boiling noise could be heard above the groans and hysterical screams of the guests.

It was the five thousand gallons of water in the attic trying to find a way out—I knew it instantly. Why worry about that? We were through toppling—that was the main thing. I bet I formed that thought in a quarter of a second as I tried to pick myself up. And then a closet door in the corner of the far end of the room burst open and a wave of water three feet high leaped toward us. "Trap door connects closet with attic"—my mind mechanically registered. In a moment the place looked like a crowded swimming pool. Women shrieked—they are always shrieking, no matter what happens—. What difference did it make if we did get wet—we had hit the ground, and it was all over!

BUT in the same instant, I realized again that my optimism was premature. An ominous, dull, heavy rumbling, accompanied by a fierce trembling, shook the overturned building. I instantly knew it for what it was—it was the Automatic Dining Table rolling across the side wall. When it hit the ceiling . . . ! Of course we were by no means on a level. The ground was sloping, and the overhang of the eaves was not sufficient to block the building up. It's strange what the human mind will do, I'll tell you again, figuring that way in an emergency, crowding the reasoning of hours into next to nothing. For it was all a matter of split seconds. And then there came the crash, and for a second time, a shivering impact shook the building as the table landed in the trough of the forward corner that was formed by the ceiling and the front wall. We heard the crackling of a few rafters as the eaves crumpled under the weight, and then, for the second time, the house stood poised in unstable equilibrium. Like the play of the backwash at the beach, the mass of water rushed into the forward corner, where it buried those of the guests who had rolled down the inclined wall. Again, its shifting weight decided what was to happen. The building groaned as we felt the corner settle. Redoubled shrieks of terror split the air as, slowly and yet too fast, the house again keeled over. Again, everybody and everything started to slide down

the incline, shorter this time than before, because it was only a side wall, but more painful because of the projections in the form of plate rails, picture molding and small nails and hooks used for fastening various articles of use and ornamentation, and which ripped the clothing from those who came in contact with them. It was a mercy there were only the two small windows in the long front wall of the room and that they were near the ends—that thought crossed my mind. Like all the others in the house, they were of heavy plate glass and stood the racket. One moment, we were in four feet of water as the house stood teetering on the corner of the eaves, and the next, the water flattened out as the coarse and fine aggregate of human and inanimate bodies landed on the ceiling. For a brief instant, we were almost on a level again, the house poised on the ridge of the low pitch of the room whose ridge ran parallel with the front wall.

Only for a brief moment, and then there came the rumble and crash of the table, followed by the wave of water, and the Perambulating Home resumed its perambulation, and again slowly turned over. "Locomotion introduced to the Home"—that had been Hicks' phrase. It was true. Wait a minute and let me illustrate. Did you ever see the Tumbling Toy? I had always thought it an interesting mechanical plaything. It is simply a long, tubular capsule with rounded ends, in which a little metal ball is free to run. When this toy is placed on any incline, the ball will run down the tube. When it hits the end, the capsule rises, hesitates, turns up in the air around the ball, as it were, and over, and lies down. The ball runs down the tube a second time, until again, when it comes to the end, the toy overturns, repeating the process until the end of the incline is reached. That is the kind of progress we made: As the slope steepened and the house gained momentum, the turns became more rapid and jerky, the moments of hesitation shorter, the crashing noises louder, the shrieks, screams, curses, demands, prayers, more desperate. The company, drenched like rats in a barrel, with pants bottoms and silk dresses ripped, hair disheveled, faces white and distorted by terror, were inextricably mixed up with each other and with chairs, picture frames, mats, rugs, cushions, and innumerable other miscellaneous furnishings. It's strange, I say again, how you will notice things in such a situation, but Croffit still had the picture frame around his neck, and the Japanese, perspiring with fright in spite of the cooling effect of the water, held a large ash tray clutched in his hands as if it personified salvation. These flashes imprinted themselves on my rapidly revolving brain between turnings. And so, rolling and tumbling over and over at a more and more rapid pace, the periods of hesitancy ever shorter and more abrupt, with ever louder creaking, crashing, clattering, tinkling, crunching noises, with people, furniture and a hundred other objects mixed up in an ever more hopeless tangle, rolling over, into, and by each other in a boiling, rushing, swishing, foaming sea of water like punching's in a tumbling barrel, the Perambulating Home proceeded on its way.

As I gulped down a big mouthful of water which

I had taken by mistake when I intended to take a deep breath, a sickening thought pierced my brain like a red-hot streak: We must be nearing the bluff! Would we topple over into the sea? Cold sweat broke out on my wet body even as I felt the bottom of my pants rip on a nail that was near the top of the rear wall. Would we? If so, then, World, good-bye!

And even as I formed that horrible thought, the house turned over once more, after just having been front wall down. Once more it stood poised—agonizingly poised, for a moment that seemed eternity. Then came a new rumbling, culminating in the impact of that confounded table. Again we all slid down the floor, but before we got to the end, we found ourselves and the innumerable paraphernalia that were mixed up with us, midways on the ceiling. We were starting to fall through space! The house turned a little more, and now I knew we must be falling, roof down, and yet—strange—there was no shock. We were falling and the house was, too! Relativity. Seconds, minutes, hours, ages passed as we fell, and then, all at once, the ceiling seemed to hit us from below with a sudden yet cushioned impact. As I later found out, we dropped only thirty-two feet, but I lived my life over in the time required to fall through that distance. There was a splashing sound, we were rocked in several successive mighty bounces, and I knew we had struck the water.

A SINGLE piercing feminine scream split the air: "Help! Help! I am dead!" and then the back of a chair, overturning, hit me a tap on the temple, just a little tap, but in the right place.

When I awakened from vague dreams, something was stinging me. I lay for a minute and waited to see if I was dead. Then I opened my eyes and looked up. My head was bedded in Irvine's lap, who was pouring something powerful down my throat and largely down my shirt front. With a sputter, I sat up and looked around. Hicks, slightly weaving on his legs, was poised in front of me, a tin cup in his hand. I closed my eyes, and then opened them again.

"Wake up, ole man, we're all righ'." I knew the sound of that voice anywhere—that was Hicks.

"Shnap out of it and—hic—ashume dutish shird offsher Motorship Perambulator, ole man," Hicks admonished, and then he took a drink from the tin cup.

Dazed and confounded, I looked around me. My mind was rhythmically swaying up and down, and my head was humming. In the gathering twilight I could see a couple of forms prostrate on the floor—or rather ceiling—along the walls. They seemed to be snoring. Kragg, somewhat vacant-eyed, wet and with one coat sleeve missing from the elbow, was sitting in a sadly damaged chair, trying to observe the color of the liquor by looking through the side of the tin cup in which he held it. The Japanese, a form in torn and wrinkled clothing, was in another armchair further back, weakly grinning at regular intervals. A voice from the dusk of the far corner beyond tried to sing, "We're all jolly good fellows," and failed.

"Aren't we sunk? Aren't we sinking?" This feebly from me.

"Not by a darn shight," responded the inventor, brandishing a bottle. "This is good ship Perambulator, and we're prosheeding on our way to Onofre Harbor—own power," and again he laboriously filled his cup.

The upside down door in the opposite wall opened and Smith climbed down to the ceiling. He, too, though wet and somewhat worse for wear and with a large bump on his forehead, exhibited sundry signs of good feeling, to wit, an inflamed countenance, a parboiled eye, and a slightly inarticulate speech. He smartly saluted Hicks by touching the bump on his forehead.

"Have to report, cap'n, there are lightsh on the port shide, sir," he said.

"Change course two poinsh wesht, Mr. Shmif, and send the shtarboard watch below." Smith, saluting, turned on his heel and fell headlong on the floor. With difficulty he got up and climbed through the door from which he had come. Hicks staggered away and climbed after him.

IT was from the Japanese that I learned what had happened during the two hours I had been unconscious.

"And so, Honorable Perambulator Home are now transmigrated into ocean-going motor-ship of alcoholic joy, destitution generally unknown." Thus the slant-eyed little man of the setting-sun concluded his discourse. Even while he spoke, I noted the rhythmic rise and fall of the house on the waves, and the steady purr of the two electric motors under power from Hicks' storage battery—the motors for driving the large ventilating fans in the attic, which was now under our feet. Fully enclosed, they were, Hicks had said. They must be, working that way under two feet of water, with the fans now acting as screws, one pushing, one pulling, driving the Perambulating Home at a fair rate through the waves. That five thousand gallon water tank, now upside down—naturally that would prevent us from sinking—would trap enough air under it to keep the whole upper part of the house out of the water. It was all clear to me. That they had raised the Disappearing Table and resurrected enough bottles to put them in their present plight, was the most natural thing of them all, under the circumstances.

I went and looked through the door through which Smith had disappeared. There, on the ceiling of the spacious front porch, behind a sort of railing formed by the wall stripe which ran around it, Hicks and Smith were standing. Hicks was scanning the ocean through a whiskey bottle. Smith was trying to light the wrong end of a wet cigar from a flashlight. In the corner, muttering to himself, sitting on a chair somebody had lugged out, was Croffit. Irvine had his arms around him,

"Goo' ole Crawfish," he was saying over and over, "goo' ole Crawfish. We're frendsh, ain't we, jus' frendsh?" to which Croffit was responding by muttering that he'd "cut your shroat when we get 'shore!'"

"Have' look shrough my binoclarsh an' shee if you don't shink thash Onofre Harbor. Mr. First Offsher," said Hicks, handing the bottle to Smith. Smith, touch-

ing his bump in salute, threw the flashlight carefully overboard and gravely took the proffered bottle, through which he surveyed the horizon.

"You're righ', cap'n, thash Onofre Harbor, sir," he finally pronounced, and immediately thereafter started to sing "Sixteen men on a dead man's chest."

I looked around in perturbation. By now it was almost night. On all sides was the ocean, gray in the falling dusk. A few twinkling lights were in the distance. And here we were, a crew of drunks, plowing through the waves, as the Jap had said, destitution unknown.

Sudden and complete realization of our plight and its dangers hit me like a club. What was to become of us? Where would it end? Something must be done, right away. What . . ."

Suddenly I heard voices from somewhere outside. A blinding glare shot out of the night. A dark shape dived alongside of us. There was a swish, a bump, a sharp command. And the next thing I knew, four men in uniform had clambered up on the porch. Government patrol officers!

In a jiffy, they had taken in the situation. They went through the good ship Perambulator, putting us all under arrest. The next thing we knew, we were in tow of the government boat, headed toward the mainland. And what happened thereafter I need not tell; you can use your own imagination. I will only mention that I paid a \$500 fine like all the rest, except Hicks, who was fined \$2,000. And even at that I was glad that, this time at least, I had persuaded nobody, and no one could have a grudge against me.

THE END.

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1. The Mercury vapor arc lamp gives a light of very high actinic power. From the ordinary standpoint, what is the effect of this light? (See page 392.)
2. What effect have radium and rays such as X-rays upon the human system? (See page 420.)
3. What forces of incalculable magnitude are there, which may yet be harmless? (See page 422.)
4. What is the mineral carnotite and what are its uses? (See page 424.)
5. How will you describe the action of the rocket which has recently been applied in Germany to the propulsion of an automobile as described in SCIENCE AND INVENTION of July? (See page 427.)
6. What classification could you give, even if partly hypothetical, to the frame work of matter? (See page 429.)
7. If the substance is completely permeable to light vibrations, what two qualities of the negative type would you attribute to it? (See page 429.)
8. What do the letters RPM indicate? They are an expression used in mechanics and physics. (See page 456.)
9. What two bodies of scientists have been at war with each other for half a century giving a curious instance of how natural science can occasion an almost personal dispute? (See page 461.)
10. In natural history, the resemblance of animals or insects to their surroundings such as an insect resembling a twig, or one whose wings look exactly like two leaves, have received the name based more or less on an exaggerated appeal to evolution. What is the name of this phenomenon? (See page 464.)

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The MOTH

By H. G. Wells

Author of: "The Time Machine," "The Invisible Man," etc.



Hapley suddenly moved his head back and looked with both eyes. His mouth fell open with astonishment.

PROBABLY you have heard of Hapley—not W. T. Hapley, the son, but the celebrated Hapley, the Hapley of *Periplancta Hapliia*, Hapley the entomologist.

If so, you know at least of the great feud between Hapley and Professor Pawkins, though certain of its consequences may be new to you. For those who do not know of it a word of explanation is necessary, which the idle reader may go over with a glancing eye, if his indolence so incline him.

It is amazing how very widely diffused is the ignorance of such really important matters as this Hapley-Pawkins feud. Those epoch-making controversies, again, that have convulsed the Geological Society, are, I verily believe, almost entirely unknown outside the fellowship of that body. I have heard men of fair general education, even refer to the great scenes at these meetings as vestry-meeting squabbles. Yet the great hate of the English and Scotch geologists has lasted

now half a century, and has 'left deep and abundant marks upon the body of the science.' And this Hapley-Pawkins business, though perhaps a more personal affair, stirred passions as profound, if not profounder. Your common man has no conception of the zeal that animates a scientific investigator, the fury of contradiction you can arouse in him. It is the *odium theologicum* in a new form. There are men, for instance, who would gladly burn Professor Ray Lankester at Smithfield for his treatment of the Mollusca in the Encyclopædia. That fantastic extension of the Cephalopods to cover the Pteropods . . . But I wander far afield from the age-old feud of Hapley and Pawkins.

It began years and years ago, with a revision of the Microlepidoptera (whatever these may be) by Pawkins, in which he extinguished a new species created by Hapley. Hapley, who was always quarrelsome, replied by a stinging impeachment of the entire classification of

WE present a most curious story by H. G. Wells. We might call this an adventure in psychology. It is a queer as well as startling penetration into the realm of the human mind, and this sort of thing occurs very much more often than most of us realize. It is unfortunate for many people that they do not know where reality leaves off, and where imagination begins.

Pawkins.¹ Pawkins in his 'Rejoinder'² suggested that Hapley's microscope was as defective as his power of observation, and called him an 'irresponsible meddler'—Hapley was not a professor at that time. Hapley in his retort,³ spoke of 'blundering collectors,' and described, as if inadvertently, Pawkins' revision as a 'miracle of ineptitude.' It was war to the knife. However, it would scarcely interest the reader to detail how these two great men quarrelled, and how the split between them widened until from the Microlepidoptera they were at war upon every open question in entomology. There were memorable occasions. At times the Royal Entomological Society meetings resembled nothing so much as the Chamber of Deputies. On the whole, I fancy Pawkins was nearer the truth than Hapley. But Hapley was skilful with his rhetoric, had a turn for ridicule rare in a scientific man, was endowed with vast energy, and had a fine sense of injury in the matter of the extinguished species; while Pawkins was a man of dull presence, prosy of speech, in shape not unlike a water-barrel, over conscientious with testimonials, and suspected of jobbing museum appointments. So the young men gathered round Hapley and applauded him. It was a long struggle, vicious from the beginning and growing at last to pitiless antagonism. The successive turns of fortune, now an advantage to one side and now to another—now Hapley tormented by some success of Pawkins, and now Pawkins outshone by Hapley, belong rather to the history of entomology than to this story.

But in 1891 Pawkins, whose health had been bad for some time, published some work upon the 'mesoblast' of the Death's Head Moth. What the mesoblast of the Death's Head Moth may be does not matter a rap in this story. But the work was far below his usual standard, and gave Hapley an opening he had coveted for years. He must have worked night and day to make the most of his advantage.

In an elaborate critique he rent Pawkins to tatters—one can fancy the man's disordered black hair, and his queer dark eyes flashing as he went for his antagonist—and Pawkins made a reply, halting, ineffectual, with painful gaps of silence, and yet malignant. There was no mistaking his will to wound Hapley, nor his incapacity to do it. But few of those who heard him—I was absent from that meeting—realized how ill the man was.

Hapley got his opponent down, and meant to finish him. He followed with a simply brutal attack upon Pawkins, in the form of a paper upon the development of moths in general, a paper showing evidence of a most extraordinary amount of mental labor, and yet couched in a violently controversial tone. Violent as it was, an editorial note witnesses that it was modified. It must have covered Pawkins with shame and confusion of face. It left no loopholes; it was murderous in argument, and utterly contemptuous in tone; an awful thing for the declining years of a man's career.

THE world of entomologists waited breathlessly for the rejoinder from Pawkins. He would try one, for Pawkins had always been game. But when it came it surprised them. For the rejoinder of Pawkins was to catch influenza, proceed to pneumonia, and die.

It was perhaps as effectual a reply as he could make under the circumstances, and largely turned the current of feeling against Hapley. The very people who had most gleefully cheered on those gladiators became serious at the consequence. There could be no reasonable doubt the fret of the defeat had contributed to the death of Pawkins. There was a limit even to scientific controversy, said serious people. Another crushing attack was already in the Press and appeared on the day before the funeral. I don't think Hapley exerted himself to stop it. People remembered how Hapley had hounded down his rival, and forgot that rival's defects. Scathing satire reads ill over fresh mould. The thing provoked comment in the daily papers. This it was that made me think that you had probably heard of Hapley and this controversy. But, as I have already remarked, scientific workers live very much in a world of their own; half the people, I dare say, who go along Piccadilly to the Academy every year, could not tell you where the learned societies abide. Many even think that research is a kind of happy-family cage in which all kinds of men lie down together in peace.

In his private thoughts Hapley could not forgive Pawkins for dying. In the first place, it was a mean dodge to escape the absolute pulverization Hapley had in hand for him, and in the second, it left Hapley's mind with a queer gap in it. For twenty years he had worked hard, sometimes far into the night, and seven days a week, with microscope, scalpel, collecting-net, and pen, and almost entirely with reference to Pawkins. The European reputation he had won had come as an incident in that great antipathy. He had gradually worked up to a climax in this last controversy. It had killed Pawkins, but it had also thrown Hapley out of gear, so to speak, and his doctor advised him to give up work for a time, and rest. So Hapley went down into a quiet village in Kent, and thought day and night of Pawkins, and good things it was now impossible to say about him.

At last Hapley began to realize in what direction the pre-occupation tended. He determined to make a fight for it, and started by trying to read novels. But he could not get his mind off Pawkins, white in the face and making his last speech—every sentence a beautiful opening for Hapley. He turned to fiction—and found it had no grip on him. He read the *Island Nights' Entertainments* until his sense of causation was shocked beyond endurance by the Bottle Imp. Then he went to Kipling, and found he 'proved nothing,' besides being irreverent and vulgar. These scientific people have their limitations. Then, unhappily, he tried Besant's *Inner House*, and the opening chapter set his mind upon learned societies and Pawkins at once.

So Hapley turned to chess, and found it a little more soothing. He soon mastered the moves and the chief gambits and commoner closing positions, and began to beat the Vicar. But then the cylindrical contours of the

¹ "Remarks on a Recent Revision of Microlepidoptera. *Quart. Journ. Entomological Soc.*, 1863.

² "Rejoinder to certain Remarks, etc. *Ibid.* 1864.

³ "Further Remarks," etc. *Ibid.*

opposite king began to resemble Pawkins standing up and gasping ineffectually against check-mate, and Hapley decided to give up chess.

Perhaps the study of some new branch of science would, after all, be better diversion. The best rest is change of occupation. Hapley determined to plunge at diatoms, and had one of his smaller microscopes and Halibut's monograph sent down from London. He thought that perhaps if he could get up a vigorous quarrel with Halibut, he might be able to begin life afresh and forget Pawkins. And very soon he was hard at work in his habitual strenuous fashion, at these microscopic denizens of the wayside pool.

It was on the third day of the diatoms that Hapley became aware of a novel addition to the local fauna. He was working late at the microscope, and the only light in the room was the brilliant little lamp with the special form of green shade. Like all experienced microscopists, he kept both eyes open. It is the only way to avoid excessive fatigue. One eye was over the instrument, and bright and distinct before that was the circular field of the microscope, across which a brown diatom was slowly moving. With the other eye Hapley saw, as it were, without seeing. He was only dimly conscious of the brass side of the instrument, the illuminated part of the table-cloth, a sheet of note-paper, the foot of the lamp, and the darkened room beyond.

Suddenly his attention drifted from one eye to the other. The tablecloth was of the material called tapestry by shopmen, and rather brightly colored. The pattern was in gold, with a small amount of crimson and pale blue upon a grayish ground. At one point the pattern seemed displaced, and there was a vibrating movement of the colors at this point.

HAPLEY suddenly moved his head back and looked with both eyes. His mouth fell open with astonishment.

It was a large moth or butterfly; its wings spread in butterfly fashion!

It was strange it should be in the room at all, for the windows were closed. Strange that it should not have attracted his attention when fluttering to its present position. Strange that it should match the tablecloth. Stranger far than that to him, Hapley, the great entomologist, it was altogether unknown. There was no delusion. It was crawling slowly towards the foot of the lamp.

"New Genus, by heavens! And in England!" said Hapley, staring.

Then he suddenly thought of Pawkins. Nothing would have maddened Pawkins more. . . . And Pawkins was dead!

Something about the head and body of the insect became singularly suggestive of Pawkins, just as the chess king had been.

"Confound Pawkins!" said Hapley. "But I must catch this." And looking round him for some means of capturing the moth, he rose slowly out of his chair. Suddenly the insect rose, struck the edge of the lampshade—Hapley heard the "ping"—and vanished into the shadow.

In a moment Hapley had whipped off the shade, so

that the whole room was illuminated. The thing had disappeared, but soon his practised eye detected it upon the wallpaper near the door. He went towards it poising the lamp-shade for capture. Before he was within striking distance, however, it had risen and was fluttering round the room. After the fashion of its kind, it flew with sudden starts and turns, seeming to vanish here and reappear there. Once Hapley struck, and missed; then again.

The third time he hit his microscope. The instrument swayed, struck and overturned the lamp, and fell noisily upon the floor. The lamp turned over on the table and, very luckily, went out. Hapley was left in the dark. With a start he felt the strange moth blunder into his face.

It was maddening. He had no lights. If he opened the door of the room the thing would get away. In the darkness he saw Pawkins quite distinctly laughing at him. Pawkins had ever an oily laugh. He swore furiously and stamped his foot on the floor.

There was a timid rapping at the door.

Then it opened, perhaps a foot, and very slowly. The alarmed face of the landlady appeared behind a pink candle flame, she wore a night-cap over her gray hair and had some purple garment over her shoulders. "What was that fearful smash?" she said. "Has anything——" The strange moth appeared fluttering about the chink of the door. "Shut that door!" said Hapley, and suddenly rushed at her.

The door slammed hastily. Hapley was left alone in the dark. Then, in the pause, he heard his landlady scuttle upstairs, lock her door, and drag something heavy across the room and put against it.

It became evident to Hapley that his conduct and appearance had been strange and alarming. Confound the moth! and Pawkins! However, it was a pity to lose the moth now. He felt his way into the hall and found the matches, after sending his hat down upon the floor with a noise like a drum. With the lighted candle he returned to the sitting-room. No moth was to be seen. Yet once for a moment it seemed that the thing was fluttering round his head. Hapley very suddenly decided to give up the moth and go to bed. But he was excited. All night long his sleep was broken by dreams of the moth, Pawkins, and his landlady. Twice in the night he turned out and soused his head in cold water.

One thing was very clear to him. His landlady could not possibly understand about the strange moth, especially as he had failed to catch it. No one but an entomologist would understand quite how he felt. She was probably frightened at his behavior, and yet he failed to see how he could explain it. He decided to say nothing further about the events of last night. After breakfast he saw her in her garden, and decided to go out and talk to reassure her. He talked to her about beans and potatoes, bees, caterpillars, and the price of fruit. She replied in her usual manner, but she looked at him a little suspiciously, and kept walking as he walked, so that there was always a bed of flowers, or a row of beans, or something of the sort, between them. After awhile he began to feel singularly irritated at this, and to conceal his vexation went indoors.

Presently he went out for a walk again.

The moth, or butterfly, trailing an odd flavor of Pawkins with it, kept coming into that walk, though he did his best to keep his mind off it. Once he saw it quite distinctly, with its wings flattened out, upon the old stone wall that runs along the west edge of the park, but going up to it he found it was only two lumps of gray and yellow lichen. "This," said Hapley, "is the reverse of mimicry. Instead of a butterfly looking like a stone, here is a stone looking like a butterfly!" Once something hovered and fluttered round his head, but by an effort of will he drove that impression out of his mind again.

IN the afternoon Hapley called upon the Vicar, and argued with him upon theological questions. They sat in the little arbor covered with briar, and smoked as they wrangled. "Look at that moth!" said Hapley, suddenly, pointing to the edge of the wooden table.

"Where?" said the Vicar.

"You don't see a moth on the edge of the table there?" said Hapley.

"Certainly not," said the Vicar.

Hapley was thunderstruck. He gasped. The Vicar was staring at him. Clearly the man saw nothing. "The eye of faith is no better than the eye of science," said Hapley awkwardly.

"I don't see your point," said the Vicar, thinking it was part of the argument.

That night Hapley found the moth crawling over his counterpane. He sat on the edge of the bed in his shirt sleeves and reasoned with himself. Was it pure hallucination? He knew he was slipping, and he battled for his sanity with the same silent energy he had formerly displayed against Pawkins. So persistent is mental habit, that he felt as if it were still a struggle with Pawkins. He was well versed in psychology. He knew that such visual illusions do come as a result of mental strain. But the point was, he did not only see the moth, he had heard it when it touched the edge of the lampshade, and afterwards when it hit against the wall, and he had felt it strike his face in the dark.

He looked at it. It was not at all dreamlike, but perfectly clear and solid-looking in the candle-light. He saw the hairy body, and the short feathery antennæ, the jointed legs, even a place where the down was rubbed from the wing. He suddenly felt angry with himself for being afraid of a little insect.

His landlady had got the servant to sleep with her that night, because she was afraid to be alone. In addition she had locked the door, and put the chest of drawers against it. They listened and talked in whispers after they had gone to bed, but nothing occurred to alarm them. About eleven they had ventured to put the candle out, and had both dozed off to sleep. They woke up with a start, and sat up in bed, listening in the darkness.

Then they heard slippers going to and fro in Hapley's room. A chair was overturned, and there was a violent dab at the wall. Then a china mantel ornament smashed upon the fender. Suddenly the door of the room opened, and they heard him upon the landing.

They clung to one another, listening. He seemed to be dancing upon the staircase. Now he would go down three or four steps quickly, then up again, then hurry down into the hall. They heard the umbrella stand go over, and the fanlight break. Then the bolt shot and the chain rattled. He was opening the door.

They hurried to the window. It was a dim gray night; an almost unbroken sheet of watery cloud was sweeping across the moon, and the hedge and trees in front of the house were black against the pale roadway. They saw Hapley, looking like a ghost in his shirt and white trousers, running to and fro in the road, and beating the air. Now he would stop, now he would dart very rapidly at something invisible, now he would move upon it with stealthy strides. At last he went out of sight up the road towards the down. Then, while they argued who should go down and lock the door, he returned. He was walking very fast, and he came straight into the house, closed the door carefully, and went quietly up to his bedroom. Then everything was silent.

"Mrs. Colville," said Hapley, calling down the staircase next morning, "I hope I did not alarm you last night."

"You may well ask that!" said Mrs. Colville.

"The fact is, I am a sleep-walker, and the last two nights I have been without my sleeping mixture. There is nothing to be alarmed about, really. I am sorry I made such an ass of myself. I will go over the down to Shoreham, and get some stuff to make me sleep soundly. I ought to have done that yesterday."

But half-way over the down, by the chalk pits, the moth came upon Hapley again. He went on, trying to keep his mind upon chess problems, but it was no good. The thing fluttered into his face, and he struck at it with his hat in self-defense. Then rage, the old rage—the rage he had so often felt against Pawkins—came upon him again. He went on, leaping and striking at the eddying insect. Suddenly he trod on nothing, and fell headlong.

There was a gap in his sensations, and Hapley found himself sitting on the heap of flints in front of the opening of the chalk-pits, with a leg twisted back under him. The strange moth was still fluttering round his head. He struck at it with his hand, and turning his head saw two men approaching him. One was the village doctor. It occurred to Hapley that this was lucky. Then it came into his mind with extraordinary vividness, that no one would ever be able to see the strange moth except himself, and that it behooved him to keep silent about it.

Late that night, however, after his broken leg was set, he was feverish and forgot his self-restraint. He was lying flat on his bed, and he began to run his eyes round the room to see if the moth was still about. He tried not to do this, but it was no good. He soon caught sight of the thing resting close to his hand, by the night-light, on the green tablecloth. The wings quivered. With a sudden wave of anger he smote at it with his fist, and the nurse woke up with a shriek. He had missed it.

"That moth!" he said; and then, "It was fancy. Nothing!"

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A. S. B.

All the time he could see quite clearly the insect going round the cornice and darting across the room, and he could also see that the nurse saw nothing of it and looked at him strangely. He must keep himself in hand. He knew he was a lost man if he did not keep himself in hand. But as the night waned the fever grew upon him, and the very dread he had of seeing the moth made him see it. About five, just as the dawn was gray, he tried to get out of bed and catch it, though his leg was afire with pain. The nurse had to struggle with him.

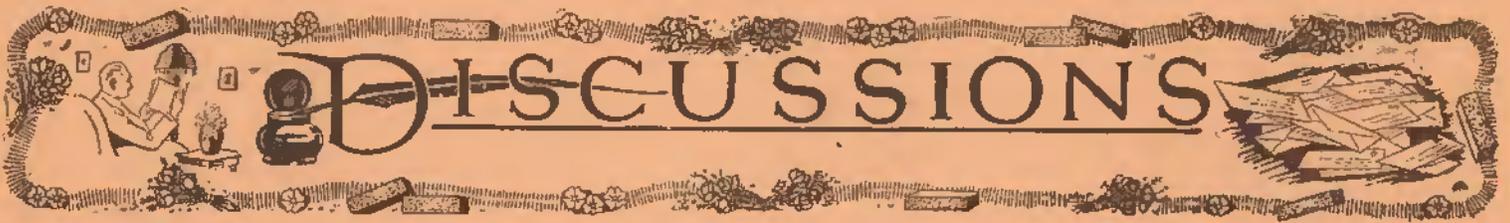
On account of this, they tied him down to the bed. At this the moth grew bolder, and once he felt it settle in his hair. Then, because he struck out violently with his arms, they tied these also. At this the moth came and crawled over his face, and Hapley wept, swore, screamed, prayed for them to take it off him.

The doctor was a blockhead, a just-qualified general

practitioner, and quite ignorant of mental science. He simply said there was no moth. Had he possessed the wit, he might still, perhaps, have saved Hapley from his fate by entering into his delusion, and covering his face with gauze, as he prayed might be done. But, as I say, the doctor was a blockhead, and until the leg was healed Hapley was kept tied to his bed, and with the imaginary moth crawling over him. It never left him while he was awake and it grew to a monster in his dreams. While he was awake he longed for sleep, and from sleep he awoke screaming.

So now Hapley is spending the remainder of his days in a padded room, worried by a moth that no one else can see. The asylum doctor calls it hallucination; but Hapley, when he is in his easier mood, and can talk, says it is the ghost of Pawkins, and consequently a unique specimen and well worth the trouble of catching.

THE END



In this department we shall discuss, every month, topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the stories appearing in this magazine. In case a special personal answer is required, a nominal fee of 25c to cover time and postage is required.

AN AMUSING CONTRIBUTION TO THE DISCUSSIONS COLUMNS

Editor, AMAZING STORIES:

Quite a number of readers have written in objecting to the cover of AMAZING STORIES. If it hadn't been for the cover I wouldn't be writing this letter to tell you how I enjoy your magazine. I saw in the window of a radio store a magazine on whose cover was a picture of two men in what seemed to be a laboratory. They were gazing at a head resting on a table. My curiosity was aroused but I was not able to buy the magazine, when I saw it. I was forced to wait a month for the next issue. I've gotten every issue of AMAZING STORIES since.

And I've really enjoyed every issue. Some of the stories I have not liked, but I have read them just the same. I think the best two stories I ever read are *The Second Deluge* and *The Moon Pool*.

I think there are better authors than H. G. Wells but I liked the *War of the Worlds* anyhow. Continue to print Jules Verne's stories. It gives us a chance to look back and see what people of another time laughed at.

I can't see why you shouldn't print *Hick's Inventions*. They are more scientific than some of the stories and have a laugh thrown in.

The May issue is especially attractive. H. G. Wells is in it, but that is no bar. If there was only a little more water with his bread! The fourth dimension is a little ways beyond me but then I suppose the third dimension would be beyond a two dimension man. When it comes to traveling in time I think the idea is phooey. I can see traveling into the past but as for traveling into the future, I think that is the one impossible thing. If it was possible men would travel into the future to see what the world would be like, find its dangers, come back and then the future would not be what the travelers saw.

And now, if you don't mind, after that unscientific demonstration of the impossibility of traveling into the future, I am going to do what one other reader has done, criticize the critics, only I will take the May letters.

George C. Dick—I agree with you. You have the right idea although the stories you said that you did not like, I thought were pretty good. I didn't swallow Dr. Mentiroso but the Doc stood me on my head.

R. E. Graham—Paul's drawings are mighty good. I've gotten so I can pick out his drawings from the others. I don't agree on Wells, Jules Verne and Simmons. Wells is dry but others like him and many like Jules Verne and Simmons. If what you say is true of Wells I agree with him. Civilization is only a thin varnish and it isn't dry yet. It takes very little to rub it off. Don't be harsh with Mr. Verrill. I think he wrote the story as a laugh against time traveling. Mr. Graham

is all wet when he comes to the *Treasures of Tantalus*. Already we have a machine by which you can see and hear a person at the same time. It is called Television.

Robert Eisenbach—I agree with your opening paragraph on the stupid people that think a writer can tell them how a product of his imagination works. On your next paragraph, I don't agree. To use an expression I have already used to fit a different case; you must have some water with your bread. I think I can claim the championship for something of Pennsylvania, for although I am nineteen I never went anywhere with a girl or ever wanted to, but yet I think a little romance in a story makes it go down better.

Joseph Goldstein—George Cameron—Hurrah! Here are two critics that aren't criticizing something they don't know anything about. It's too bad the world isn't filled with your type of people. It would be a better place if it were.

John Pratzki—You are the same type of critic the preceding two are. While you criticize the time machines (which I do) you don't go up in the air and land on the poor editors' necks.

F. Balcar—*The Revolt of the Pedestrians* was a particularly interesting story. It and stories like it show what might happen and can happen if we are not careful. Personally, I don't think it will happen, because legs are so necessary to us youngsters in athletics that good legs are admired.

Mearle Prout—*Ten Million Miles Sunward* left me rather dazed, but I could not find the flaw in it. It was a good story just the same. Can't you see the facts in the traveler moving at the speed of light? If you were in outer space looking at the Earth, you would see it and the continents and seas, etc., and you would see it revolving, because of the light waves coming to and passing you. If you started away you would continue to see it. If you increased your speed to the speed of light you would no longer see the earth revolving. It would seem to stand still because you are looking at the same ray all the time. If you increase your speed the Earth starts to revolve backwards because you are looking at the light waves in reverse order.

Robert Eisenbach—Don't forget that others like Wells and Verne.

C. P. Townsend—You don't need criticizing.

A. S. Glasser—You speak of the hugeness of the Earth. Even in the Solar System this Earth is only a grain of sand. I think you are right, though, in its ability to disturb the balance.

"Interested Reader"—See F. Balcar.

And now I will close this rather long letter by telling you how to run AMAZING STORIES. (a) collect all letters that tell you which types of stories to print. (b) Make a neat pile of them.

(c) Collect the stories desired. (d) Give letters a shove into waste basket. (e) Look over stories and if you think they are no good, send them after letters. (f) Pick stories you think are right. (g) Print in magazine and send to subscribers and newsstands. (h) Count Profits.

FREDERICK BITTING,
7955 Heather Rd., Elkins Park, Pa.

[Now some of our correspondents can see what impression they produce on another reader. Frequently it appears as if we ought to blush at publishing some of the letters we receive, because they are so laudatory (this perhaps is one of them) and we certainly appreciate the writer's good wishes and enjoy the somewhat caustic ending of his letter.—EDITOR.]

THE STORIES OF LU SENARENS

Editor, AMAZING STORIES:

It was with a great amount of interest that I read your article or rather your epitaph dedicated to Mr. Lu Senarens, otherwise known as "Noname" in your June issue of AMAZING STORIES. It immediately brought back pleasant memories of my younger days when I read and reread the adventures of Frank Reade, Jr., and his two inimitable companions, Timothy Topstay and Poop. His *Around the World in 20 Days; In Search of the Sea Serpent; Lost in the Sargasso Sea* and his many other adventures originating in Readstown, N. J., always held my interest right to the last paragraph.

I certainly do believe that Mr. Lu Senarens' stories should have a place in your AMAZING STORIES. Why not republish one in serial form and give your readers of today an opportunity to enjoy the writings and imaginations of this truly great writer of the last century, whose stories are so much like fact in the present?

I have been reading your stories for more than a year and I have enjoyed them very much. I was particularly impressed by the evolution incorporated in the story, *The Land That Time Forgot*, also *The Moon Pool*. I also enjoy the column given over to the readers who write in their letters and suggestions.

HOWARD J. FAHRER,
784 St. Paul St., Rochester, N. Y.

[This letter interests us greatly. It is very difficult to get Mr. Senarens' stories complete. He was an author of inexhaustible fertility and the few pictures we show of the devices in his stories were certainly very curious and very interesting in the prophetic aspect. In a way, he might be called "The American Jules Verne" with the suffix, "only more so." We certainly shall consider the reprinting of some of his work.—EDITOR.]



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What Some of Our Students Say of This Course!

I have not written since I received the big set. I can still say that it far exceeded my anticipations. Since I have been appointed chemist for the Stratton Coal Co., testing all the coal and ash by proximate analysis. The lessons are helping me wonderfully, and the interesting way in which they are written makes me wait patiently for each lesson.—**MORLAIS COZZENS.**

I wish to express my appreciation of your prompt reply to my letter and to the recommendation to the General Electric Co. I intend to start the student engineering course at the works. This is somewhat along electrical lines, but the fact that I had a recommendation from a reliable school no doubt had considerable influence in helping me to secure the job.—**J. H. VAN BENTHUYSEN.**

So far I've been more than pleased with your course and am still doing nicely. I hope to be your honor graduate this year.—**J. M. NORRIS, JR.**

I find your course excellent and your instruction, truthfully, the clearest and best assembly I have ever taken, and yours is the fifth one I've studied.—**JAMES J. KELLY.**

From the time I was having Chemistry it has never been thus explained to me as it is now. I am recommending you highly to my friends, and urging them to become members of such an organization.—**CHARLES HEN-JAMIN.**

I shall always recommend your school to my friends and let them know how simple your lessons are.—**C. J. ANDAHL.**

I am more than pleased. You dig right in from the start. I am going to get somewhere with this course. I am so glad that I found you.—**A. A. CAMERON.**

I use your lessons constantly as I find it more thorough than most text books I can secure.—**WM. H. TIBBS.**

Thanking you for your lessons, which I find not only clear and concise, but wonderfully interesting. I am—**ROBT. H. TRAYLOR.**

I received employment in the Consolidated Gas Co. I appreciate very much the good service of the school when a recommendation was asked for.—**JOS. DECKER.**



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PHYSIOLOGICAL EFFECTS OF NULLIFICATION OF GRAVITATION

Editor, AMAZING STORIES:

1. You have had a good many stories of space-traveling in your pages, and all of them seemed to have neglected the effect upon the human physiology of the withdrawal of gravitation. That is a question that interests me immensely; eventually I shall try to put it into a story. However, at the present I have no material nor ideas that I could work into a story of space-travel, and am giving you my ideas, for the benefit of other writers who may care to give the matter some consideration. Air-travel has meant profound physiological effects; those of space travel will be quite as profound, if not more so.

a. The depressing effects of long periods of monotony and of physical inactivity and of close association of a small number of individuals, have been studied, and accounts can be found in the history of submarine travel and of prison life.

b. Minor symptoms caused by withdrawal of gravitation: intra-abdominal tension, which is an important factor in the maintenance of the body's physical tone, is kept up largely by the force of gravity.

An entirely new system of muscular balance and coordination would have to be built up, in order that the individual's least movement might not send him hurtling hither and thither; and before inhibition and relaxation were sufficiently developed, there would be bruised spots and sore muscles.

c. The serious spot where absence of gravitation would cause trouble is in the semicircular canals of the inner ear. In these the fluid is kept in the lower halves by gravity while we are in a vertical position; we also learn to adjust in the horizontal position, if changes in position are made slowly. If changes in position are rapid and do not have a fixed relation to visible objects, vertigo results. If gravitation were withdrawn entirely, this fluid would be distributed at haphazard all about the semicircular canals, and the only result that I can derive from that, is a most terrific vertigo, with nausea and vomiting. The space traveler would be too darned sick to run his machine. Some individuals would be sicker than others. Some individuals would rapidly acquire an adaptation; others would get it slowly; others would never get it.

I should like very much to see some writer of space stories consider this seriously.

2. I consider *The Miracle of the Lily* the finest thing you have ever published. I am keeping a great scrap-book of all the good things in AMAZING STORIES, purchasing two issues if necessary to get my clippings complete. By eliminating hopeless material, and material that I already possess in book form, I have the cream of Scientifiction, comprising less than one-fifth of all the material you have published. Unhesitatingly, I place at the head of this, *The Miracle of the Lily*.

Why? Because it fulfills to a high degree all the great requirements of this class of writing.

1. It deals with ideas of big importance to the human race.
2. It presents these ideas in a form which is plausible during the reading of the story.
3. It presents the ideas in the recognized literary form termed the "short-story" correct in structure and developed skillfully, with the proper suspense and the proper "surprise" at the end.
4. It is written in good English.
5. It deals with scientific matters as though they were familiar to the author, not with the pitiful, ridiculous clumsiness that even some of our great American writers display in dealing with scientific subjects.
6. It appeals to emotions that exist deep within the heart of every human being, whether he be scientific or not.

What more can you ask? *The Yeast Men* was a dramatic conception, but was spoiled by tinkering too much with a fresh and vigorous idea.

To have taken the original conception of budding, irresistibly multiplying yeast men, and worked it up into a dramatic plot without all the accessory trappings of radium activation and pools of poison slime, would have required real literary workmanship. But it would have been something.

Some day perhaps we'll have a Lord Dunsany in this field; a fellow who can do poetical things with scientific ideas. But, there is only a thinnest of partitions dividing that field from blithering nonsense. We'd better be serious till we learn how.

Anyway, it's better reading if it sticks to the forms that thousands of years of human writing have found to be the best.

MILES J. BREUER, M.D.,
 908 Federal Trust Building, Lincoln, Neb.

[You will find in Mr. Hugo Gernsback's book, *Ralph 124C 41+*, that he has carefully considered all of the points brought out in your letter. The reference to this may be found on page 285, part of which is reprinted herewith: "While all the blood vessels remained healthy, Ralph became greatly alarmed over the change that slowly, but steadily, made itself apparent in the respiratory organs. Some change was taking place which he did not understand. He knew it must be the action of the Armagatol, but he was unable to do anything, as with the chemicals on hand it was impossible to produce the life-saving Permagatol.

"Ralph grew more despondent each day, and his hope of bringing his betrothed back to life grew dimmer and dimmer as the hours rolled on. For the first time since he left the Earth he became space-sick.

"Space-sickness is one of the most unpleasant sensations that a human being can experience. Not all are subject to it, and it does not last longer than forty-eight hours, after which it never recurs.

"On Earth, gravitational action to a certain degree exerts a certain pull on the brain. Out in space, with practically no gravitational action, this pull ceases. When this happens, the brain is no longer subjected to the accustomed pull, and it expands slightly in all directions, just as a balloon loses its pear shape and becomes round when an aeronaut cuts loose, to drop down with his parachute.

The effect on the brain results in space-sickness, the first symptoms being violent melancholy and depression followed by a terrible heart-rending longing for Earth. During this stage, at which the patient undergoes great mental suffering, the optical nerves usually become affected and everything appears upside down, as if the sufferer were looking through a lens. It becomes necessary to take large doses of Siltagol, otherwise brain fever may develop.

"At the end of two days the sickness left Ralph, but it left him worn and exhausted physically and he was subject to terrible fits of depression. At these times the boundless space about him appalled him, weighing him down with its infinite immensity. The awful stillness crushed him. Everything seemed dead—dead as was that silent motionless figure that had been a living laughing creature who had loved him—it seemed so long ago."—EDITOR.]

THE NAME "AMAZING STORIES" AND THE QUESTIONNAIRE CRITICIZED. SOME BRICKBATS. (Good natured ones.)

Editor, AMAZING STORIES:

I have been a more or less consistent reader of your magazines since you first began to publish them and I want to congratulate you on AMAZING STORIES because it supplies, as you realize, a long felt need in its particular field. I must, however, agree with numerous readers in that it really should bear a more suitable appellation than the one it now labors under, which only very inadequately describes its really splendid contents.

Other readers have complimented and criticized your different stories. They all are the best in their line and naturally all will not appeal to each individual, but what displeases some will please others, so do not heed too many personal requests. I am forced to agree with Professor Hutch that you really should make AMAZING STORIES THE journal of Scientifiction and that the questionnaire is more in place in any of your other magazines than in this one. Reprints are very well in their place but a live modern magazine should have little use for work that is already well read and known and that was or has been "popular" in the past.

The present issue of both the monthly and the quarterly are fine, and I personally found the story of Dr. Keller's, named *A Biological Experiment*, very interesting and showing a quality of soundness and keen thinking that makes it a pleasure to read.

I would like to say one more thing before I close this letter and that is to request that you confine Mr. Paul's illustrations to the interior of your magazine. A sailor is given little credit for possessing brains and it is embarrassing to find a half tolerant expression on an officers' face after he gives one glance at the sometimes extremely grotesque drawing with which your magazines greet the world. I have been assigned to Asiatic Station and a number of my shipmates and officers have assured me that I surely will go crazy without the help of the East if I continue to read a publication with such idiotic stories in it. Now, of course, they have never read one of these magazines, because a glance at the covers scared them away. After talking to many of them and showing what the magazine really contains, they withdrew their previous opinions, but still say they never would be seen reading a book like that until they had first torn off the covers.

Naturally, I can stand their friendly "razzing" but what I would like to drive home is the fact that you really are lowering your circulation by your present policy. The Navy of today produces more skilled craftsmen and thinkers than any other organization or commercial group in the world and you are barring yourself greatly from this field merely by your mode of presentation to the world at large.

There is much more to say on this subject but I will leave that to others who have more time to say it in.

MARLEY W. FELTEN, F3/c.

U. S. Naval Training School, Hampton Roads, Va. [We have indicated in the heading that your brickbats are good natured ones. We cannot publish but a small fraction of the letters we receive, but you would be surprised if you knew the praises which have been lavished upon our covers. If we parted company with Mr. Paul, it would be very hard to find anyone to take his place, who would be able to give the scientific touch to the pictures which the subjects exact. The covers are considered by some to be almost the best part of the magazine, and we think that your fellow officers are simply joking when they say they would tear the covers off, so don't mind their "razzing" as you call it. We have to follow the American rule that the majority count and the majority of critics highly appreciate the cover illustration combination of artistic effect and science.—EDITOR.]



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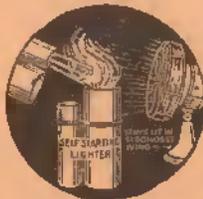
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TRAVELING FASTER THAN LIGHT—THE CONDITIONS ON MARS

Editor, AMAZING STORIES:

Being a foreigner, not yet so very long in the U. S. A., it is not easy to express my thoughts clearly in your language but, being a reader of your magazine and especially interested in the discussion pages, I cannot withstand the desire to write you about a question that is discussed in the April and May issues, namely, what a traveler in space will see by traveling at a speed greater than that of light.

I hope that my English will not be so poor that you will not understand what I am talking about.

In the March issue Mr. Simeon writes: "The traveler rushed from the known universe at a speed many times greater than light, yet looking back could see the receding pin-points of light that were stars. Now if he was traveling too fast for light to overtake him, how could he see them?" I quite agree with Mr. Simeon, but . . . I also agree with your commentary to be careful about any objection to a traveler in space seeing stars.

In the May issue, Mr. Prout writes about the same subject and he is in my opinion on the right track to solve this problem, though he fails to work it out properly.

Let us first consider what a traveler in space will see, when he rushes toward the light source. I will hereby use the formula of the Doppler effect, an important formula in astronomy. I hope you do not doubt the soundness of this formula, otherwise my efforts to convince you will fall flat.

To make the question as simple as possible, I will leave the theory of Einstein out of calculation and further assume that the light source is in rest relatively to the ether.

The frequency of the light, reaching the observer rushing towards the light source, will be:

$$\text{frequency observed} = \frac{\text{speed of observer}}{\text{original frequency} (1 + \frac{\text{speed of light}}{\text{speed of light}})}$$

When the observer has a speed equal that of light, the observed frequency will be double the original frequency, according to the formula above.

Red light, having the lowest frequency of the visible light, will then turn into ultra-violet light, having a frequency about double that of red light. But ultra-violet light is invisible (though it can be made visible, so as to say, by means of photography), consequently the entire visible spectrum will turn into an invisible spectrum. Red light, however, is not the beginning of our known spectrum. Science has discovered that there exists light, though invisible for the human eye, with a frequency up to 1/400 that of red light. A part of this spectrum will become visible. Even if the traveler has a speed of 400 times that of light, he can see its existence. How the traveler actually will see the light, faint or bright and of what color, depends entirely on its original composition.

Now let us consider what the traveler in space will see by rushing away from a light source.

The frequency of light, reaching the observer rushing away from its source, will be:

$$\text{frequency observed} = \frac{\text{speed of observer}}{\text{original frequency} (1 - \frac{\text{speed of light}}{\text{speed of light}})}$$

The formula indicates that the frequency decreases, when an observer travels away from the light source. At a speed equal to half the speed of light, the observed frequency is half the original, hence, ultra-violet light turns into red light and a part of the invisible spectrum beyond violet light will become visible.

At a speed equal that of light, the observed frequency will be zero, hence, the observer sees nothing. At a speed twice that of light, however, the observed frequency will be equal to the original but negative; this means, that the light waves travel relatively to the observer in opposite direction of his own motion. In order to see light, we have to look in the direction the light waves are apparently coming from; our traveler has also to look in the direction of his own motion. Though he then turns his back toward the light source, he sees it in front of him. By measuring the speed with which he is apparently moving toward the light source, the observer will discover that the light source is relatively to him at rest, consequently the light source moves ahead of him in the same direction and at the same speed, notwithstanding it is behind him and not moving at all. He can also draw the conclusion, that he himself and the light source together are in rest. Which conclusion the traveler will chose depends on whether he has some other evidence of his motion or not; if not, he can chose the one as well as the other, but he will hardly guess that both conclusions are wrong.

I should like to say more about this, but am afraid to take too much of your precious time. The most amazing conclusion is, that the traveler sees what is behind and in front of him at the same time; looking back he stares in the deepest dark.

At first it was my intention to write you also about some statements in *Heron Muenchhausen's Adventures*, but my letter will then be too long. I will only ask you, if you are sure that most of the scientists today agree with the theory of Dr. Lowell about the canals on Mars? This was certainly the case 20 or 30 years ago; not today, after the researches by Campbell and Keller, Slipper, Nicholson and Pettit, Coblenz and Lampfand, regarding the existence of water and oxygen in the atmosphere and the temperature on Mars? I have read many



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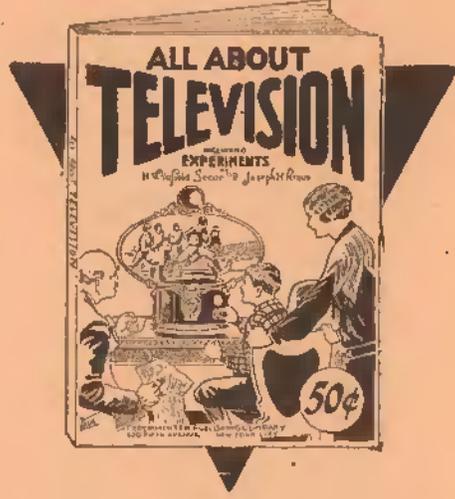
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books about astronomy, in which the Lowell theory is mentioned, but none of them agreed with it. It is certain that there are strong evidences against the Lowell theory. Of course, this does not prove that this theory is impossible, but we ought to judge a theory by its probability and not by its possibility.

We often reject a theory as being impossible, though we mean to say improbable, whereby we usually forget to add: as far as our knowledge goes. Less discussion would be made if the critics kept this better in mind.

I sure have to end this letter now. Kindly remember me to Mr. I. Am. A. Liar, alias Mr. I. M. Alier.

F. LEISTRA,

143 East 39th St., New York, N. Y.

[The problem of the traveler traveling faster than light is always an interesting one, but it falls into the class of mental gymnastics. In the first place, according to Einstein, nothing can travel faster than light, because, according to his mathematical formula, any object traveling as fast as light must disappear completely. Einstein tries to prove that if you take a metal rod and measure it while it is at rest, it will measure a certain amount of feet or inches. If you take the same object in an airplane, traveling 200 miles an hour, then the same rod will measure less than when it rests. As you keep on increasing the speed, the object will shrink more and more, until when it finally has the speed of light, it will vanish completely. This is the celebrated Lorenz-Fitzgerald contraction.

At this point, we wish to inject a new thought into the problem. It is pretty well concluded today that light has substance, which, perhaps, may clash with the above Einstein conception. Science seems to go back to the corpuscular theory of Newton. If that is the case, then we can imagine light coming from a star, the same as water shot from a nozzle, or we may imagine the corpuscles issuing steadily, as if shot from a machine gun. Imagine that you are looking toward a dark, non-luminous body, such as the moon or earth, if the sun were removed. Now start shooting cannon balls in a continuous stream into the direction of the observer. The cannon balls are luminous, made so by some chemical or electrical means. Now let us see what happens. The observer sits in a space-flyer and moves at the same rate of speed as light. He gets directly in front of the fast-moving luminous cannon balls and as long as he keeps directly in front of them, he will, of course, see them. If now, he starts to travel faster than the cannon balls, always in the same direction, the cannon balls will become fainter and fainter, until finally, he can no longer see them. If, however, the traveler in the space flyer goes slower than the speed of light, i.e., than the speed of the balls, he can then very well turn his back to the cannon and yet see the balls in front of him. Of course, he cannot be in their direct path, because then the space-flyer would cast a shadow and nothing would be seen, but a little to the side, it would appear as if the cannon balls were actually in front of him, because he would have no way of telling in which direction they are going.

The Martian canals are still very much a thing of controversy and every camp has its own convictions and its own theories as to the origin of them. —EDITOR.]

OUR NEW SIZE AND BINDING

Editor, AMAZING STORIES:

I note that the June issue of AMAZING STORIES is much altered in appearance, and in other respects, in comparison with former issues.

As a reader of AMAZING STORIES since the first issue, I implore you not to leave the magazine in this condition. The magazine is much too large for convenience in handling; the staple method of binding makes it cumbersome and bent and hard to retain in one position. The book is stiffer and cannot be easily bent back. The magazine has taken on the aspects of the regular class of cheap magazines. I have always remained a reader of AMAZING STORIES because I thought it was above the average in all respects.

If you still maintain your promise of keeping AMAZING STORIES at its high level (former) do not let the magazine have such faults, as more than mere stories go to make the magazine enjoyable.

I am penning you these lines as I am interested in the future of AMAZING STORIES and having its interest at heart, I cannot stand by when the high quality and prestige of AMAZING STORIES is being torn down and say nothing.

I hope you will at least give this your consideration, because many of my friends who read AMAZING STORIES criticized the late issue, likewise.

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It is impossible to please everybody. Besides, AMAZING STORIES corresponds now in size with 90% of standard magazines. The change in the method of binding was suggested by numerous letters of criticisms about the old system which was called "perfect binding." Many seemed to think it very imperfect, so we have come back to the usual stapling binding. When the numbers are put into volume form by the regular binder, the staples are removed and then everything is in perfect shape for his work. But we can assure you that judging by the comments which we have received, the magazine is certainly not being "torn down." It is impossible to avoid criticism and we certainly desire it and appreciate it, but we are trying to meet the conditions of the case and endeavoring to please our very indulgent clientele. —EDITOR.]

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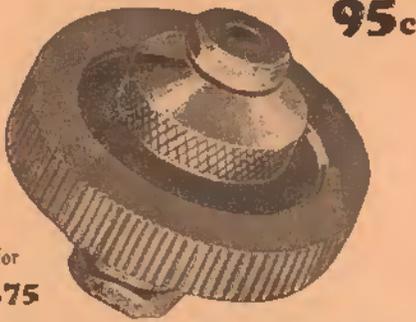
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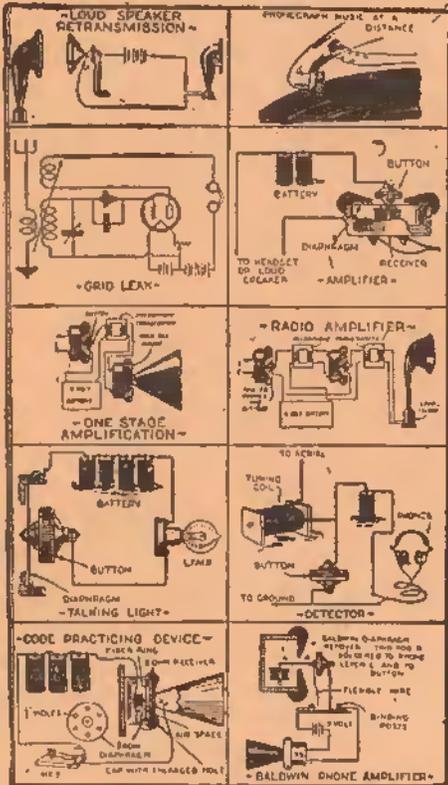


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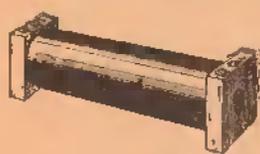


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NOTES UPON A NUMBER OF OUR STORIES. GENERAL APPRECIATION OF THE NARRATIVES

Editor, AMAZING STORIES:

These are the first comments I have ever written in concerning your incomparable magazine, AMAZING STORIES. It cannot be beat, as I feel, and since the first issue it has been my favorite magazine.

I welcome with pleasure the new increase in dimensions, which was effective with the April, 1928, issue.

The idea of printing the portraits of the various authors, whose stories appear in your magazine is certainly good, and I hope you get them all in eventually.

The stories also furnish useful material for school work. I am planning to report on some of them for outside reading. Another thing is the works of great men which is in some of the stories. An example of this is Shakespeare's "King John," a quotation from which appeared in M. H. Haste's *The Talking Brain*. I gave this in elocution the other day.

Now to get down to the stories themselves: Your first serial, *Off on a Comet*, by Jules Verne, was intensely interesting, and there seemed to be an air of actuality about it. Verne's stories are always welcome here. I have not yet found one that did not interest me.

The Man From the Atom, by Mr. Wertenbaker, was remarkably original, and expresses a wonderful counterpart of the Einstein theory. All of his stories are interesting, and I hope there are more to come.

The Colour Out of Space was a marvelous story, and is really full of science. It merely requires eyesight to see it.

Mr. Wells' *War of the Worlds* was an impressive story, but it was a bit hard to read. I think this is because I am still young, with more or less of a desire for stories with little description.

The Second Deluge of Mr. Serviss was extremely interesting for a long serial. *The Batholite* was quite new to me. All of Serviss' stories are interesting, and I hope there are more.

The Fosdick and Hicks stories were most interesting, and the more, the better. Contrary to some of your readers, I don't think humor is at all out of place in your magazine. They would probably blow the cobwebs out of their brains.

What has happened to genial old Dr. Hackensaw? Please tell him to wake up.

Ye editor need not fear feeling too chesty about his own contributions. They are exactly the type of story that I like. *The Magnetic Storm* was superb. The O. Henry ending of *The Electric Duel* was so sudden that I was almost precipitated from my chair. *The Scientific Adventures of Baron Muenchhausen* are the best ever. The longer they last, the better. The good-humored ridicule of the usual beginnings of stories is laugh-provoking.

Wells, *When the Sleeper Wakes* was much more interesting than *The War of the Worlds* and *A Story of the Days to Come* bids fair to be better than *When the Sleeper Wakes*.

The Master Mind of Mars was great, and I found it hard to convince myself the next morning that the story wasn't real.

Mr. Bell's *The Moon of Doom* was marvelous, but I don't comprehend how the moon's approach to the earth should cause the latter to speed up on her axis. The story also refreshed my vocabulary considerably, and I will admit I had to look up some of the words.

By far the best story with a sequel that you have yet published is Mr. White's *The Retreat to Mars*, followed by his *The Return of the Martians*. It gives a very good conception of what interplanetary travel via the rocket method will be like. I think it will be our eventual means of interplanetary travel.

The Moon Pool of Mr. Merritt was a wonderful story. When I first read it, I began to think that your magazine was degenerating to publishing rank fairy stories, but a little thought and a second reading quickly changed this view. I am now quite sure that everything described in that story is possible.

The QUARTERLY is exactly what was wanting all the time before its conception. I like to be able to have a volume with a complete novel in it, and that is what the QUARTERLY accomplishes.

Yours truly,

FRANCIS UFFELMAN,
1270 Mechanic Street, Camden, N. J.

[This very pleasant letter is of interest as a review, specifically, of some of the more important of our stories which we have given, and our correspondent's views of these stories, for the most part, certainly coincides with ours. You speak of your desire for stories with little description, but we assure you that stories lacking in description would be very arid, and the power of giving good description, is one of the things which mark the great author. We are especially glad to hear that you appreciate the humorous stories. Following our custom of putting in "brickbats" as well as commendation in this department, we have had occasion to publish several unfavorable criticisms of the Fosdick and Hicks stories. We still hope to hear from Dr. Hackensaw but under the present conditions, we are unable to make any promises. We are sorry to say that you are soon to hear no more from your friend, the Baron. If *The Moon Pool* contained nothing but the psychological studies carried out by its characters, it would rank high.—Editor.]



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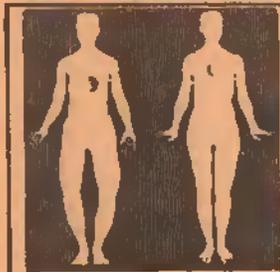
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SOME POINTS IN THE INVISIBLE MAN STORY FROM AN ADMIRER OF MR. WELLS AND GOOD WORDS FOR TWO OTHER AUTHORS AND FOR THE EDITORS

Editor, AMAZING STORIES:

While I am at the writing machine, I'd like to indulge in some comments on the tales you have published recently.

Let's lead off with Mr. Wells' dandy tale of the invisible man. If only he had omitted to state that "it was strange to see him smoking; his mouth and throat, pharynx and nares became visible as a sort of whirling smoke cast" and to explain the visibility of the coagulated blood as being due to Griffin having only produced invisibility in "living tissue." You see, the one passage made me consider whether or not other things than smoke entered the mouth which should have been visible if "only living tissue was changed." And the other passage caused me to consider the point as to whether or not all that goes to make up the naked body of a man could properly be classed as living tissue.

So it is that I have come to the conclusion that food and drink are taken in at the mouth as other than living tissue and that some portion of that which is eaten and drunk remains lifeless and inert during the whole of its sojourn within the body. Reasoning strictly, then, unless Griffin were totally without food in any state of digestion or elimination, that material would have been visible when he slipped out of his habiliments to evade capture! Even bridgework or fillings in his teeth would be seen floating around unsupported unless his oral cavity was quite unsoiled by dental ministrations.

But who cares whether I am right or wrong? The tale is so engrossing and engagingly told that even if it were granted that there was a deviation from strictest logic, it would remain one of the best stories you have recently published.

The Revolt of the Pedestrians and *The Yeast Men* were powerful tales from the pen of David H. Keller, M.D. The two just named were superior, to my way of reading, to his later story, *A Biological Experiment*.

Would you forward a letter for me to Francis Flagg? I am quite anxious to get in touch with him, for I had just left the region he describes in his tales when I first found his work in AMAZING STORIES and I hope to return "in the sweet by and by."

I look forward eagerly (as also do my studio mates) to another one of A. Merritt's wonderful stories. He has a large and enthusiastic following in Chicago. He is, I feel, one of the very finished writers of the new school, and for his type of work has few peers.

I am grateful to the editorial staff for giving the reading world AMAZING STORIES and for keeping so strictly month after month to the lofty standard which you have set.

WILLIAM P. KEASBEY,
1014 East 61st St., Chicago, Illinois.

[The extract which we publish from your letter, we feel is perhaps too flattering to the editors. Your criticism of Mr. Wells' *The Invisible Man* remind us of X-ray photographs of the human body in which the filling of the teeth and all metallic objects which may be in his pocket, come out with startling distinctness. How would it do if a man could be made invisible temporarily for the benefit of physicians in order to detect any strange objects in his system; it might be bullets or something which he had swallowed, such as a coin, and have this as a substitute for X-raying? This certainly is suggested by your very ingenious criticism. Your letter to Mr. Flagg has been duly forwarded. You are right in your appreciation of Mr. Merritt.—Editor.]

SOME VERY PLEASANT CRITICISMS FROM A HIGH SCHOOL STUDENT

Editor, AMAZING STORIES:

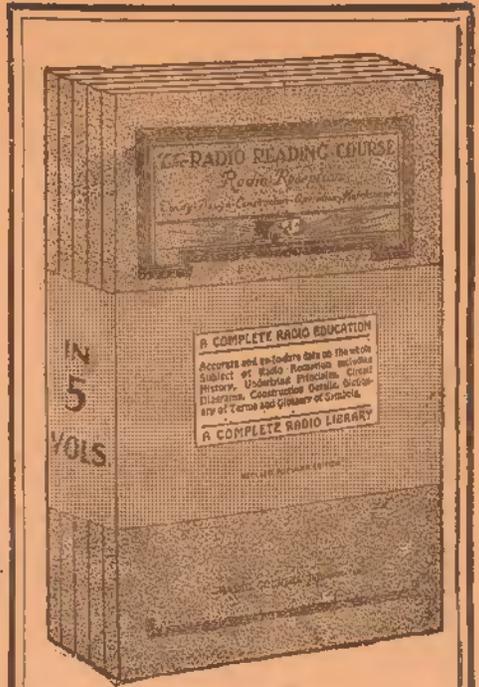
I am not quite sixteen, but I wish to tell you of the wonderful help your superb magazine has given me in my school work. I received so many "A" grades in my themes that my English teacher asked me what was my "source of information."

I went to school in Dole, Jura, France, when I was but four years old, so that I could read when I was about five. Isn't it queer how unimportant things linger in the memory? I remember begging my mother, at the age of six, to buy me a certain magazine profusely illustrated with box-shaped, green-colored individuals with one eye. I particularly remember something of a sentence telling of their drinking something solid, very much like dope. All this is foolish perhaps—but it left a lasting impression, a gap that only your wonderful interplanetary tales could fill. I like all types of scientific stories, but have a decided preference for those about other planets.

That the covers of your magazine have improved is shown by the fact that one of my teachers, seeing my May, 1926, issue, told me I shouldn't read it. From the grotesque cover she thought that it was a new type of fairy-tale magazine.

Your artist Paul has continually improved—he gives me great pleasure. I have found many small mistakes, but I have yet to find a scientific mistake.

Upon being asked my favorite magazine, I replied: "AMAZING STORIES" to my friend. He at once got the impression that it was another of the libidinous magazines which ruin the atmosphere of the stand; but he no sooner saw some of the pic-



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tures than he wished to buy all my old issues.

Here are the stories I do not care for: *Mesmeric Revelation*, *The Talking Brain*, *Blasphemer's Plateau*, *The Telepathic Pick-Up*, *The Story of the Late Mr. Elvisham*. I protest it is not the tales of horror I can't stand—I read *Lakh-Dal, Destroyer of Souls* alone at eleven o'clock without batting an eyelash, though I am very nervous.

Here are the stories I like: *Off on a Comet*, *Columbus of Space*, *High Tension*, *Island of Dr. Moreau*, *Second Deluge*, *The Thought Machine*, *Visitation and Moon Pool*. My favorite authors are Verne, Wells, Merritt, Serviss and Verrill. (I get the last three "mixed up" terribly.)

Due to a "mixed-up misprint" I could only read the first three stories (but those were worth a dollar each) in your January, 1927, issue.

In your *QUARTERLY* I didn't like the seventy-three pages for one story and the fifteen pages for three others. But your *Moon of Doom*, by Bell, equalled the *Master Mind of Mars*, by Burroughs (those being the two best I ever read), though despite the reprints, I enjoyed the *Annual* the better. One of my favorite authors fell behind my expectations in his *Face in the Abyss*, but all the rest of the stories were remarkably well assembled and written, making a book I will keep.

It is with great glee that I read of the French characters in so many of the stories. I am glad that the French intelligence, especially in astronomy, is so well recognized. Though in two stories I didn't like their use as villains. If I took several authors to Eastern France, they would stop writing "the little Frenchman," but instead, "the giant cloud of a Frenchman," I have seen!

In *Sub-Satellite* I was irritated by the fact that the author didn't deny the possibility of reaching the moon, but denied the possibility of life, merely because of lack of atmosphere. Bah! there might be life so grotesque, beyond our wildest nightmares; simply because we have to have atmosphere, vegetation and water is no sign that life couldn't exist without these, and when there is air, why—

Well, anyway, here's hoping some day to see the word "scientifiction" in every dictionary.

BERNARD SIMON,
1459 Erie St., Toledo, Ohio.

AMAZING STORIES has been so much appreciated by our younger clientele, that we are led to believe that it has a true teaching value. Letter after letter comes to us from young students in our schools, telling us how much it has done for them. Mr. Paul is giving great attention to his work and we can assure you that some of his drawings show a wonderful sense of appreciation of the story. We are using the *QUARTERLY* to a certain extent for giving long stories, but it is quite likely that your criticism is a just one. Referring to your closing words, the general belief is that the moon is without inhabitants.—EDITOR.]

THE BLUE DIMENSION, SUGGESTION FOR ITS ENDING. VIEWS ON OTHER STORIES

Editor, AMAZING STORIES:

I have read every story in every issue of *AMAZING STORIES* since the *ANNUAL*. My only criticism of it is one that has been voiced before in the "Discussions" column, which is that the cover and name of the magazine give the average person the idea that the contents are what is usually called "literary trash." I had that idea of it until I saw the name "Edgar Rice Burroughs" on the cover of the *ANNUAL*. Being a lover of his stories, I bought the *ANNUAL* and became converted. But I have been unable to convert anyone else. The general remark is, "The cover is enough for me." I like best such stories as *The Golden Girl of Munan*, *The Revolt of the Pedestrians*, *A Story of the Days to Come*, *A Visitor from the Twentieth Century*, *The King of the Monkey Men*, and *A Modern Atlantis*. This last named I think is simply great.

Now for a comment on *The Blue Dimension*. This is not a criticism, because I do not believe a story so far removed from ordinary life can be criticized. And the story had to have an ending, why not the one it has been given? But the following way for the Doctor to return seemed a simple solution to the problem to me. The story plainly states that any object going through the Re-vibrator appears not immediately but gradually on the other plane. It thus appears that the machine could be stopped and reversed with an object half through it. So why could not an object have been sent half through it where it could have been seen and grasped by the Doctor? Then, as long as he held to this object, why could not both have been brought back to this plane by the reversing of the Re-vibrator?

F. C. HAENCHEN,
1406 West 16th St., Oklahoma City, Okla.

[We think the average person you refer to is hardly so affected by Mr. Paul's cover page illustrations in the way you specify. If he is so affected, it is because he does not look at them long enough to see that the ideas of natural science suggested by pictures of apparatus and laboratory interiors is present in many of them; and where natural history was concerned, in the story of *The Octopus Cycle*, an accurate study was made of the cuttle fish, as this mollusk is popularly but inaccurately termed, the same creature which Victor Hugo depicts as attacking his hero in his novel, *The Toilers of the Sea*. As regards *The Blue Dimension*, don't you think it is possible that your suggestion never occurred to the operator of the strange machine?—EDITOR.]



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SOMETHING ABOUT SAURIANS AND THEIR SUCCESSORS. PAUL'S COVER PAGE DESIGNS

Editor, AMAZING STORIES:

Your April number has been read and approved, although I do not care much for your friend, the Baron. To my mind, *The Ycast Men* was especially good, with the *Miracle of the Lily* running it a close second, while the two stories that deal with past forms also appealed.

I always did like those "saurus" brutes. In Arizona, where I lived for seven years, there is a species of lizard that has the habit of running on its hind legs, much as did the extinct ones. It is called the Banded Lizard, is bluish green in color, normally, although like many of the tribe its color changes, and has bands of black, white or red around its neck; sometimes all three colors. Those that I saw were from eight inches to fourteen in length, with brown-red spots and a long slender tail. I have seen them running on their hind legs after some smaller lizard. I caught several by snaring them with a flyrod and a silk line and had one in particular for some weeks. To see one of these banded lizards fighting with a horned toad—which in spite of its name is also a lizard—at the level of one's eyes is extremely interesting. The illusion is as perfect as those in the picture, *The Lost World*. If your clever and versatile artist could see, as I have done, a duel between a banded lizard and a chuckawalla—which is a larger, thicker and more sluggish form—he might think that his picture of the tyrannosaurus and the brontosaurus was not far from the truth. This pet of mine had the run of my laboratory and would let me pick him up, but after I saw him bite the end of a lead-pencil off clean I ceased to fondle him. I don't know whether he really ate centipedes, scorpions, or the big hairy spiders that infested my shack, but they were not in evidence while he stayed with me, and I was sorry when he finally departed. If there is any doubt about this matter of lizards running on their hind legs in an almost upright position, you will find the fact mentioned in Ditmar's "Reptile Book," which I think is good authority.

As to reprints, I might suggest *The Great Stone of Sardis*, by Stockton; *The Battle of the Monsters*, by Morgan Robertson; *The Long Night*, by Oliver; there is a flesh-eating plant in *The Devil-Tree of Eldorado*, by Frank Audrey, and some interesting, if perverted, ideas in the *Manuscript Found in a Copper Cylinder*, whose author I do not recall. If some of your younger critics had lived when *The War of the Worlds* was appearing in the old unspoiled *Cosmopolitan Magazine* they would better understand the tense grip the story had. One of the Boston papers later "localized" the story and had daily reports of the "War," with the scene laid around Boston, which was far more gripping than any real war news could be.

But by all means let us have the new stories as well as the old ones. Your magazine is well balanced and I hope you will keep up your present gait. Of course, you cannot hope to please everybody every issue, and I think your choice of a name is rather unfortunate, since it is often classed with the other "Stories" and "Confessions" by those who do not care for them, as they judge by the title and do not buy. I have introduced several readers to your magazine, but I saw it several months before I started to read it. I did not like

the title, and it was only when one of "Paul's" covers caught my eye that I finally fell.

You are doing a good work, I think. To hold the youthful imagination with stories that teach, no matter how fantastic they may be, is a far better thing than to pander to its darker side with the so-called "truth" yarns. What we need is more Lindberghs and fewer Loeb and Hickmans.

As to humor, how about that farce, *A Round Trip to the Year 2000*, by W. W. Cook?

CHARLES E. ROE,
Hudson, Mass.

[Our correspondent supplies an excellent commentary on some quite powerful stories which appeared in our columns on the subject of prehistoric saurians. Magnify the lizards of this letter perhaps several thousandfold, and you can picture to yourself what dreadful monsters the old-time saurians were and the picturesqueness and vividness which have characterized the stories about them in this magazine, will be amply justified. We also wish to thank you for your suggestion for reprints.—EDITOR.]

THE ACTION OF THE SUN'S RAYS ON MARS AND THE EARTH

Editor, AMAZING STORIES:

I have been reading your magazine ever since I first saw it on the newsstand. In your monthly issues I find many happy hours; scientific reading to my mind is the best entertainment in the world, and that surely is the basis of your magazine.

I have just finished reading the June issue. In the story, *Baron Muenchhausen's Scientific Adventures*, you stated that the planet Mars, due to absence of cloud layers, would receive and retain more heat during the day than our earth, giving as your reason the statement that, due to the density of our cloud layers, heat could not penetrate.

We all know that the moisture which is in the clouds tends to absorb heat instead of, like asbestos, reflecting it.

Mars, due to its scarcity of atmosphere, and cloud blankets, would reflect the heat and light of the sun. It is a cold planet because it is a reflecting rather than an absorbing surface, due to lack of atmosphere and clouds or vapor.

ERNEST FRANCIS,

c/o Three Star Inn, Hampton Bays, L. I.

[We are glad that we have given you happy hours, and the fact that our stories receive so much criticism from readers goes to prove their value. They set our readers to thinking, which is in many cases, a very good thing. Unfortunately, it is not always good. The point about the action of cloud layers is that the intense rays of the sun will penetrate to some extent the densest clouds while any low grade heat, radiated from such an object as the earth, will not penetrate clouds to any great extent, so that the tendency of clouds is to produce even temperature. In this way, clouds do have some effect on the earth's temperature. The complete absence of clouds on Mars, if we assume that there are none, would cause it to receive practically unproduced heat from the sun and to that extent, it would be a warmer planet. We have no right to say that Mars is a reflecting rather than an absorbing object. It certainly does absorb. The telescope shows Mars red as to its surface. Red does not reflect light to a large degree. Only white does so.—EDITOR.]

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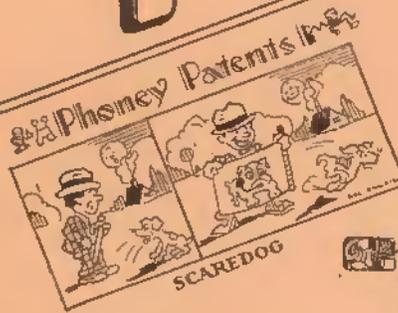
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FLYING FASTER THAN THE SPEED OF LIGHT

Editor, AMAZING STORIES:

May I add my comments to the discussion of visibility at speeds greater than light? I make no claims to being a scientist and submit these ideas humbly, hoping you will not be offended at my contradictions of your statements and will point out any error in my reasoning.

In this month's "Discussions" you say that stars would be visible after they have been passed at a speed greater than the speed of light because light waves which have left them prior to the passing would be seen. You point out that sound waves from a locomotive whistle would be heard by a person traveling faster than sound provided the whistle had been blown some time previous to the person passing the locomotive.

Now I hold that these illustrations are not analogous. It is obvious that light waves will affect the eye only when coming upon it from one direction—that is the direction in which the person is looking and within a narrow angle. Light waves reaching a person from behind will not affect the eye and cannot be seen. Sound waves, however, will affect the ear and sounds can be heard from any direction regardless of whether the hearer is facing the sound or not. Therefore the illustrations are not the same.

It seems logical that at speeds greater than light objects which have been passed could not be seen looking backward, but could be seen diminishing ahead and apparently overlapping objects which were approaching. They would therefore appear transparent, similar to a double exposure on a photograph. The light waves from objects passed would reach the eye only when the observer looked forward as he is overtaking them instead of them overtaking him.

To illustrate: suppose we are in a space flyer hovering a few hundred feet above the earth. We see a scene of a countryside with a road along which automobiles are traveling. Now let us turn on our power and travel off into space at exactly the speed of light. (Disregard the fact that the scene would diminish in size so rapidly that we could not see details.) What would we see? We would still see our countryside but the autos would appear motionless as only the light rays which were reaching us at the moment we started would be reaching our eyes now. We would be keeping pace with the one set of rays exactly.

Now let us increase our speed. The picture would immediately be blotted out and there would be total darkness. No light rays could reach our eyes from the direction we were looking. The rays that had left previous to our starting would be reaching us, but from the back of our heads and we cannot see in the back of us. If we turn around however we can then see as the rays can now reach our eyes. The scene would again be visible but the autos would appear to be going backward as we would be affected by light rays which left them earlier and earlier. We could of course also see the stars ahead of us as light rays from them and also from objects in back would both reach our eyes even though they were traveling in opposite directions.

This seems to me to be the logical condition, but I admit I probably am wrong. Well, maybe some day we will be able to travel faster than light and then the argument can be settled once and for all.

K. A. GONZALES,
231 East 87th Street, New York City.

[The idea of seeing planets and flying faster than the speed of light is very puzzling and paradoxical. Various correspondents have taken various views about this subject and we are glad to publish the views of our correspondents with little or no comment, as they speak so clearly for themselves.—EDITOR.]

MORE ABOUT THE EFFECT OF HIGH SPEED ON LIGHT AND VISION

Editor, AMAZING STORIES:

When reading some of your AMAZING STORIES Discussions, I happened upon one concerning an interplanetary—or rather an interuniversal—story, in which a space machine traveled, at a rate much faster than that of light, away from this universe. The point of which I wish to speak is that the stars of our universe were spoken of as fading in the distance, as the space machine left them behind. Now how, if the machine were going faster than light, could the rays of light from the stars overtake it? Rather, I should think, the machine would overtake the light, and the stars actually left behind would appear to be ahead. The machine would run into the ray of light, get ahead of it, and leave a pitch black shadow behind it!

I hope I have made my theory clear, for I realize that although I understand it myself, I am not much at explaining.

STANLEY McMICHAEL,
78 Sutton Manor, New Rochelle, N. Y.

[You must imagine that our travelers are following a beam of light that has existed for ages so that their eyes will be affected by it to a certain degree as if they were standing still. It is not clear when we conceive of the path of ether waves traversed by our travelers, why they should see any planet or star ahead of them when it really is behind them. One point to be remembered is, that there are any number of undulations produced, many outside the range of our vision, and it would be some of these so-called "invisible waves" which would affect the eyes of our travelers.—EDITOR.]

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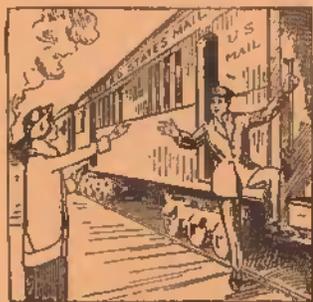
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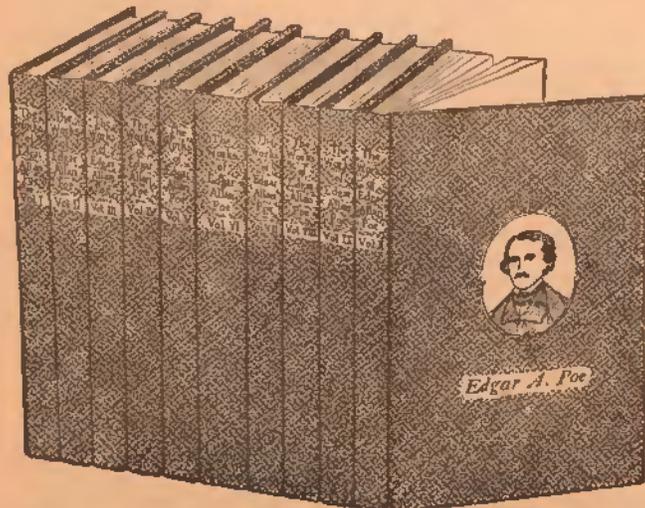
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