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OCTOBER

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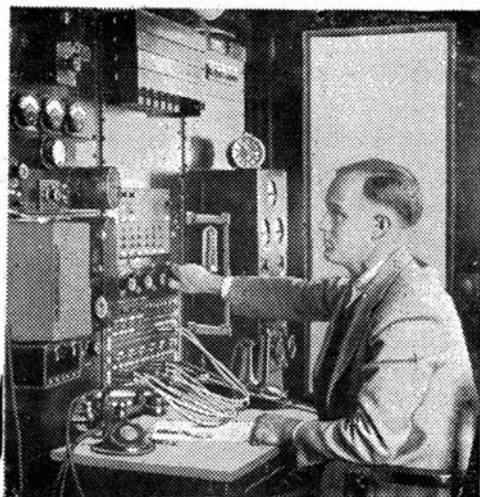
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19	1351	37	820
20	1316	38	794
21	1299	39	769
22	1268	40	741
23	1235	41	709
24	1205	42	685
25	1176	43	658
26	1149	44	633
27	1111	45	606
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AMAZING STORIES

Scientific Fiction

Vol. 7

October, 1932

No. 7

In Our Next Issue

CAPTAIN BRINK OF THE SPACE MARINES, by Bob Olsen. We have learned from explorers of the depths of the ocean, for instance, that there is a form of life peculiarly adapted to the enormous pressure of the deep waters. In high altitudes other forms of life are found. Who can tell but that there are intelligent beings somewhere in the universe who are peculiarly adapted to the conditions surrounding other planets in our universe? Naturally, such life would be vastly different from anything we know, but Bob Olsen, of much fame, has some very definitely thought-out conceptions on the subject which he gives us in this excellent scientific yarn.

WORLD OF THE LIVING DEAD, by Ed. Earl Repp. (A Serial in two parts) Part I. Here we have a great earth bubble or cavern, where a subterranean race of beings is holding human beings of the surface in abject slavery for the mining of radium. Before we know what the denouement is, the reader will be worked up to a state of excitement. The effects of radium on the human system are strongly brought out.

THE DOOM OF LUN-DHAG, by William Lemkin, Ph.D. We are all more or less acquainted with fanatics—generally harmless fanatics—whom we humor a bit and let continue on their misguided path. But occasionally it would be wise to guard well some person or persons with brilliant scientific minds who begin to labor under gross delusions—as witness our friend—or enemy—in this story, which is one of Dr. Lemkin's best.

THE MAN WHO LIVED TWICE, by William Kober. There is no doubt that many experiments calculated to prove time as the fourth dimension or, in fact, to prove there is such a dimension, have gone on apace. Strange things are possible; and few things are stranger than that which is pictured by our new author in this absorbing tale.

And other unusual scientific fiction.

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The Cover

this issue depicts a scene from the story entitled, "Space Rocket Murders," by Edmond Hamilton, in which is shown the graphic 12th hour rescue of our scientist friend, from embarking on a forced trip to a strange planet with strange beings.

Illustrations and Cover by Morey

Published Monthly by Teck Publications, Inc., Washington and South Avenues, Dunellen, N. J.

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222 WEST 39th STREET, NEW YORK CITY, N. Y.

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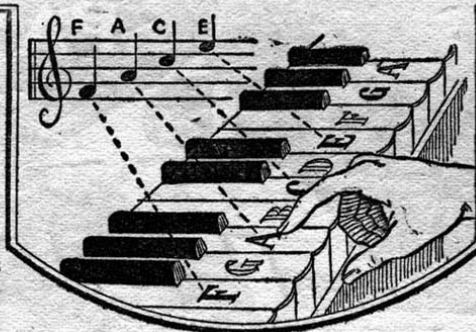
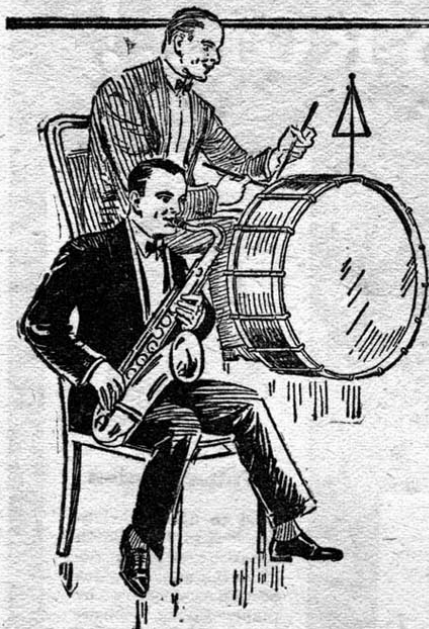
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AMAZING STORIES

THE MAGAZINE OF SCIENTIFICS

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Extravagant Fiction Today *Cold Fact Tomorrow*

Friction

By T. O'Connor Sloane, Ph.D.

THE subject of lost motion in mechanics one sometimes feels is in a sense neglected. There are innumerable examples of it in machinery and in the animal system. Its varieties are so many that it seems that the one term is not enough for it—that it should have many divisions. Sometimes, one feels that it should almost be treated as a sort of a popular term and hardly a scientific one. It is fair to say a man's efforts in the mechanical line are devoted to moving things or to arresting movement. In some places where we more or less unjustly consider that people are inferior to ourselves, loads are carried on the back or on the head. When this is done, friction hardly comes into play at all and some very extraordinary examples of this carrying of loads are cited among Indians, especially in the southern part of this continent. In old times we used to often see bricks carried up a ladder in a receptacle called a "hod", which rested on the shoulder of the workmen. This was a very fine example of almost frictionless operation. It is seldom seen now as mechanical elevators of one kind or another, either steam or electric, do the work and friction again appears upon the scene. If a heavy stone, too heavy to lift, was to be moved in primitive times it would be pushed or pulled by hand along the ground and the greatest effort, relatively speaking, would be required to move it. The rough surface of the stone scraping along the ground and perhaps digging into it, generated any quantity of friction. An improvement on this, which is still in use, is the so-called stoneboat. This is a flat platform of heavy plank with smooth steel straps or runners beneath it intended to take the weight and to slide along the ground with greatly reduced friction. The stoneboat, which is only two or three inches thick, avoids the necessity of lifting the stone. It is really a form of sled, and sleds today play an extremely important part in transporting material in the Arctic and Sub-Arctic regions, sliding along on snow and ice with greatly reduced friction. The skater represents a sled as he slides along first on one skate and then on the other, so we have not gotten rid of plain sliding friction, but in the vast majority of cases, use it only where there is very little friction to be experienced owing to the nature of the substances in contact with each other, generally steel and ice.

The total amount of friction depends, of course, on the travel of one surface on the other and to reduce this, man invented an appliance which is one of the most amazing products of his ingenuity and which plays an enormous part in the operations of the world. This appliance is the wheel. If the axle is two inches in diameter and the wheel three feet, sliding friction, as we may call it, is one-eighteenth of what it would be if the axle slid directly on the ground.

So far we have spoken of sliding friction, but unfortunately there is what is known as rolling friction and this is exerted between the periphery of the wheel and the surface on which it rests, its roadway. Lubricants, such as oil and grease, diminish friction and are used as everybody knows in the bearings of machinery, in the hubs of wheels. The friction between this solid and a liquid is extremely small and if it were practical to inject a liquid under the bearing of a wheel or shaft so that it could rest upon a film of oil, if such were the lubricant, the friction would be extremely small. Very serious attempts have been made to apply this system and while it is not practical except in special cases, it has been found that it reduced friction to an extremely small amount. It has been exhibited in some of the great expositions or World's Fairs and produced very striking effects. It has even been suggested to use it as a lubricant for a sled sliding in a grooved way, but, of course, it suggests and inevitably produces a great waste of lubricant. One of the bearing surfaces would be drilled full of small holes through which the lubricant was to be forced, giving a layer of pure liquid instead of a bearing of babbitt metal or brass.

One of the early improvements in bicycles was ball-bearings. For heavy work roller bearings were used. The rollers or balls, relatively small, fit quite closely between the axle and the joint. Everything is very smooth, lubricant is added and the balls or cylinders, as the case may be, substitute roller friction for friction of surface against surface. Recently the roller bearings have been used very extensively for the bearings of wheels on railroad cars. The next thing should be rubber tires. One of the interesting features of ball-bearings is that the manufacture of steel balls has developed enormously. It is hard to say what a steel ball would have cost in old times, but now the cost of one is absolutely trivial and the accuracy is extreme. In roller and ball bearings, the balls or rollers, as the case may be, are subject to very slight flattening. This interferes considerably with their efficiency.

An interesting thing in friction is what is known as the angle of repose; this is the steepest angle at which any given granular material will lie. The sand at the seashore gives an excellent example. If we make a little heap of perfectly dry sand and then move the finger around its base as nearly in a circle as may be, constantly approaching the center, we will presently have a conical heap of sand and the angle which the side of the cone makes with the base gives you the angle of repose. This varies for different sands and is sometimes quite an important element to be considered in an engineering project. It is dependent on friction between the grains of sand. If we follow out the subject of friction to its fullest extent, we will get quite curious and interesting results.



At once the fellow reached up and, to my surprise and horror, jerked off his close-cropped hair in one mass—a wig in fact. . . .

Space-Rocket Murders

By Edmond Hamilton

Author of "The Universe Wreckers," "The Comet Doom," etc.

BUILDING a ship that will successfully travel across the void and safely land on another body in our vast universe is not the only consideration that should be given the problems of interplanetary travel—when this new dream of scientists is finally realized. It might be well to give some thought to our method of approach and our plan of action, if and when we succeed in reaching another planet—if there should perchance be life and intelligence where we land. Our well-known author gives us in this new amazing story some very vital things to think about.

Illustrated by MOREY

CHAPTER I

Letter of Dr. Ferdinand Melford, Chemistry Professor in the Philadelphia School of Science, to Arthur Melford, Instructor in Physics, Manhattan University, New York.

MY DEAR NEPHEW ARTHUR:
I am writing to you tonight under considerable stress of mind and I fear, indeed, that this letter will cause you to consider my mentality a little disordered. But I beg of you at the start to cast aside that thought and to read seriously what I have to tell you. A little incoherence is perhaps to be forgiven a man who writes under such a menacing shadow of death as now hangs over me.

I can see you asking yourself in surprise, "Death from what?" I wish I knew the answer to that question myself, but I do not. All I know is that across my path has come a sinister force or forces which I fear may even this very night bring about my—. . . but there, I will leave all this and tell you the facts.

You will remember, no doubt, that in the last ten months I have been engaged in all the time I could spare from my routine work in the School's laboratories and lecture-halls, in a private research of my own, a study of rocket-fuels and a search for a fuel more efficient than any now available. As you know, I was interested in this field by Henri Mertaud, the late French rocket-experimenter, whom I met more than a year ago in Paris, when attending the International Chemical Convention.

M. Mertaud was kind enough to show me and Dr. Cyrus Hungerford, through whom I met him, some of his model and larger experimental rockets. He rather surprised me by the completeness of his laboratory, which included what he said was the best vacuum-tank for rocket-tests in the world. He gave me an interesting account of the work he had carried on in this field for six years, first in collaboration with Dr. Richard Braun of Berlin, and after Dr. Braun's death, alone. Mertaud and Dr. Braun, as you know, sent atmospheric rockets much higher in the stratosphere than any had ever done before, having greatly improved the designs of such pioneers as van Hijn and Morrow.

M. Mertaud was convinced, he told me, that rockets of his design or improvements of his design might with sufficiently powerful fuel attain a high enough velocity to escape entirely from the earth's attraction and travel through space to the moon or even, at the right time, to the planets of Mars or Venus. He even visualized the possibility of such rockets someday carrying human passengers and being capable of returning to earth. All this development would logically follow, Mertaud believed, upon the improvement of rocket-designs and the invention of lighter and more powerful fuels.

I was so interested by M. Mertaud's statements that I told him I would not mind spending some time in the study of rocket-fuels myself. Mertaud at once took up the suggestion, as he had understood from Dr. Hungerford that I was a chemist of standing, and the next day sent me a mass of literature on rocket-designs and fuels. In the days that followed, I had several talks with him

on the problem, and when I left France, I assured M. Mertaud that as soon as I finished some special work on hand, I would devote myself to the rocket-fuel question.

I did so, a few months after my return, and eventually came to use most of my spare time on the problem. I soon found that the crux of the matter was to combine in a single fuel the necessary elements of lightness, power and quickness of firing. I will not give you the details of my work, but it is sufficient to say that I soon became convinced, as Mertaud and Braun had become, that powders were an unsatisfactory form for rocket-fuels, and that liquefied gases offered a better approach than did ordinary liquid fuels. I was experimenting with combinations of liquid hydrogen with various other liquefied gases, when the news of M. Mertaud's unfortunate death reached me four months ago.

You may remember that Mertaud's laboratory burned down and that his charred body was found in it, he having been apparently trapped by the fire. It was supposed that some of the super-inflammable fuels he was testing in model rockets had taken fire, for it was recalled that his former collaborator in rocket-experiments, Dr. Richard Braun, had perished in a laboratory-fire of similar nature.

Of course I was shocked by Mertaud's death, but it did not make me think of giving up my researches, as I had now become quite interested in the fuel problem. I had no thought whatever that his death was anything but the accident it appeared. But I will say at this point that *I am now quite certain that the deaths of Henri Mertaud and of Dr. Richard Braun were not accidental.* You will understand shortly how I know this.

At the time, though, my only reaction was a sincere regret for M. Mertaud's unfortunate end, and I went steadily on with my rocket-fuel experiments. I cannot give all the details of my work except to say that in time I came to the conclusion that as a fuel-base, liquid hydrogen had drawbacks that outweighed its advantages, and I began to make tests of various combinations of liquid oxygen, alcohol and other substances.

Not long after this—about two months ago—I entered into some correspondence with an American physicist who had taken up the problem of space-rocket design. This scientist, a Dr. Harris Winn of Detroit Scientific College, was interested in the possibility of designing small space-rockets capable of reaching the moon, and wrote me asking about some features of Mertaud's work. I answered, mentioning my study of rocket-fuels, and we continued to exchange letters on the subject.

Two weeks ago I published, in the May number of the *Journal of the Association for the Promotion of Science*, a short article summarizing the present status of space-rocket work, and mentioning, besides the earlier work of Braun and Mertaud and others, my own work with rocket-fuels and Dr. Winn's experiments. This was the first public announcement of my work, and you will soon see what consequences it brought in its wake. I fear, indeed, that its final consequence may be my death. But I am again, in my nervousness, outrunning my story, and must put things in their proper order.

Tonight, at about ten o'clock, five hours ago from the time I write this, I had a caller. As you know, I still live and have my private laboratory in the old Melford mansion and estate near the School, with only Barnett, my house-man, staying in the place here at night with me. I was in my study when I heard the bell ring, and in a moment Barnett brought in to me a card bearing

the entirely unfamiliar name of "Mr. Peter Nebo."

I told Barnett to show him in. Mr. Peter Nebo proved a rather unusual-looking caller, a squat, stocky man dressed in good-quality clothes that fitted him rather badly. His black hair was close-cut and his face and hands were remarkably white and bloodless-looking, as though the man were just out of long confinement. He had unprepossessing pale-green eyes.

As this Peter Nebo entered the room, I rose to meet him. But Mannie, my little rat-terrier, who had been drowsing by my desk, sprang up before me and ran at my caller, barking furiously and showing his teeth in a diminutive snarl. I had Barnett take out the little dog, then showed Mr. Nebo a chair, and when he was seated, asked what I could do for him.

His pale-green eyes looked at me for a moment with a peculiar weighing expression before he spoke.

His voice was deep bass, unusually resonant, and he spoke in quite unaccented English.

"Dr. Melford," he said, "I've come on rather a strange errand, which has to do with your article on space-rocket work published recently in the magazine of the Association for the Promotion of Science."

"You're not a reporter getting a story on the topic, are you?" I asked. Certainly he did not look like one.

Nebo shook his head. "No, but I and some associates of mine are very much interested in that article. Especially in the part of it where you stated that your work with fuels might materially aid in the launching some day of space-rockets toward other planets. Was that correct?"

"It was, yes," I told him. "Of course, all this work of mine is purely experimental, but, if more efficient fuels were devised, they would certainly advance tremendously the possibilities for successful space-rockets."

"And it is for fuels of such efficiency that you are searching?" pressed Peter Nebo. "I mean, you are working with the fuel-requirements of space-rockets directly in mind?"

"I am," I replied, "for such a fuel would have to be highly specialized. But just what is your interest in this, Mr. Nebo? You say you are not a reporter?"

"You will understand my interest," Nebo answered, "when I tell you that instead of your Association for the Promotion of Science I represent a lesser-known organization that might be called an Association for the Retardation of Science."

"Association for the Retardation of Science?" I repeated, puzzled. "Is this a joke or am I to understand that..."

"Well, let us say for the retardation of a certain field of science," Peter Nebo amended. "That field, Dr. Melford, deals with the research of space-rocket improvement, which might someday lead to extra-terrestrial travel and journeys to other planets. Our Association is unalterably opposed to such journeys ever being made by men."

"But why?" I asked. "Are your objections theological?"

"I am not at liberty to state fully the reasons for our stand," Nebo said smoothly. "But I will say that we are convinced that man will lose rather than gain by making contacts with other worlds in space, if that is ever possible. We are, in a word, earth-isolationists."

"That is certainly an unusual viewpoint," I said. "But I fail to see just what connection this has with my work."

"The connection is apparent," said Peter Nebo. "You

are, by your own admission, experimenting with fuels that might advance space-rocket design and thus greatly increase the possibility of travel to other worlds. Our society is determined to forestall such travel from ever taking place. We are, therefore, asking you to abandon your researches in this direction and to destroy all the notes and results your work has already yielded you."

For a moment I was too much astounded by the cool effrontery of this request to make answer to it. Then I rose to my feet, indignation possessing me.

"Really, sir, I wonder that you can make such a proposition!" I said. "To ask a scientist to give up his researches because you have some vague objections to them!"

"You refuse to do so?" Nebo asked calmly. Somehow his calmness irritated me the more.

"Of course I refuse!" I exclaimed. "What made you think I would drop ten months' work at your request?"

The pale-green eyes of the man opposite me hardened as he rose. "It is not exactly a request," he told me. "It is more in the nature of a demand."

"A demand?" I cried, and he nodded.

"Yes, and a demand you would do well to heed, Dr. Melford. Our Association is not wholly without power and we are prepared to use force if that is necessary to bring about our wishes."

"You threaten me, then?" I exclaimed, and Peter Nebo again calmly nodded.

"I do. Unless you quit the rocket-fuel researches immediately of your own will, we will use force to stop them. Will you agree to abandon this work?"

"Mr. Nebo," I said furiously, "I will give you one minute to leave this house. If you do not, I will call the police. I am only prevented from doing so now by my conviction that you are mentally unbalanced."

Peter Nebo looked at me for a moment in silence. "I am sorry that this is your answer, Dr. Melford," he said, and then walked out.

I was so angered for a few moments after he had left, that I was still rather of a mind to summon officers to apprehend the man. But after I had thought it over for a few minutes it seemed to me so evident that the fellow was at least partly insane, that my anger faded into irritation.

I WAS beginning work again on the notes that had engaged my attention before Nebo's interruption, when from out my subconscious memory came a vague something that startled me. It was a remembrance of something Henri Mertaud had said in the last letter he had written me before his death. As memory of what he had written grew clearer in my mind, I rose to my feet, my thoughts utterly overturned. Then hastening to my file, I began a rapid search in it for Mertaud's last letter.

When I found the letter, which Mertaud had written to me the day before he perished in his laboratory fire, I ran quickly through it until I found the lines I wanted. I read them through and then, the hazy suspicions in my mind now crystallizing swiftly into a dreadful certainty I went back and read them again.

"This afternoon," Mertaud had written toward the end of his letter, "another crank called on me, one more original than most of those who bother me. Most of them, you know, are lack-witted people who hear of my space-rocket work and want to set sail with me immediately on a voyage to Neptune or Sirius.

"This individual, an odd-looking, squat, white-faced and green-eyed fellow, coolly told me that he represented an organization opposed to all space-rocket or other scientific work with interplanetary possibilities, and informed me that unless I ceased such work forthwith, it would be the worse for me very soon. I showed him the door without ceremony, as I was rather busy. I remember poor Braun wrote me not long before his death that someone with much the same idea had bothered him. Truly the curse of this work is the number of crazed and insincere persons it attracts to one!"

I stared for moments at those lines, my mind working. That odd-looking white-faced and green-eyed, squat person, who had warned Henri Mertaud, could only be the man I had just ejected, Peter Nebo. Nebo had demanded of Mertaud that he stop space-rocket research. Mertaud had refused, as anyone would—and within twenty-four hours Mertaud had perished! That laboratory-fire that destroyed Mertaud and his work, was it accidental? Or was it the work of Nebo and his associates?

And what had Mertaud said . . . that Dr. Braun shortly before his death had mentioned someone who had told him to halt his rocket-researches. And Braun, with his work, was destroyed soon after that just as Mertaud was later! Was it Nebo and his associates, then, who had warned and destroyed in Braun's case also? Then Nebo's tale of his organization determined to stop space-rocket research at all costs, was the truth, and no mere figment of his mind!

It seemed and still seems to me that any group of men must be partly mad who would let their convictions on such an academic subject carry them to such lengths, but whatever the truth as to that, it was indisputable that these men were deliberately using murder when other means failed to stop all scientific research that might lead to interplanetary travel!

If this was so, I was in real and imminent danger. Nebo and his associates had warned me and I had flouted their warning. If the cases of Braun and Mertaud were any criterion, they would not allow me long to live. Most of my notes and formulæ on the rocket-fuel experiments were in my private laboratory here in the house, as no doubt they knew. At any time they might try to destroy me and my work together as they had destroyed Braun and Mertaud.

Immediately I reached for the telephone and in a minute I had laid the situation before the police department. Though somewhat skeptical at first, my account of the deaths of Braun and Mertaud, and of Nebo's presumed connection with them, changed their attitude, and they agreed that it was imperative that my house have protection for at least the next few nights.

So a little less than two hours ago there arrived one Police-Captain Crail with four officers. To Captain Crail I recounted the whole matter and he agreed that it was possible Nebo and his associates might try to fire the house to destroy me and my work, as they had apparently done with the German and French rocket-experimenters.

Captain Crail suggested that he and his men take up positions of hiding in the shrubbery around the house and grounds, and thus be able to apprehend Nebo and his companions if they approached the house. I agreed to the wisdom of this course and had Barnett show them to suitable places of hiding. I then returned to my study, only a little easier in mind.

That, as I say, was less than two hours ago. Crail and his men have been hiding out there during this time, but apparently no one has approached the house. At Crail's orders, one of the officers has come into the house each quarter-hour to make sure of my safety. As all this has made me too nervous to sleep or work, I have spent the intervening time in writing to you, my dear Arthur, this account of what has happened. My reason for so doing is that I want you to leave your classes at Manhattan University and come down here to stay with me for the next few days.

I realize that I have no right to draw you into any danger that might threaten me, but I have no one else to turn to. The police will be watching, of course, but that is not like having a companion. You will perhaps feel surprised that I should experience such apprehension over the threats of this group of men, but this Nebo made so strong an impression on me, and the record of the two space-rocket experimenters dying shortly after his warnings is so close and sinister, that I cannot rid my mind of a certain foreboding.

Barnett is waiting now to take this letter out to mail, and Captain Crail's man has just come in again to see that we are all right. It is within a few hours of morning and I will be a great deal relieved, and perhaps less fearful, when day comes. But in the meantime, Arthur, I confess that you will make me feel much better, if on receiving this letter, you will wire me that you are coming.

Your affectionate uncle,
FERDINAND MELFORD.

CHAPTER II

Account of Arthur Melford

PROFESSOR VON GERSTEN, having asked me to draw up for our own consultation, an account of events from the time I received my uncle's letter until now, I am doing so with the aid of some details from Captain Crail and Lloyd, my close friend and superior at Manhattan University, Dr. Lloyd Jackson. I am afraid that this précis will hardly serve to explain the dark mystery that enmeshes us, and that seems to grow darker and more terrible with the passing of time, but it may help.

Ten days ago I was living the more or less care-free life of a physics instructor in the New York institution where I've held a post for the last three years. My chief concerns were the dinning into a couple of hundred thick-headed sophomores the elementary facts of electricity and magnetism, and the equally tough and fruitless struggle to bring my golf score under a hundred. Then came my uncle's letter and swift-following on its heels—tragedy.

I received the letter of my uncle, Dr. Ferdinand Melford, early on the morning of June 2nd. I found it in my mail when I arrived that morning at Manhattan University for an early final-exam. I was giving. As letters from uncle were rather infrequent, though our relations were of the friendliest, I opened and read it at once.

I was astounded! My uncle's account of the threats made against him by this Peter Nebo, whoever he might be, and of the strange deaths of the other two space-rocket experimenters, Braun and Mertaud, was startling. I did not wonder that uncle feared a like fate at the

hands of Nebo and his group, whatever their motives. And when I showed the letter to my superior, Lloyd agreed with me that a real danger threatened Dr. Melford.

I was touched by my uncle's half-apologetic request that I stay with him for a few days. Certainly no one had a better right to make such a request, for Uncle Ferdinand had taken the place of my dead parents in my boyhood and youth, had supervised my education and guided my choice of a career. More a father than an uncle, in my regard, I did not hesitate a moment in arranging to have a substitute give my classes their examinations for the next few days.

But before I left the university that morning, the tragedy came. It arrived in the form of a telegram for me, which I reproduce herewith.

Dr. Ferdinand Melford and servant killed shortly before morning in fire that destroyed house. Please come to Philadelphia immediately.

CRAIL, Police Department.

An hour later I was on a train speeding southward through the familiar New Jersey cities. And Lloyd was with me.

My dominating emotion was keen grief for my uncle. I had never realized how much the kindly, elderly scientist meant to me until I received that telegram. But before our train reached Philadelphia, I had set aside for the time my emotion, and was discussing with Lloyd the most important fact—the certainty that Dr. Melford had been murdered.

It was clear enough, in view of his letter of the night before. Nebo and his associates had carried out their threat and uncle and his laboratory had been destroyed just as had Mertaud and Braun. It seemed incredible that men could live who would commit a string of murders simply because of their objection to such an abstract field of science as space-rocket research.

It was indisputable that that had been the cause of uncle's death, though. There remained the question as to how he had met death while supposedly under police protection. I meant to investigate that problem, too.

When Lloyd and I debarked at the Broad Street Station that afternoon, we took a taxi and drove southward across the city to the suburb in which lies the Philadelphia School of Science. Not far from the campus the cab turned into the extensive wooded grounds of the old Melford estate.

The grounds of the old place looked the same, with their big oaks and beeches and dense, rather unkempt shrubbery, as when I had spent my boyhood there. But the rambling old frame mansion that had been the home of several generations of Melfords was reduced to a pile of debris in which several policemen and plain-clothesmen were searching.

One of the latter came over to Lloyd and me as we got out of our cab. He was a keen-faced man of middle age, whose expression had now a certain tenseness and haggardness.

"I'm Captain Crail," he told me. "You'll be young Mr. Melford?"

"Yes, and this is Dr. Jackson," I said. "My uncle's body. . ."

"It and the servant's remains, what there is of them, have been removed to a mortuary," Captain Crail said.

"What about this Peter Nebo and his associates?" I demanded. "Have you caught them yet?"

Crail shook his head. "No, we haven't, though we've got a net spread for Nebo over this whole end of the country."

"I understand that you and four of your men were watching the place at the time this happened," I said.

Captain Crail nodded, his face unhappy. "We were, and that's what makes me feel worst on the thing. Five of us here to protect Dr. Melford—and he and the servant killed in spite of us."

"But I'm not sure that five hundred men around the house would have saved your uncle. Whoever this Nebo and his pals may be, they fired the place in a way that we can't even guess yet."

"It happened at three in the morning, less than an hour after your uncle sent that letter to you. I and my four men were hiding in the shrubbery right around the house here, and no one could possibly have gotten within fifty feet of the place without being seen by us."

"To tell the truth, I didn't really think there was much danger threatening your uncle. From your uncle's account, I judged this Nebo as just another crank. Who but cranks would want to stop scientists from monkeying with rockets? But the thing was too serious to take chances on, in view of what your uncle told us about the German and French scientists who had been killed, so we were watching."

"I'd told Wilkes, one of my men, to go in every fifteen minutes and make sure your uncle was all right. Not that I had any idea anybody could get through us to the house, but I just didn't want to take any chances. From where I was hidden, I could see Wilkes go in each time, and about two o'clock I saw Barnett come out and mail the letter your uncle had written to you."

BARNETT returned in a few minutes and everything was quiet. At three o'clock Wilkes went in as usual on the quarter-hour and he reports your uncle was writing in his study, with his dog beside him, and Barnett was sitting in the hall. Two minutes after Wilkes came out, it happened.

"The house simply exploded into flame! I never saw anything like it—one minute the house was a big darker bulk in the darkness, and the next it was a single sheet of flame roaring upward as though every particle in the place had taken fire at the same instant!"

"We ran toward it but to enter that roaring furnace would have been suicide. Your uncle and the servant must have been dead immediately—we never even heard a cry from them. We ran around the grounds looking for anyone who might have started it, but there was no one! Not even a car was in sight, though one of my men, Janney, says he did hear a whirring noise as of a car speeding away."

"The place was burned down to ashes quicker than anything I ever saw before, even before the firemen got here. If it had been soaked in gasoline and filled with gunpowder it couldn't have burned faster—it was more an explosion of fire than burning."

"I had them get the radio-cars into this district and comb it for signs of Nebo or other suspicious-looking characters, but they found no one. Meanwhile Nebo's description was sent out to all nearby cities on the teletypes, and that may get us some line on him yet. I sent cables also to the Berlin and Paris police for dope

on the Braun and Mertaud deaths, and then wired you the news."

Captain Crail looked squarely at me. "Now, before anything else, Mr. Melford, I want you to tell me straight, whether you think I and my men were negligent in failing to prevent your uncle's death."

I shook my head slowly. "It seems that there is no way in which you could have prevented what happened," I said. "But what I want to know is, what *did* happen? How did Nebo's band fire the place so swiftly, and apparently invisibly?"

Crail spread his hands helplessly. "Mr. Melford, the thing's as much a mystery to us as it is to you. There seems no way to explain it, for I'll take oath they weren't on the grounds."

"Maybe they dropped an incendiary bomb from a low-flying airplane?" Lloyd suggested. "You said one of your men heard a whirring sound."

The police-captain shook his head. "They couldn't have done that, Dr. Jackson. It was the darkest kind of night last night and no plane, even at its slowest speed, could locate a house accurately enough for that. Also, a plane's motor is unmistakable, and we'd all have heard it. As it was, only Janney thought he heard a low whirring."

We looked at each other, then at the men still industriously delving in the ashes. The thing was baffling, the more so as I could see no rational motive for it all.

"It seems unbelievable that any men should feel so strongly on the subject of preventing travel to other planets that they'd kill two or three space-rocket experimenters simply to stop research along that line!" I exclaimed. "Nebo and his associates must have some other motive for these killings!"

"I'm not so sure," Captain Crail replied. "Madmen will do unpredictable things and I believe that Nebo and his companions, however many of them there may be, are all mad."

"Madmen who all have the same delusion?" I said skeptically. "Madmen who can execute crimes like these?"

"Yet madmen they are in my belief," Crail persisted. "Madmen whose crazed brains have somehow acquired the idea that for men ever to travel to other worlds would be unholy and forbidden, and who are deliberately murdering all workers on space-rocket and other experimenters who might further interplanetary travel."

"I've wired asylums here and abroad asking information on any patients released or escaped in the last ten years with delusions on that subject. I'm expecting an answer from them and also from the Berlin and Paris police on the Braun and Mertaud cases. We might go back into town to headquarters and see what they answer."

We agreed to Captain Crail's suggestion, and after he had ordered his men to continue searching the ashes for possible clues, we drove in with him to the Police Department Building.

In Crail's little office, two lengthy cablegrams and some shorter messages were awaiting him, and he read them to Lloyd and me.

The cablegrams were from the Berlin and Paris police and gave the details of the deaths of Dr. Richard Braun and of Henri Mertaud. Dr. Braun's death had occurred two years before. He had a rocket workshop at the edge of a Berlin airport and it had been seen one night to burst suddenly into violent flames, destroying

Braun and most of his work. The police-theory had been that some of his rocket-fuels had taken fire or exploded suddenly.

The same theory was held by the Parisian department in regard to Henry Mertaud's death four months back. Mertaud's field-laboratory had been outside Paris, but his model and testing-laboratory had been in the heart of Paris, a small two-story brick structure. It, too, had been seen at night to explode abruptly into fire and only the charred remnants of Mertaud's body had been found in it.

The shorter wires were from various asylums and bureaus replying that they had no record of any patients with delusions as to interplanetary travel having ever been released or escaped.

Captain Crail tossed the messages down upon his desk. "Which advances us not at all," he said. "We knew Nebo and his band killed Braun and Mertaud, and now we're sure they did it in the same way that they fired Dr. Melford's place, but that's all."

"No reports of Nebo's presence have come in from neighboring cities?" Lloyd asked, and Crail shook his head.

"Not one. You'd think the man had vanished into thin air, and until we get him, we've no chance of laying hands on whatever associates he may have."

We three were staring rather helplessly at each other and night had fallen, when a card was brought in to Captain Crail.

"Professor Herman von Gersten, Berlin," read Crail. "What does he want?"

"He says it's about the death of Dr. Melford," said his assistant, and we all started a little.

"Send him in at once," Captain Crail directed.

PROFESSOR HERMAN VON GERSTEN proved to be a thick-set man of middle age, with short curly blond hair, eyes, that were as keen as Crail's, behind his thick-lensed glasses, and a deceptively ingenuous face.

Crail greeted him and briefly introduced Lloyd and me. Von Gersten's eyes lit when Crail named me.

"So, the nephew of the unfortunate Dr. Melford!" he said. "That is good, that I meet you so soon."

"I understand you're here about Dr. Melford's murder—you've got something to tell us?" asked Captain Crail hopefully.

"On the contrary," answered von Gersten. "I am here investigating that murder, as I have been investigating, when time allowed me, for the last eight years."

"The last eight years?" Crail repeated. "Why, Dr. Melford was only killed last night."

"You misunderstand," the German informed him. "It is not Dr. Melford's death I have been investigating in these eight years, but the deaths of other men who have died as he died—and for the same reason!"

"You mean Mertaud and Braun?" I put in, and the Teuton turned quickly toward me.

"Ah, so already you know that Dr. Melford's death and those of Mertaud and Braun are connected?"

"We know, yes," I said, and would have continued, but Crail intervened.

"Just a moment, professor," he said. "I'd like first to know if you are an authorized investigator or police-agent."

For answer von Gersten drew from his breast-pocket a small blue card he handed to Crail with a bow.

"I hold a chair in the Berliner Polytechnik Institut," he said, "but have also a post in the Criminal Science Department of the Berlin police."

"Good enough," Captain Crail remarked as he handed the card back. "And you want us to tell you the details of Dr. Melford's death?"

"I do, yes," von Gersten said. "When you have told me, it may be that there are things that I can tell you. A fair exchange of information, not so?" He beamed upon the three of us.

"Well, the facts as to Dr. Melford are soon told," Captain Crail said gloomily. "If the newspapers had them, instead of thinking the thing accidental, as they do, they'd be headlining it."

He briefly recounted the facts and von Gersten listened with utmost attention. When Crail had finished, the German's blue eyes were keen as sword-blades.

"It is as I feared," he said. "Had I landed in this country yesterday instead of today, I could have saved your uncle."

"You knew then that an attempt to murder him would be made?" Crail shot at him.

"I knew the possibility of that," von Gersten amended. "One week ago I read in the excellent Journal of the Association for the Promotion of Science an article by Dr. Melford on space-rocket work, mentioning his work with rocket-fuels and also the space-rocket experiments of a Dr. Winn of Detroit."

"I saw that article and I went straight and bought a ticket for America on the next boat. I landed in New York today, intending to go to Philadelphia to Dr. Melford. But in the newspaper I read an article describing Dr. Melford's death in a fire that had his house destroyed. I knew then that they—those whom you call Nebo and his associates—had struck even sooner than I had expected."

"You were going then to warn Dr. Melford that Nebo and the rest would be after him?" Crail asked.

Von Gersten bowed. "Yes, for I knew that so soon as they learned of the rocket-researches of Dr. Melford and also of Dr. Winn they would act to stop them. And I had a plan as to that."

"But who is this devil, Nebo?" I interrupted. "You must know that, if you know so much about this."

The German looked gravely at me. "Yet I do not know that, Mr. Melford. Who is Nebo? How many associates has he? Where is his home or base? I know no more than you."

"But I have followed the work of this man and his companions for eight years, and do know something. I know that Nebo, who has used the names of Smart, Wladolowski, Cametto and others indiscriminately, and his associates, have murdered at least eleven scientific experimenters in these eight years!"

"Eleven!" I exclaimed. "Eleven scientists cold-bloodedly wiped out by this madman and his band?"

"I am not so sure, myself, that he is a madman," von Gersten said. "But I will tell you briefly of Nebo's record."

"You have heard of Willem van Hijnn, the Dutch engineer who was the pioneer in space-rocket research. He who sent small rockets higher into the stratosphere than any before him had ever done? Well, van Hijnn died eight years ago, as perhaps you remember. And he died as Dr. Melford died—in a fire that swept his workshop!"

"Van Hijnn was a friend of mine, and I was in

Amsterdam at his funeral. I suspected nothing, any more than anyone else, until I came across a diary he had left in his bedroom at home. In it, two days before he died, van Hijnn had recorded how a man named Wladolowski, a strange-looking man with unnaturally white face and green eyes, had called on him and warned him he must stop his work with space-rockets. Nebo, of course, under a different name.

"Naturally, van Hijnn had refused—and two days later he was destroyed. That aroused my suspicions. Yet try as I might, I could get no further trace of the so-called Wladolowski. I forgot the occurrence until two years later, when the Englishman, Felix Morrow, perished. Morrow was a London author who had taken up and gone on with van Hijnn's space-rocket experiments, because of his intense interest in the possibility of traveling to the moon or to some planet.

"Morrow had a Thames-side workshop with a trained technical assistant and had made a hobby of his space-rocket models. His workshop, too, puffed into flame one night—always at night, mark!—and he and his assistant were burned to death. I read of that and would have thought nothing of it, had not the newspaper mentioned the efforts of the London police to trace an odd-looking, green-eyed man who had had some sort of altercation with Morrow the night before the fire.

"At once I remembered the case of van Hijnn. Was this, then, the man who had had the argument with Morrow, the Wladolowski who had threatened van Hijnn? I went to London to investigate, and I learned that this time the green-eyed man had given his name as Smart. After leaving Morrow's place, he had been seen to join three companions a little along the street.

"This meant that my Wladolowski or Smart was not working alone but had associates. How many of them he had, or has, I cannot guess. By that time I was convinced that Morrow and his assistant were murdered to stop them from continuing their space-rocket research, just as van Hijnn had been. This must mean a group of madmen was at large, so strongly infected with the delusion that space-travel was unholy that they would kill to prevent it from ever being brought about.

"The next space-rocket experimenter to meet death was Krasny of Buda-Pesth, eight months later. Then over a year afterward, two Japanese scientists who had advanced a scheme for firing a projectile to another world from a huge cannon sunk into the earth's crust, were slain in their Tokio laboratory. In both cases, that of Krasny and of Oyumi and Shota, a visit from a caller easily identifiable as your Nebo or my Wladolowski had preceded their deaths, and in both cases the experimenters perished by fire.

"In the years since then, six more scientists were destroyed. Dr. William Hayes, the Australian scientist who was at work on a new kind of successive-firing rocket, was next. As usual, his death was by fire, though in his case I could not trace any call by Nebo beforehand. I am sure that such a call took place, however, as these murderers seem punctilious in warning their victims and giving them a chance to stop their research.

"After Hayes, followed the death of Serge Wilsoff, of the Soviet's Moscow laboratories. Wilsoff had been trying to devise rockets for passenger-traffic over oceans, and had turned to consideration of the launching of one into space. Quickly came the warning

to stop such research. Then, when the warning was disregarded, came death by fire. Very shortly after, L. Molokoff, who took up Wilsoff's work, met the same fate. And in the last two years have followed the similar deaths of Dr. Braun, of Henri Mertaud and now of Dr. Melford.

"In each case," von Gersten's eyes were glittering as he drove home his point—"in each case the murder was done by firing the laboratory, workshop or home of the scientist in question. In my opinion that is done so the man and his work would perish together. In no case was the method of firing discoverable, but every time it happened during the night.

"Also, in each case, the scientist was given a chance to stop his work. Nebo, under one name or another, called on them and warned them that all research leading toward space-travel must halt. All of the eleven disregarded this warning, and all have died.

"I might have been able to save some of them by warning them, but in no case have I had time. For in every instance, the warning and the murder took place almost directly after it had become publicly known that the scientist in question was engaged in space-rocket research. Evidently Nebo and his companions constantly scan scientific journals and newspapers and miss no such news, and evidently they act at once on learning of it."

Von Gersten leaned back, spread his hands. "There you have the story," he said simply. "Eleven experimenters slain by this Nebo and his band—a remorseless, relentless group who have determined apparently that space-travel never shall take place. And a group who have eluded all efforts at discovery!"

Crail and Lloyd and I had listened to von Gersten intently and with deepening perplexity.

"By God, it's unbelievable!" Captain Crail exclaimed. "A bunch of lunatics running down eleven scientists like that!"

"But are they lunatics?" Lloyd asked. "Professor von Gersten, can these men really have no other motive for this list of murders than a common delusion?"

The German shook his head slowly. "Many times I have asked myself that question," he admitted. "Sometimes it seems to me that only the craziest of lunatics would such murders commit. And at other times I seem to sense behind these crimes some great mystery whose edge we do not even approach."

"Well, whatever is the motive of Nebo's group, it's up to us to catch them," said Captain Crail. "Have you any idea as to how that could be done?"

Von Gersten's head bobbed. "I do have an idea, one that brought me to America," he said. "I meant to try it with Dr. Melford, but it is not too late—we can try it with the Doctor Winn, the other rocket-experimenter Dr. Melford mentioned in his magazine-article.

"My idea was this, that Nebo's group would sooner or later approach Dr. Melford when they learned of his space-rocket work, and warn him to stop it, as they have always given warning. I meant to persuade Dr. Melford to have men ready at all times with him to seize this Nebo or whatever name he might give, when he came to give his warning.

"It is too late, as I say to carry out that plan with Dr. Melford. But we can do it with Dr. Winn. Sooner or later, Nebo and his associates will warn Dr. Winn as they did Dr. Melford, to stop the space-rocket work. We will get Dr. Winn to keep about him out of sight,

policemen who will seize Nebo when he calls upon him!"

"That's a real idea, professor!" exclaimed Captain Crail, his eyes kindling. "I never thought of it, but it'll give us a real chance of getting Nebo, and once we have him, we can soon get the rest of them!"

"But hadn't you better communicate with Dr. Winn at once about it?" Lloyd asked. "There's no telling how soon your Nebo might visit him, now that Dr. Melford is disposed of."

"That's right," Crail said. "I'll get Dr. Winn on the phone now—once he agrees to the plan we can go up there to Detroit and be waiting with him when Nebo shows up."

He grasped the telephone and in a few minutes the connection to Detroit had been put through. The Detroit Central reported that Dr. Winn's home had informed her that the scientist was this night in his laboratory in one of the buildings of Detroit Scientific College, and that she would connect us with him there.

In a few moments more, in fact, a thin and somewhat impatient voice was audible from the receiver Captain Crail held.

"This is Dr. Harris Winn," it stated. "What is it?"

"Dr. Winn, this is the Philadelphia Police Department, Captain Crail speaking," said Crail. "You read of Dr. Melford's death?"

"Yes, yes—a sad accident," answered Winn. "Melford was a brilliant man. But what are you calling me about?"

"We are certain that Dr. Melford's death was not an accident," Crail told him swiftly. "We believe that the murderer, or one of them, may call on you sometime soon and we want to arrange that he be detained if he does so."

"The murderer of Dr. Melford call on me? Why in the world should he?"

"Dr. Melford was murdered by a group of madmen or fanatics of some sort who are bitterly opposed to all scientific research into space-rockets, which might lead to space travel," Crail explained. "Their leader, who named himself Peter Nebo, warned Dr. Melford shortly before his murder to stop such research, and we believe Nebo may give you a similar warning."

"But I've already had a warning of that sort—this very afternoon!" replied Dr. Winn.

We jumped to our feet. "You have?" cried Crail. "Who gave it to you—what happened?"

"It was a man who called himself Walter Ennis," replied Dr. Winn, "a short, stocky person."

"Did he have an unusually pallid face and green eyes?" cried Crail.

"Yes, that describes him exactly. He told me some fol-de-rol about an organization opposed to space-rocket experimentation and demanded that I stop my researches. I showed him the door."

"Dr. Winn, that was Peter Nebo—the head of the group that killed Dr. Melford and almost a dozen other scientists in the same line of research!" cried Captain Crail.

"Tell him to at once leave his laboratory; to hide in another part of town!" exclaimed von Gersten, his blue eyes blazing. "He is in most deadly danger!"

"Get out of your laboratory, out of the building!" Crail told the scientist on the other end of the wire. "At any moment Nebo's group may carry out their threat and destroy you as they did Melford and the rest!"

"But I don't understand . . ." we heard Dr. Winn start

to say when he broke off suddenly. Then from the receiver in his voice came a high scream that mingled with a loud roaring sound. "My God, it's . . ."

"What is it?" yelled Crail into the transmitter. "What's happening?"

The receiver was silent as the grave. Crail jabbed the hook fiercely as von Gersten and Lloyd and I pressed tensely to him. "Operator!" shouted Crail. "What's the matter with that line?"

"I don't know; it just went dead," replied the Detroit operator's voice. "Just a moment, please, and I'll find out what's the matter."

In a silence of utter suspense we four waited in the little Philadelphia office, our minds all at the Detroit end of the wire. It was not one moment but many before we heard the Detroit operator's voice again, this time excited.

"Your line went dead in a fire!" she reported. "The building of Detroit Scientific College, in which your connection was, is reported as having burst into flames and is already half-destroyed, they say."

"What about our party, what about Dr. Winn?" cried Captain Crail.

"There's a report that there were only two men in the building—a professor and a janitor—and that the fire was so sudden that neither escaped!" the operator answered. "If you'll hold the line, I'll get the names for you . . ."

But Captain Crail set the telephone down on the desk softly and turned to us. His face was very white. "This time too, Professor von Gersten," he said, "you have been just a little too late. Dr. Winn is dead."

Von Gersten's eyes now were cold, steely. "The twelfth man dead at the hands of Nebo's gang, yes," he nodded. "And the only chance we had of capturing Nebo—gone!"

CHAPTER III

Account of Captain James Crail

BEING a policeman and not a writing man, I didn't want at all to draw up this recountal of the events in this case that followed the murder of Dr. Winn. But the others, young Melford and Professor von Gersten and Dr. Jackson, having insisted that I was best fitted to do so, I am taking it on. There'll be no more literary polish in it, though, than in any police report.

I'll admit that I was rather knocked off my feet on that night of June 2nd when we four in my office heard of the destruction of Dr. Winn and his laboratory in the Detroit College. It had never occurred to me that Nebo and his pals might strike again so quickly after their murder of Dr. Melford, and I felt a certain responsibility for not having warned Dr. Winn.

Also, I still felt responsible more or less for the murder of Dr. Melford. Of course, as Arthur Melford had agreed, Nebo's band must have used some unheard-of way to fire Dr. Melford's house, and a hundred policemen around it would apparently have done no more than we did, to prevent it. But just the same, no policeman who is called on for protection, likes to see the man he's protecting murdered under his nose, and that's what had happened to Dr. Melford.

It made me determined to get this lunatic Nebo and whatever nuts might be trailing with him, if it took

me ten years. That began to look like more of a job when this von Gersten appeared and told us of the number of space-rocket experimenters and scientists that Nebo's group had killed in the last eight years. But the idea of nabbing him through Dr. Winn brightened things up for me.

The destruction of Dr. Winn, that took place literally within our hearing, though he was in Detroit and we in Philadelphia, blasted our hopes in that direction.

The first news given us by the Detroit operator was soon supplemented by the Detroit police.

According to them, the building at Detroit Scientific College, in which Dr. Winn was, had simply puffed into flame from top to bottom. Winn and the other man in it, the janitor, had no chance to escape.

No cars had been seen leaving the place during or after the fire, and no one had reported seeing a man of the description of Peter Nebo. The Detroit police promised to get a dragnet out for him at my request, but I had small hopes of their success.

When I finished talking to them, I looked at the others. Young Melford and Dr. Jackson were rather white but Professor von Gersten seemed more keenly disappointed than shaken.

"Gone—the chance to catch that demon!" he exclaimed. "Had Dr. Winn known sooner, he could have had men there to seize Nebo when he visited him this afternoon!"

"There's no use going over what might have been," I told him. "The thing to do is to get on the trail of Nebo and the rest before they spring any more of these murders."

Von Gersten shook his head. "My friend, there will be no more murders in the immediate future," he assured me. "For the simple reason that Melford and Winn were the only outstanding space-rocket experimenters, and that until new experimenters take up the problems of interplanetary travel and attract the attention of these madmen, they will have no cause to act."

"But when we next hear of such scientists taking up space-rocket research, we will not delay. We will surround them with men who can seize whichever of Nebo's group appears to warn them. And once we have some of them, if only one, we can search out the others."

"Then that's what you're going to do—wait until other scientists take up space-rocket work and use them to trap Nebo?" Arthur Melford asked. Von Gersten nodded.

"It is all that can be done. It may mean a long wait, but sooner or later the chance will come, and then we will maybe end once and for all this organization of mad murderers."

I stared at the three of them. "Say, you three may be swell scientists, but I'll say you'd make poor cops!" I said. "To talk about waiting, maybe for years, until some other scientists take up the rocket-research!"

"What else is there to do?" Arthur Melford asked.

"Do?" I repeated. "Didn't you ever hear of the gentle art of framing? Don't you suppose that Nebo and his fellow-nuts can be framed as well as any gangster or gunman?"

"Frame Nebo?" said Melford. His face lit up. "I think I see what you mean! You mean to get some scientist to give out that he is seriously engaged in space-rocket experiments, and that that will . . ."

"Will come to the attention of Nebo and his associates and they'll think it's straight," I finished for them.

"And when they call on the scientist in question to give him their usual polite warning about stopping his experiments, before bumping him off, they'll run into a bunch of hidden men they won't have a chance in the world to get away from!"

"It is superb!" cried von Gersten. "Captain Crail, I congratulate you—this will mean their capture!"

"Well, save the congratulations until we're in the clear," I told him. "The first thing to do is to fix it up for some scientist to publish a lot of stuff about his important space-rocket experiments. It ought to be a scientist of first-class standing, too, so that Nebo and his gang won't suspect camouflage."

"You'll find it rather hard to get a scientist of standing to put out such a story," predicted Dr. Jackson. "Scientists are so jealous of their scientific reputations that most of them would refuse to take a chance of impairing their standing by issuing untrue statements."

I grinned at him. "I know that, but I know one scientist of first-rate standing who'll do it, I think. His name's Dr. Lloyd Jackson."

"I?" said Jackson startledly. "You want me to announce I've been experimenting with space-rockets, then?"

"Yes, I do," I said. "You've got enough scientific position to make Nebo's group believe your statements. They'll come to warn you before trying anything—they always have—and as I said, we'll be ready night and day to grab them when they come."

Dr. Jackson reflected for a moment. "All right, I'll do it," he answered.

"Thanks, Lloyd," said Arthur Melford gratefully. "I'll be there to take any chances you have to take."

"We all will," I agreed. "Now, what statements are you going to issue? They ought to be strong enough to make Nebo and the rest sure to come, you know."

"If you will permit a suggestion," said von Gersten keenly, "why not say that you have developed a method of producing atomic power, immense power from the controlled disintegration of atoms, and that you intend to use it first in a space-rocket to reach the nearer planets?"

ARTHUR MELFORD nodded quickly. "That would bring Nebo and the rest, if anything would! For that would mean, if it were true, an immense scientific step forward in the possibility of interplanetary travel."

Dr. Jackson made a wry face. "It'll mean my scientific reputation going to shreds, too, when I announce it," he said. "Atomic power! But I'm with you on it."

"Good!" I said. "Now I suggest that you return to New York immediately, Dr. Jackson, and about two days from now make that announcement to the newspapers. It ought to get publicity enough."

"We'll be up there with you from the time you announce that, on. In the meantime, I'll arrange to get leave here and to take a couple of my own men with me, and Mr. Melford can carry out his uncle's funeral ceremonies, as I suppose he wants to do."

"I believe all of us, including Professor von Gersten, should be careful not to be seen with you after the announcements are made, lest Nebo and his pals become suspicious. So we'll join you just before you give out your statements and stay with you, hidden, until Nebo shows up."

"You have some sort of private laboratory at Manhattan University, I suppose?" I added.

Dr. Jackson nodded. "Yes, a fair-sized one on the top-floor of the Building of Physical Science."

"Well, you can, in your statements, let drop the fact that your model space-rockets and atomic power formulae and all that are in your private laboratory, and that you're working there night and day. In that way Nebo will know where to find you. And the rest of us can lie hidden there and when he shows up we'll grab him, if we have to kill him to do it."

These were the arrangements which, after a little more discussion, we adopted. Dr. Jackson returned to New York that night.

Von Gersten and Arthur Melford remained in Philadelphia with me and on the next day, June 3rd, was held the funeral of the remains of Dr. Melford and his servant. Both von Gersten and I attended with young Melford.

On the morning of the 4th we three left for New York, with us being three of my men, Wilkes, Janney and McCloskey. The chief had allowed them and me indefinite leave for the time the case required. No doubt the New York police would have cooperated to the extent of furnishing a couple of men, but to ask them, meant giving out the whole story of what was still, to the newspapers, only a couple of accidental fires.

We reached New York before noon and went straight out to Manhattan University, on the northern heights of the island. The big place had rather a deserted look as the regular school-year was ended and summer-school had not yet begun.

Young Melford led us to the Building of Physical Science, a big square gray-stone building at the campus' western edge. We went in and up to the private laboratory of Dr. Jackson, where he was awaiting us.

There was a small office at one end of the laboratory and it was there that we meant to watch and wait, in shifts, after the announcements were made, for the appearance of Nebo's group. Jackson had placed a couple of cots and some tinned foods in this office, as our wait might extend for days.

After I had pronounced it all satisfactory, and we had settled down in the office, Dr. Jackson telephoned the four leading New York newspapers and said he had some important news to give out. They appreciated Jackson's standing and promised to send out reporters at once. In fact, four reporters and a photographer appeared in less than an hour. Dr. Jackson received them in the laboratory, but we had opened the office-door a crack and could see from our hiding-place in the office as he gave out his statement.

I was afraid that Dr. Jackson's natural repugnance to giving out untrue statements might make him play his part badly but he rose to the occasion. In an impressive way he told them that he had solved the secret of producing power from the disintegration of atoms, and that he meant to use this atomic power in a new-design of space-rocket that he was going to build.

The reporters were much excited. "Could you give some sort of demonstration, Dr. Jackson?" one pleaded. "This is going to create a great sensation."

"I fully intend to give a demonstration of my discovery," Jackson told them, "but to demonstrate this atomic power on other than a minute scale, I will have to arrange a field-laboratory in some less thickly-inhabited region than this. The forces released by this process are too powerful to take chances with."

"But, doctor, why are you applying your discovery

to the construction of space-rockets, instead of to more ordinary purposes?" asked another. "Atomic power will revolutionize the world if it is applied to industry."

"I know that," said Dr. Jackson seriously, "but I consider the space-rocket question, the possibility of bringing about travel to other worlds, of the greatest importance. I mean to use this atomic power I have developed in this way first."

There were other questions from the reporters, shot at Jackson so rapidly that he could hardly answer them. He promised a demonstration of the atomic power within a few weeks—as soon as he had devised an easier-controlled apparatus. He also told them that he was working every day and most of the night at the task of designing an atomic-powered space-rocket.

They left, obviously anxious to return with their stories, and Jackson came back to the office where we were hidden.

"You heard that bunch of pseudo-science I handed them?" he said. "At least it ought to make a great newspaper-story."

Arthur Melford laughed. "It will, Lloyd. I can hear now some of the comments your scientific confrères will be making when they read of your wonderful discovery."

"Yes, I know about what they'll call me," said Jackson ruefully. "But you think it'll bring Nebo?"

"It certainly should," declared von Gersten. "If they hunted down those other scientists simply because they were experimenting with space-rockets, they will certainly come here when they hear you have discovered a source of atomic power to use in such a rocket."

"They'll come," I agreed, "and when they do come, we've got to be ready. From now on at least two of us will always be awake and watching, and we all have our guns. When Nebo and his pals do show up, they won't get away."

THERE began then a strange wait. I decided that four of us, in two shifts of two, were enough to wait in the office off the laboratory, and so I had two of the men, Janney and McCloskey, post themselves at the front and rear entrances, respectively, of the building's ground floor. To the caretaker in charge of the unused building, Jackson explained that these were men he had hired to protect him from curiosity-seekers.

The other four of us, von Gersten, Arthur Melford, Wilkes and I, remained in the little office. We were all armed, and as two of us would always be watching the laboratory where Jackson was, all would be ready for Nebo's welcome.

The New York newspapers on the night of June 4th gave considerable front-page space to the startling announcement Jackson had made to the reporters. We read the articles that night, Jackson having had the caretaker bring in copies of all the papers.

Dr. Jackson's statement, sensational enough by itself, was made even more sensational by the newspapers' treatment. They enlarged on what his discovery of atomic power would mean, if it proved to be all he stated. Electricity and steam as sources of power would be scrapped, a handful of coal could run a steamship around the world, and the like. And even more wonderful, Dr. Jackson meant to use atomic power first in launching a rocket into space toward other worlds.

The writers here drew highly imaginative pictures of Jackson's atomic rocket touring the worlds of the solar

system, of possible inhabitants on such planets as Mars or Venus, of a future line of atomic rockets plying between the various planets and earth, it being presumed that terrestrial colonies would soon be established on the planets that proved habitable. All this would result from Dr. Jackson's discovery.

The scientists, who had been asked for their comments, were of different opinions. Some said it was quite possible that Dr. Jackson had devised a way of obtaining atomic power but that the idea of making its first use the actuating of a space-rocket was unsound. Others stated outright that they did not believe the alleged discovery. Most of those who were asked rather hedged on the question. Generally, though, there was an air of disbelief among the savants.

But the public, or at least a great portion of it, seemed to believe. For there began that very night an influx of curiosity-seekers, cranks, reporters and inventors, that lasted for the next four days. They streamed up into the laboratory to question and bother Dr. Jackson, and he had perforce to let them all be admitted, since we could not tell when among them might come Nebo and his associates.

In those four days we continued the most monotonous of existences, two of us in the little office keeping watch on the laboratory and Jackson while the other two slept. It was not so monotonous for Jackson himself, because, confined by our plot to the laboratory, he occupied himself in work of his own, that I suppose his visitors thought was part of the space-rocket and atomic-power researches. In those four days he did not leave the laboratory.

On the fifth day, his stream of visitors had slackened a good deal, for the first sensation caused by Jackson's statements had by then faded out a little. We remained constantly on the watch. It was my belief that by this time Nebo's group would certainly have read of Dr. Jackson's wide-heralded discovery and plans, and that they would not delay long in putting in an appearance.

On the evening of the fifth day, we ate together a somewhat sketchy dinner, and then Dr. Jackson went back into the laboratory to continue his work, while von Gersten and I kept watch. It was Wilkes' and young Melford's turn to sleep. Von Gersten and I sat close together, near the crack of the just-opened door, within full view of the brightly-lit laboratory, where Jackson potted with his flames and test-tubes.

It was a little bit before midnight that there sounded a knock at the laboratory's outer door. Jackson went to open it and I saw two men step quickly inside. Immediately I sensed that these were not ordinary visitors, for they had not been announced by the caretaker in charge below. And as they stepped into the lighted laboratory's full illumination, I saw that the end of our wait was at hand.

The foremost of the two men was Peter Nebo! I needed but one glance at his squat figure, dressed in a good-quality dark suit, his close-cut black hair, unnaturally dead-white face and hands and green eyes, to identify him.

And his companion might have been his twin brother, for this other man also was stocky, dark-haired, white-faced and green-eyed! I rose to my feet, eyeing Nebo tensely through the crack in the door, and with my gun out in my hand. Von Gersten too had seen, and with eyes gleaming behind his glasses had risen, gun in hand.

I saw that Dr. Jackson also recognized his callers

but he betrayed no sign of any prior knowledge.

"You are Dr. Lloyd Jackson?" asked Peter Nebo politely. "My name is Clark and I and my brother wish to see Dr. Jackson."

Jackson nodded. "What is it you want, gentlemen?" he asked calmly. "I am Dr. Jackson."

"We wished to learn, Dr. Jackson," said Nebo, "if it is true as the newspapers stated, that you have discovered a method of producing practical atomic power, and intend to utilize it to propel a space-rocket?"

"Yes, the newspaper accounts were substantially correct," Jackson told him. "I have been successful in developing such power and mean to use it first in that way."

In the next moment, things happened with bewildering rapidity. I had been ready to burst out into the laboratory with von Gersten and confront and capture Nebo and his companion. I had fully expected that he would go on to warn Dr. Jackson that he must halt his space-rocket research, as he had done in the other cases.

Instead, Peter Nebo uttered a quick cry in some unknown tongue, and at the same moment he and his companion grasped Dr. Jackson and hastened with him to the laboratory door! They were abducting Jackson instead of warning him!

Instantly von Gersten and I burst out, and I shot swiftly at Nebo's companion. He dropped with a guttural cry, but as he did so, a half-dozen squat, white-faced men rushed into the laboratory from the hall in answer to Nebo's shout!

Four of them grasped Jackson, and with Nebo, dragged him out of the laboratory, while the other two delayed a moment to aim flat metal rods in their hands toward us. From the rods sprang thin jets of clear liquid, and though these jets missed von Gersten and me, where they struck against the laboratory's wall, the wall burst suddenly into flame!

As the two ran out, von Gersten and I shot, but missed them in the smoke and flame pouring from the laboratory's wall. I heard the tread of running feet ascending the hall stairs that led to the roof! Wilkes and Arthur Melford burst from the office, awakened by the uproar, pistols in their hands, and Janney and McCloskey came running up from below.

"McCloskey—Janney—get an extinguisher and put that fire out before it spreads!" I yelled. "The rest come on with me!"

I RAN into the hall and up the stairs, Melford and von Gersten beside me and Wilkes following. "What's happened?" young Melford was shouting.

"Nebo and his gang—they took Jackson up to the roof!"

As we raced up the stairs, we heard a whirring sound, quickly dying away above. We burst out on the roof and even in the darkness it took but an instant to see it was empty!

Arthur Melford yelled and pointed westward. There against the glow of the lights along the Hudson, we saw momentarily a slim speeding shape of gleaming silver that vanished even as we saw it.

"They've got away with Lloyd!" Melford cried. "They had a plane on this roof and have escaped in it!"

"A plane?" I exclaimed. "Then that's how they got into the building, coming down from the roof! But how did they ever land and take off a plane on this small roof?"

"God knows, but they did it somehow!" Melford said.

McCloskey and Janney emerged on the roof, grimy and panting. "We got the fire out," they reported. "Did they get away with Dr. Jackson?"

"They did," I said. "But why did they carry Jackson away instead of warning him to stop research, as they did all the other scientists? Has Nebo taken him off to kill him?"

"No, I think not!" von Gersten interposed. "Tell me, you saw that companion of Nebo's you killed, and those half-dozen others Nebo called to his aid? You saw that they looked alike?"

"They all looked like Nebo himself, if that's what you mean," I told him. "Squat, white-faced, green-eyed—but what about it?"

"I think it means much, that," von Gersten declared. "I think it may explain all this mystery that for eight years has puzzled me. Quick, we will go down and examine that one you shot and whose body they left where it dropped."

We went back to the laboratory, which was badly burned but was no longer burning. The body of Nebo's companion lay by the door where it had fallen and we all knelt beside it.

Seen so closely, the man was very strange-looking. His green eyes stared up sightlessly at the ceiling, a round hole above one eye showing where my bullet had gone. His face and hands retained their unnatural dead-whiteness.

Von Gersten rummaged in the pockets of the man's clothing. He drew out several objects we inspected. One of them was a flat metal rod with a trigger-like catch at one end, plainly one of the weapons that released the jets of liquid, which had fired what matter they had touched.

Another object we turned over and over was an intricate little cylindrical mechanism of wires and diaphragms none of us could fathom. The other thing in the man's pockets was an oblong silvery metal plate several inches long, on whose surface was engraved in black an accurate Mercator's projection of the earth's surface.

Superimposed on this map were a number of curving lines that glowed with light as though marked by radium-paint. These lines all radiated from a single point in eastern Labrador, to some ten or twelve points distributed over the earth's surface. Along each line was an inscription in characters absolutely unfamiliar in appearance to all of us.

"What does this earth-map mean?" I asked. "Can you make anything of it?"

"I can make something of it, yes," von Gersten said in a tone of repressed excitement. "But I make more of this man himself than of what he carried in his pockets—see!"

We all gasped. Von Gersten had grasped the dead man's close-cut black hair and had suddenly pulled the whole mass of it off! The black hair was a wig, and its removal disclosed a moist-looking green-skinned head. And this bulbous green head was *soft*, von Gersten's pressing thumb sinking into it an inch!

Our bewilderment and horror deepened when the German pulled off the dead man's clothing and we saw that all his body except his face and hands was covered with moist green skin also. Closer examination showed that the whiteness of the face and hands was due to a coat of white skin-paint having been applied to them, for

when a little of this was scraped away, the green skin showed beneath.

This green-skinned body was quite inhuman in general characteristics. There seemed no skeleton in it at all, it having been supported instead by immensely thick-grouped muscles. The legs and arms, in fact, were nothing more nor less than great tentacles that tapered down at their extremities to semi-human fingers and toes.

With hands that trembled a little, von Gersten pointed out that the ears were quite different in inner-structure from anything human and that the teeth in the mouth were artificial ones, apparently inserted to allow the reproduction of human speech-tones.

"I have no doubt," von Gersten said, "that dissection of this body will reveal that it is entirely boneless, and that the circulatory, digestive and nervous systems will be found radically different from the human."

He stood up, the metal world-map with its glowing lines in his hand. We rose unsteadily also. "But then what is this—this thing?" I asked shakenly. "It's not only like nothing human, it's like nothing ever known on Earth!"

"You are right there, Captain Crail," von Gersten said, almost calmly. "Although it seems to have developed a near-human form, the species to which this thing belongs, cannot have developed under terrestrial conditions."

"You mean that this thing and the rest, that Nebo and the others are . . ."

"I mean that Nebo and his associates cannot be creatures of Earth at all. They are creatures of some other world."

CHAPTER IV

Account of Dr. Lloyd Jackson

IN preparing this account of my capture and what followed, I have made painstaking efforts to adhere scrupulously to fact, even in the smallest details. The importance of so doing is obvious, when it is realized, as it now is, that my capture at the hands of Nebo and his followers and what came after constitutes the first conscious contact between the inhabitants of earth and inhabitants of another world, between humans and intelligent non-humans.

That night, when I opened the door of my laboratory to the two callers who had knocked on it, I had, of course, no suspicion of the astounding truth. But I did know that I was facing Peter Nebo and one of his associates. The descriptions left no doubt—this squat man with black hair, unnaturally white face and green eyes could be no other than the ring-leader of the group that had killed a dozen space-rocket experimenters. The other was so much the same in appearance, that I accepted Nebo's ready explanation that it was his brother.

When I admitted, in answer to their first question, that I had discovered a source of atomic power and meant to use it in a space-rocket, I fully expected to hear Nebo warn me to stop such research, as he had warned Dr. Melford and all the others. I knew that Captain Crail and Professor von Gersten must be watching from the office at the laboratory's end, and before Nebo finished his warning, they and the others would burst out and seize the two.

But to my utter surprise, no sooner had I made that

admission, than Nebo and the other had grasped me and were rushing with me toward the door. I heard a cry from Captain Crail and a shot, and Nebo's companion loosed me and sank to the floor. But Nebo continued to hold me with a strength that even then seemed to me superhuman, and in answer to his shout, a half-dozen figures like him poured in from the hall.

Four of these grasped me also and I was lifted and carried out of the laboratory with a swiftness and strength I could not resist. I heard cries from Captain Crail and von Gersten, and heard too the sudden crackle of flames as I was borne up the stairs toward the roof. With Nebo urging his followers to greater swiftness in deep cries in an unknown language, we burst out onto the roof.

In the darkness, I was just able to see that I was being borne toward a long, torpedo-like metal craft that rested on the roof. I kicked and struggled, but was like a child in the hand of my captors. They hurried me to a round open door in the metal hull's side, leapt in with me, and then as the last two to reach the roof sprang in, there was a whirring sound from the craft's bottom and stern, and through a small window in the door I saw the roof dropping away, as we darted into the night.

Nebo uttered a brief command and those holding me abruptly released me. I looked dazedly around.

The interior of the craft was undivided, so that I stood near the center of a sort of hollow metal submarine forty feet long. It was brightly lit inside and there were several small windows.

The craft's interior was rather crowded by unfamiliar-looking mechanisms and objects, but in my first scrutiny, I was more intent upon the occupants.

A few feet from me stood Peter Nebo, his coolly unemotional green eyes regarding me from his dead-white face.

Around me stood the half-dozen men who had helped him carry me off. With a creeping of the skin, I now discovered that all of them were replicas of Nebo in appearance, green-eyed, white-skinned, black-haired and squat-bodied. All were watching me incuriously.

Two other men, exactly like the rest, sat in the nose of the craft at a control-board covered with rods and small wheels.

I became aware that Peter Nebo was speaking. He spoke briefly in an unknown language to the men about me. At his orders all but two of them went to other parts of the craft; those two holding flat metal rods that were obviously weapons of some nature, remaining to guard me.

Nebo then spoke to me in English. "Do not be alarmed, Dr. Jackson," he said to me calmly. "We have no intention whatever of harming you."

"Why have you kidnaped me?" I asked, rather unsteadily. "Who are you—where are you taking me?"

"To answer those questions may take rather more time than you think," he said. "I will content myself for the present by saying that we have seized you in this fashion for weighty reasons."

I was beginning to recover a little from my dazedness. "The same reasons that induced you to kill a dozen other scientists, I suppose?" I shot at him.

There was a little surprise in the green eyes. "You know that we killed them?"

"Yes, I know that you've murdered a dozen space-rocket experimenters from van Hijn to Melford. Why

have you killed all these experimenters so ruthlessly?"

Nebo considered me for a minute with an unfathomable expression. "These things I will explain to you shortly, Dr. Jackson," he said. "In the meantime, be assured that no harm will come to you from us."

He turned from me and went to the nose of the craft. I saw him speak to the two men at the controls, and they answered.

Then they shifted rods and turned wheels and I felt the racing craft turn sharply in mid-air.

I half-raised myself to look through the little window beside me. Far, far below in the darkness, I made out two little beds of lights that I knew must be cities.

They sped backward so quickly that I knew the craft was traveling at incredible speed, though the only sound was the ceaseless whirring of its operation and a thin whine of winds outside.

Looking upward at the stars, I soon discovered that we were traveling almost due north. It was evident that the craft had first flown westward and then, after having left New York well behind, had now changed course and headed north.

I LOOKED about in an effort to discover the source of this strange craft's power. Ranged along its walls were big cylindrical tanks, and from these, heavy tubing or piping ran to the nose and stern of the craft and also to its floor. From the tubes that ran to the stern and the floor came the soft whirring. It was evidently these that in some way were hurling the torpedo-like hull through the air. There were connections between all the tubes and the control-board in the nose.

I also made out some smaller square tanks connected to metal nozzles that were mounted just inside the windows like so many machine-guns.

Nebo came back from the craft's nose and saw me staring about. "You are wondering how this flier operates?" he asked. "Those cylindrical tanks hold certain explosive gases compressed thousands of times."

"These gases are released through those tubes from openings outside the flier's hull, being fired at the moment they are released. Their firing-recoil is of tremendous force, and the firing of the bottom or floor-tubes raises and suspends the flier in air."

"Firing of the stern-tubes propels us forward, and similarly the nose-tubes can be used for braking purposes."

I nodded. It was in my mind to learn from Nebo as much as possible concerning this whole business.

"What about those other tanks and nozzles?" I asked, pointing to the square tanks with their gun-mounted nozzles.

"Those," Nebo explained, "are tanks of liquid so chemically compounded that almost any kind of non-metallic matter it touches bursts into flame. We use it by projecting it from those nozzles, and also have the small hand-rod containers of it."

Light broke in upon me with his words. "Then that's how you fired the laboratory-building of Dr. Winn, and Dr. Melford's house and all the rest!" I exclaimed.

"Yes, we simply brought the flier, on a dark night, over the building we wanted to destroy. Hovering a little above it in the darkness, we had only to turn a few streams of the firing-liquid down on the building below and instantly it went up in flames."

"And that's how you did it!" I repeated. "I thought of an airplane, but an airplane couldn't have hovered

and would have been heard, so" Here I broke off. I continued. "But *why* did you do it?" I demanded. "Why kill those dozen scientists and why carry me away?"

"Dr. Jackson, every one of those scientists we destroyed was working on experiments that might help to bring about interplanetary travel," said Peter Nebo simply.

"We destroyed them, after they refused to stop their work, because we are utterly opposed to such travel taking place. We will never, while we can prevent it, permit the development of space-rockets or anything else that will allow men to journey to other planets."

"But what's your reason for being so dead set against men reaching other planets?" I exclaimed. "We thought you were madmen, with a delusion on the subject, but madmen couldn't have designed this flier and these other things. You must have some reason."

"We have a reason, Dr. Jackson," answered Peter Nebo gravely. "And that reason is that we ourselves are from another planet and that our race is determined that men of Earth shall never invade our world."

I stared at him. For a moment, my first reaction to his astounding statement was that after all these men were all mad. But the very craft in which I was being hurtled smoothly through the upper night, the very unfamiliarity of all the things about me, beat down this idea and supported, incredible as it was, Nebo's assertion.

"I know that it will be hard for you to understand and believe," Nebo was going on, "but it is quite true. I and all my companions are natives of the planet that you call Venus."

"You mean to tell me, then, that you came to earth from Venus?" I said hoarsely. "In this flier?"

"Not in this flier," Peter Nebo corrected. "This is but one of the craft we use on Venus and which we brought, with several others, for use here on earth."

"The ship that brought us here from our world is many times the size of this one and quite different, though it operates on the same principle of gas-firing recoil as this little flier."

"It's unbelievable!" I said unsteadily. "You can't be from another world—you, men like myself!"

"We are not men like yourself, Dr. Jackson," said Nebo quietly. "We are not men at all."

"Look, and be assured for yourself," he added, and turning, gave a brief command to one of the men guarding me.

At once the fellow reached up and to my surprise and horror jerked off his close black hair in one mass, a wig in fact, and disclosed a green-skinned soft head like that of a seal.

He quickly then doffed his clothing. I cannot express the horror that was mine, when I saw that his body also was green-skinned and seal-like, a soft boneless trunk from which branched arms and legs that were in effect huge feelers or tentacles like those of an octopus, instead of ordinary human limbs.

I saw then that the face and hands were white-painted, accounting for their unchanging dead-whiteness. I saw also that the only parts of this grotesque and unhuman body that looked human at all were the hands and fingers, the face with its nose and mouth and ears, and the eyes—the parts of the body covered by ordinary clothing being totally different from the human.

The thing reassumed its clothing at Nebo's order. Shaken, sick, I stared at Nebo himself. "Then all of

you are like—like that—" I struggled with the words.

"Yes, I am the same and so are all these others," Peter Nebo answered.

"My God, creatures wholly inhuman!" I exclaimed.

"But creatures which, I think you will have to admit, equal and surpass you humans in intelligence," Nebo told me calmly.

"But you passed as humans—you talk our languages—" I said, unable still to understand.

"We did, because it was necessary to fulfill our work here on your world," he said.

"But what is your work? The killing of scientist's here?"

"Our work," Peter Nebo said gravely, "is the prevention of any scientific research on the part of you humans which might lead to your attaining power to visit our world.

"That is why we have killed the space-rocket inventors and other experimenters and that is why we have carried you off like this, Dr. Jackson. To understand fully our motive, you must understand something of our history."

His voice was very serious and thoughtful, and as his pale green eyes looked calmly into mine and his deep voice talked, I could not realize that this was a non-human creature of another world.

AS he spoke, I sat half-crouching on the floor, listening with a terrible tenseness. The whirring of the firing tubes never stopped as the flier drove unceasingly northward through the upper night. Except for Nebo and my two guards, the others in the craft were on watch at either the controls or mechanisms.

"Our world, the world that you have named Venus," said Peter Nebo (I could still think of him only by the human name), "is a world very much unlike yours in some respects. It is of much the same size as your earth and like it, has a day of about twenty-four earth-hours.

"Also, like Earth, Venus has an atmosphere with the vital substances of carbon dioxide and oxygen present in it, though in somewhat different proportions. But the surface of our world differs very much from the surface of this one.

"Venus has no moon. At first that fact may not seem important to you, but it has made a great difference between the two worlds. When earth was semi-molten, it flung off a great mass of its matter that became its moon. That caused irregularities of height in the surface of the earth, so that when its seas formed, they ran into the deeper basins and formed oceans, while the higher areas formed continents of dry land.

"On Venus, on the contrary, no moon having been flung forth, there have never been such irregularities of level. For that reason, when our seas condensed from the primeval hydrosphere of our planet, they covered almost the whole planet, a few small islands alone remaining uncovered. Thus, our world is predominantly a watery world.

"Because of that, evolution on Venus has followed a somewhat different course than on Earth. Here life originated in the seas and there developed its first crude forms. But very soon in its history, life moved to the land, where it began the development of a multiplicity of land-forms. After ages of such land-development, one class of the vertebrates, the mammals, proved most successful, and after still more ages of variation and selection, one species of those mammals, man, developed

the real intelligence, which has made wonderful progress.

"But on Venus, the story of evolution was entirely different. There the great part of the history of life was enacted in the waters and only comparatively late in its history was the land invaded by any life. For there the land-masses were small and unpromising, and the seas were endless and bountiful. In our world, life had developed to a comparatively high level and had produced a species of creatures of some intelligence before any living thing ventured on the land. That species of which I speak was ancestral to my own species.

"Back in those times of our earliest development in the Venerian seas, there was little vertebrate development, conditions being different than those of your terrestrial seas. The chief development in so far as intelligence and activity were concerned was among a class of creatures akin to the cephalopods, the octopods and squid of Earth.

"These creatures were four-armed, capable of quick motion through the waters and had considerable enterprise and strength. They advanced rapidly in these things until they dominated the seas and outmastered all competing creatures. Their instincts widened into consciousness and intelligence, dim at first but slowly growing.

"They were water-breathing creatures, special organs in their bodies extracting the dissolved air from the waters, but they were able also to live for some time in the air and to breathe air. Their ability to breathe air soon enabled them to spend all their time on the land. They consciously desired to invade the land and gradually they did. It was a deliberate conquest of land much different from the instinctive invasion of land made long ago by your ancestral forms of life on earth.

"Once on land, the capabilities of these creatures rapidly expanded. They learned to walk on two of their tentacle-limbs and to use the other two as arms for manipulation purposes, carrying their heads or brain-cases erect above their bodies. They quickly learned the use of tools and built structures, dwellings—a progress that would have been impossible had they remained in the waters.

"Soon their numbers crowded the islands that were the only land of Venus, and their structures had so increased as to form cities. They had designed vehicles and mechanisms by then, and weapons, and their scientific knowledge grew continually as the scientific spirit took hold.

"Two thousand years ago, while humans were still mostly barbaric and knew nothing of science, our race had reached a fairly civilized state. We were slowly becoming conscious of the real scheme of the universe, of the admirability of truth. We were, and have been ever since, just a little ahead of you in scientific progress.

"Our speculations as to what lay outside the unchanging cloud-screen that is our planet's sky, were unending. At last, eight hundred years ago, we developed an astronomical science which made it possible for us to look through the cloud-screen by using telescopic and photographic instruments sensitive to infra-red rays that can pass through the clouds.

"That is how we came to see the sun and the other worlds of the solar system and the stars. Gradually there arose a desire among us to visit the nearer of the other worlds. The planet nearer the sun than us, that you call Mercury, was plainly uninhabitable. But the next one, Earth, looked habitable to us and much we desired to visit it.

"So began experiments in space travel that continued for a long time. Innumerable projectiles and rockets were designed and launched, but none were successful. At last, two hundred years ago, a ship, designed on the rocket-recoil principle, proved workable. And when Venus and Earth were in inferior conjunction, that ship made its first successful trip.

"That first Venerian ship reached earth in what you would call the first part of the eighteenth century. But the Venerians, before landing openly on Earth, carefully reconnoitered its surface without themselves being seen, so that they might be sure there was no danger.

"It was well for Venus that they did so. For they saw that Earth held a race of intelligence and knowledge of science almost as great as the Venerians', and a race whose millions far outnumbered ours. They saw that this race of man had devised the most destructive weapons of which their science was capable and that with these weapons they fought unceasingly among themselves, striving to subdue each other and slaying each other in hosts.

"This was enough to give the Venerian explorers pause. What would happen, they asked themselves, if they landed among these races of men and told them they came from Venus? Would these fierce, hostile hordes not see at once in Venus new lands to conquer? Would they not attempt to duplicate the Venerians' ship and travel across the void to attack the Venerians?

"It might take them a long time to duplicate the Venerians' feat of space-travel, but they could undoubtedly succeed eventually. Once they had knowledge of that other world, and the possibility of reaching it, these restless beings would not halt until they had done so. And would that contact between humans and Venerians not inevitably mean bloody combat?

"WITH these things in mind, the first Venerian explorers did not make their presence known to the men of earth. Instead they headed back to Venus, and the people of Earth never even suspected their visit. When they reached Venus, they made detailed report to the Venerian leaders of what they had seen.

"Their report was given much attention. It was finally decided that the Venerians should never let the men of earth know of their existence, for, though our science was greater than that of the humans, though we could no doubt repel them if they tried to attack us, yet there were thousands of them to every Venerian and it might mean unceasing attempts on their part to invade our world. No, we would never let them dream of our existence!

"It was recognized, though, that with increasing scientific ability, the humans of earth might before long try to devise space-ships of their own.

"If they did so, they would duplicate our feat and reach Venus. They would find our crowded Venerian cities on our little islands and would take news of them back to earth.

"We decided, therefore, that we must do all in our power to prevent the earth-peoples from ever developing a method of space-travel. To do this, we would have to keep some Venerians always on earth as spies or agents acting for us.

"Since such spies must look as much as possible like humans, to pass when necessary as such on earth, a group of Venerians were altered surgically to enhance a human resemblance. The tentacle-ends of their arms were

made into human hands and fingers, the ends of their leg-tentacles were made capable of wearing human shoes; their faces were somewhat remodelled to approach the human; artificial teeth placed in their mouths and alterations of their vocal cords enabled them to produce the sounds of human speech; and wigs to simulate human hair were provided and their green faces and hands were whitened.

"This group then headed for Earth as passengers in one of the space-ships we had built. Their first care was to establish a base on earth where they would not be discovered by humans, and they did establish such a base in the uninhabited stretches of what you call Eastern Labrador. There they built shelters for themselves and the supplies they brought, building also a landing-framework for the greater safety of the space-ship. Then the space-ship returned to Venus, leaving the Venerian spies in their base.

"These Venerians had several of the small fliers we of Venus use for transport between our various islands. In these they ventured out, flying always by night, and explored Earth. They found parts of it still very savage and other parts civilized. They captured humans and took them back to their base, forcing them to teach them the various earth-languages. Of course when they had learned all they could from these captives, they were forced to kill them, although we Venerians abhor bloodshed ordinarily, still we could not let a few lives weigh against the good of an entire race.

"These Venerian spies kept their watch over Earth. They procured and read its journals and newspapers and made sure that no attempts at space-travel were being considered by humans.

"In a few years Venus and earth were again fairly close to each other in space and across from Venus to this world came a Venerian space-ship with relief for our spies—other Venerians, who would take their place.

"When these new arrivals had received sufficient information and training, the others, or the greater part of them, went back to Venus in the ship. And the new arrivals continued the watch upon mankind.

"And so it has been in all of the two hundred years that have passed since then. Unsuspected by all of you humans, there has always been a group of Venerians in our base, who, disguised as humans, were able to keep posted on the progress of human science.

"Every few years they were replaced by others from Venus who volunteered for this duty.

"In all this time, until about twenty years ago, there was little work for our spies. Although he has progressed rapidly in scientific knowledge, man has been concentrating upon extending his power on earth without thinking of leaving it. He has devised railroads and steamships, electrical power and radio and airplanes, but he has almost ignored the possibility of visiting other planets.

"But about a quarter of a century ago, our spies brought back to Venus word that men were beginning to speculate on the possibility of interplanetary travel. It was little more than speculation, romancing, but it was significant of what might come. So our spies on earth were ordered to prevent at all costs any real development in space-travel research.

"The first case in which our Venerian spies took action occurred eight years ago. Until that time, there was only empty speculation about space travel, and not much of that, but eight years ago, our spies learned that Willem

van Hijnn, a Dutch engineer, had become convinced that a space-rocket could be designed, which would reach other planets, and he was working on designs.

"Our Venerian spies, with their superior knowledge of science, knew van Hijnn's rocket-designs to be unworkable, but nevertheless his researches on the subject could not be allowed to proceed. So, not wanting ever to take life, save when there was no other course, they visited van Hijnn in disguise and warned him to stop his work. He refused, never dreaming, of course, of their true identity.

"So our spies were forced to kill van Hijnn and to destroy his work. They did so quite simply by bringing their flier over his laboratory by night and turning on the building a stream of our chemical fire-fluid, which causes any non-metallic combustible substance it touches to burst into flame. Van Hijnn and his work were destroyed.

"In the same way the others were warned. Each one refused to heed the warning. They were all destroyed. Morrow, and Krasney, and the two Japanese, these space-rocket experimenters perished in the next few years in the same way as had van Hijnn and for the same reason.

"THREE years ago, when the relief-ship came from Venus, I came with it to earth, to take my place as head of the Venerian spies here. You seem to think that it was I who was responsible for the killing of van Hijnn and those other earlier experimenters, but that is only because we Venerians all look alike to you in this disguise. I was never on Earth until three years ago.

"In these three years, I have done my part for Venus. Dr. Hayes, the Australian rocket-worker, was the first scientist I had to destroy. Then Wilsoff, and Molokoff, then Dr. Braun and Mertaud, and finally Dr. Melford and Dr. Winn. For the sake of my race, my world, I have led in the destruction of these scientists who might have brought nearer interplanetary travel for men. It is now almost time for the relief-ship to arrive and take me and my companions back to Venus, but others will arrive to take our place. As long as we have spies on Earth, no progress toward space-travel will ever be made by men!"

As Peter Nebo's serious, quiet voice stopped, I stared into the Venerian's calm green eyes with my brain whirling.

During all this conversation, the flier continued to whirr on softly at tremendous speed, northward through the night. The other Venerians remained on watch at controls and mechanisms, but so fascinated had I been by what I had heard that I was unconscious of my surroundings.

One paramount question burst up from the chaos of my thoughts.

"But if you warned and then killed all those space-rocket experimenters to prevent the furtherance of interplanetary travel, why didn't you kill me?" I asked. "Why did you carry me away?"

"Those other scientists," Nebo explained, "were all experimenting with space-rockets and fuels which, while they might in time bring about space-travel, were far inferior to our own design of space-ships. We destroyed them simply to prevent men from progressing in any way toward space-travel, as I have already said.

"But you, Dr. Jackson, in discovering a method of producing unlimited atomic power, have gone further

than our Venerian scientists. Often have our scientists tried to produce atomic power and failed. When we learned that you had solved the secret, we had no desire to kill you and destroy your work. We wanted, instead, to take this secret of yours to our scientists."

"You mean that you carried me away because you want to get my secret of atomic power from me?" I cried. Peter Nebo answered in the affirmative.

"Yes, for by so doing, we advance our own scientific powers and space-travel possibilities immensely. At the same time, we prevent your secret from ever becoming known to humans."

I stared at him and then I began to laugh—raggedly, weakly, hysterically. Nebo stared at me and the other Venerians in the speeding flier to gaze at me too.

"The joke is on you in that case, Nebo!" I cried. "There is no secret of atomic power—I never discovered it at all!"

"That cannot be so, Dr. Jackson," Nebo said calmly. "In the newspapers of the last few days there have been long accounts of your discovery of atomic power and your intention to use it in a space-traveling rocket."

"But those accounts were lies!" I shouted. "They were concocted deliberately by young Melford and Crail and von Gersten and me and published to draw you and your band to me so that we could trap you!"

Nebo's expression did not change. "I quite understand why you should say so," he told me. "Naturally you do not want this secret of atomic power to fall into the hands of another race, another world."

"But I'm telling you the truth!" I said desperately. "The whole thing was merely published to lay a trap for you and your associates. That's why my friends were at hand when you appeared!"

"Your friends would naturally be guarding you when you had such a secret," the Venerian remarked. "I am afraid there is no use pretending that you do not have it."

I stared helplessly at him. "You'll find out otherwise when you try to get such a secret out of me," I told him.

"I will not try at all," he answered. "I will leave that to the scientists of Venus."

A cold sweat seemed suddenly to break out on my forehead. "Of Venus?" I repeated. "Do you mean you're going to take me . . . ?"

"You will be taken to Venus, yes," he said. "The Venerian relief-ship will arrive at our base in the next two days and when it returns with us to Venus, you go too."

"Once on Venus, our scientists can no doubt extract from you information regarding your method of producing atomic power. You will not be harmed unless you make it necessary, and, though you will, of course, never see earth again, your experience may not be unpleasant."

The prospect opened by his words was so appalling, that for a moment I was left speechless. A random thought struck me.

"They'll know—my friends will know you're from some other world when they find and examine the body of the Venerian shot in the laboratory!" I exclaimed.

"No, for two of my followers fired the laboratory as we left," Nebo said. "That will destroy any formulae as to your discovery that you may have left, and will also destroy the body of our companion."

I did not know, could not know at that time, that two of Crail's men had managed to bring that fire under control, any more than the Venerians suspected it. I

felt caught in some nightmare, from which presently I surely must wake.

Nebo left me and went to the nose of the flier again. I saw him conferring with the two Venerians at its controls, no doubt on the course being followed.

I remained in a sort of dream as the flier whirled on through the night. The events that had snatched me from my New York laboratory and presently would transport me across a great gulf of space to another world seemed incredible, impossible.

Looking now and again from the window, I could see only darkness beneath, and from this absence of lights I judged that the flier was already hurtling over the sparsely-inhabited wastes of northern Quebec toward Eastern Labrador. Also, the stars were paling eastward to announce the imminence of dawn.

When the sickly gray light of day began to appear in the east, it dimly disclosed a barren, treeless, gray plain far below. Over these steppes that were wholly without sign of human beings, the flier was moving at dizzying speed.

But even as the day grew, the flier was beginning to slacken speed and to decrease its altitude. I saw Nebo and the other Venerians gazing from the windows ahead and guessed that we were nearing their base.

There came into sight on the gray plain ahead what looked like a small circle. As the flier rushed on and down toward it, I saw that it was a circular embankment of earth, perhaps fifty feet high and a thousand in diameter.

Inside it, was a row of neat metal buildings of no great size, except for three or four that looked like store-houses.

This row of buildings was at one side of the circle and at the other was a huge and curious structure. It was a metal framework built up from massive girders, something like an amphitheatre or hollow hemisphere in shape, as though made to receive a huge ball. It was at least two hundred feet across.

The flier headed down toward the row of buildings. I saw two other fliers resting on the ground beside the houses, and a number of figures running out of the buildings as we descended.

Our craft slanted down, hovered motionless a few yards over the ground whirring softly, then sank vertically until it rested on the earth. At once one of the Venerians threw open the door, and a wave of cooler air poured in.

Nebo spoke to my two Venerian guards and then to me. "Please go with us without making trouble, Dr. Jackson. It will be better for you if you do."

"WHERE are you going to take me?" I asked.

"Just to one of the buildings where we must confine you until the relief-ship comes," he said.

"All right, then," I answered, after a moment's hesitation.

I stepped out of the flier to the ground. Around me, besides Nebo and my two guards, crowded a score or more of figures.

They were Venerians like those I had already seen, disguised like Nebo and the others by human-clothing, whitened hands and faces and the black wigs. I could not tell one from another—they looked so much the same.

Nebo and the guards led me toward one of the smaller metal buildings. I noticed that the guards kept their rods ready for use at all times.

The door was opened and I stepped into the little building. It was about twelve feet square and had no windows—being used formerly as a minor store-room by the Venerians, I supposed.

"Food will be brought you shortly, Dr. Jackson," Nebo told me before the door was closed. "We have no food such as you humans consume, but I think you can shift with ours."

"When, exactly, do you expect your ship from Venus to come?" I asked him.

"It should be here day after tomorrow if all has been well with it," he said. "You will know as soon as it arrives, for always it stays just long enough to disembark the Venerians it brings and take on those returning to Venus. It does not stay longer, lest there should be some chance discovery by humans of its coming."

"But you can't really expect to take me back on it?" I exclaimed. "Not to another world, when I've told you that I have no process of producing the atomic power?"

The Venerian's strange face was expressionless. "I have no choice in the matter," he said. "I have my duty to my race and my world."

With that, he left me. I inspected the interior of my prison for some time in the hope that there might be some method of escape from it, but soon found there was none.

Within a half-hour the door opened and I was handed a shallow metal platter of dark red mushy substance, and a metal bottle or flask of liquid, which proved to be pure water. I ate a little of the mushy Venerian food but found a certain repellent fishy quality in its taste and gave it up. Certainly, I told myself, if that were to be my food in the future, I would be poorly off.

When the food was handed in, I saw two of the Venerians standing guard at the door with the fire-fluid rods. It was quite evident that Nebo was taking no chance of my escape before the ship from Venus came.

And when it came—what then? I asked myself. A voyage in it as a prisoner to another world, a captivity without hope of release in the island-cities of the watery world of Venus?

Captivity—and maybe torture or death! For it was evident that Nebo and the other Venerians fully believed my published statements and were convinced that I had in my possession the knowledge of a method to produce limitless atomic power.

Once on Venus, their scientists would certainly endeavor by all means to wring that supposed secret from me. The murders of space-rocket experimenters, which they had systematically committed on earth to prevent humans attaining interplanetary travel, proved that they would not balk at extreme measures to make me tell them the secret.

I had no secret to tell them, but they would never believe that. They might use the most refined scientific tortures to make me talk. I cursed the inspiration of Captain Crail that was responsible for my issuing those statements. Crail and von Gersten and Artie Melford, would they or anyone ever know what had happened to me?

Gradually I became aware that I was very tired, and stretching out on the floor of my prison, I slept. When I awoke it was with a sensation of cold, and through the door-cracks I now saw that it was night outside. I had slept through twenty-four hours or more in my weariness.

The next hours passed without incident. I was

brought more of the food in the morning, and this time I ate more, for I was extremely hungry. I looked for Nebo to appear again but he did not. With the food this time, though, was brought a sleeping-rug.

I heard Venerians pass outside now and then and once the whirr of a flier that went and returned in a few minutes. I slept fitfully, my dreams dominated by my knowledge that the next twenty-four hours were to be my last on earth if the relief-ship came as expected.

When I woke again and my food was brought, Nebo came too, eyeing me thoughtfully.

"No, we have seen no sign yet of the ship," he said in answer to my first question. "But it should be here sometime soon."

"When it does come, and we take you to put you aboard it with us, I warn you not to make any struggle or effort to escape."

It had been my resolve to make a last-minute attempt to break free, but I did not say so. "Why not?" I asked.

"Because in that case we will have to use force," Nebo answered. "We will take no chance of killing you, of course, but rather than let you delay us, we will stun you. You will avoid this unpleasant experience by being reasonable."

I said nothing and he went out. I heard him speak to the Venerians guarding my door as he closed it.

In indescribable tenseness I sat waiting for the inevitable moment. Hour after hour passed, morning gave way to noon, and noon to afternoon. By sunset I began to wonder if the ship would come at all.

Almost as I wondered I heard a throaty cry from one of the Venerians outside, repeated instantly by a score of them. I sprang to my feet, trembling. I seemed to hear a faint sound like distant, steady throbbing.

I could hear the Venerians running about outside my prison. Suddenly the door was flung open and Nebo appeared, four armed Venerians with him.

"The ship is arriving!" he told me hastily. "Remember my warning, Dr. Jackson. Come with us quietly."

I stepped out with them into the sunlight, trembling despite myself. The sunset westward threw brilliant light over the enclosure, and the Venerians were running toward the great metal framework at its other side.

Nebo pointed obliquely upward. There, high in the light-streaming heavens, hung a little ball of light dropping rapidly on a steep slant toward the enclosure. And as I saw it, I became aware of a faint, throbbing sound that was rapidly growing louder.

"Quick!" cried Nebo. "We must be at the framework when it lands!"

With him and the Venerian guards close about me, and the other Venerians running nearby, I was hustled across the enclosure.

Looking up, as I stumbled on with my captors, I saw that the little light-ball was a metal sphere, a huge globular craft, gleaming in the sunset's light, as it sank with slackening speed toward the framework. The throbbing of it was now a loud and continuous thunder in our ears.

IT CAME lower, more and more slowly, a colossal two-hundred foot metal ball sinking toward the framework built to receive it. I was half-way across the enclosure now with Nebo and the other Venerians. Then, as a new sound smote my ears over the thunder of the descending Venerian ship, I looked up.

I yelled, and from Nebo and the Venerians came cries of amazement and alarm. The new sound I had heard

was a staccato roar and as it came to a crescendo, I saw an airplane speeding over the enclosure from the east! Behind it were three more and behind those a half-dozen others, roaring at top speed toward the Venerian ship that even now was settling into the framework!

The planes dived and from them came the rattle of their guns speaking over their motors' roar, pouring a leaden hail down on the framework and ship in it! I saw Venerians by the framework fall, saw a door in the great globular ship's curving side swing open and Venerians emerge, pointing up at the planes and shouting.

Nebo forgot me for the moment, cried orders rapidly to the Venerians at the buildings. They ran to the four torpedo-like fliers, and in a moment these soared up toward the planes.

The Venerians holding me sought again to drag me toward the framework and ship, but now I was struggling, fighting with fists and feet.

And as I fought, I saw the airplanes and the Venerian fliers above engaging in a wild dog-fight. Two of the fliers crashed at the same moment against a plane and all three fell.

From the remaining two fliers sprang jets of clear liquid and in quick succession two planes burst into flames and spun downward. But there followed one of the fliers and then the other as remaining planes poured a storm of lead upon them and through their windows and into them.

There was a chorus of yells from the edge of the enclosure and on its eastern and southern embankments appeared troops of men, brown-uniformed soldiers with rifles, running down into the enclosure and firing at the Venerians and the framework holding the ship.

At this, the Venerians left in the enclosure ran toward the framework. I saw them swarming up a metal stairway toward the open door of the huge ship. Nebo and my guards were dragging me despite my struggles toward the mighty framework.

Abruptly three of my guards dropped around me and at the same moment I felt something like a hot iron sear my shoulder. I wrenched free from Nebo and the other guard and stumbled away from them, as more rifle-bullets hummed past us.

Nebo and the Venerian ran after me and then suddenly they too collapsed and lay still. There was no Venerian left living in the enclosure save those clambering into the great ship. And as I dropped to my knees, I saw the last of them hasten into it, saw the great door ponderously close, and then with a sudden terrific, throbbing thunder, whose detonations almost split the ears, the huge ball rose into the air from the framework.

Slowly, majestically, at first, but faster and faster, the mighty sphere rose into the sunset, unheeding of the comparatively tiny airplanes that dashed and stung about it—rose until it was far overhead, a dwindling light-globe.

Soldiers dashed past me toward the framework and then arms caught and pulled me to my feet. Men in civilian clothes were about me, all crying out together.

"Lloyd!" shouted one of them, and I came out of my daze to recognize Arthur Melford's excited face, and then beside him was Captain Crail, his features taut, and von Gersten with blue eyes flaming with excitement.

"Lloyd, we got here in time!" Arthur was almost weeping. "By heaven, they were taking you to that ship . . ."

"To Venus, yes," I said. "But how did you know that

you should come here? How did you learn where their base was?"

"The one I shot!" Crail cried. "We found a metal world-map in his pocket with lines drawn on it all radiating from one point in Eastern Labrador. And von Gersten . . ."

"Von Gersten," the German finished for him, "sees that that point in Eastern Labrador can be but their base, where they come forth from on their trips over earth. We get the soldiers and the planes and hurry to this point, in time to save you, though their ship gets away, it seems. And you say, to Venus!"

"Yes, Venus!" I exclaimed. "Look, can you see it up there—can you see it yet?"

High in the brilliant western sky the globular ship was now but a little ball of light, diminishing steadily as it rose on a steep slant. Up and up it went, smaller and smaller it became in appearance. And below it we could see another speck of light, but one that was sinking after the sun, the planet Venus dropping from our sight.

Then as we stared in awe, von Gersten and Crail and Arthur and I close together, we saw the receding light-ball become a mere pinhead of luminescence, a tiny shining point. It seemed to waver for a moment in our vision, to hesitate. Then it was gone and we stood staring after it into the empty sunset sky.

CHAPTER V.

Note by Professor Herman von Gersten

THERE is nothing which I, von Gersten, can add to the known facts of that most astounding series of killings, which has come to be called "the space-rocket murders" and its even more astounding sequel and explanation. The accounts drawn up by my companions and friends of their various experiences in this so-strange adventure summarize those facts completely.

Yet, if the facts need no addition from me, it may yet be that some comment would not be amiss. So, at least, have Mr. Melford and Captain Crail and Dr. Jackson told me, asking me to attach to their documents my opinions as to the questions which must necessarily arise.

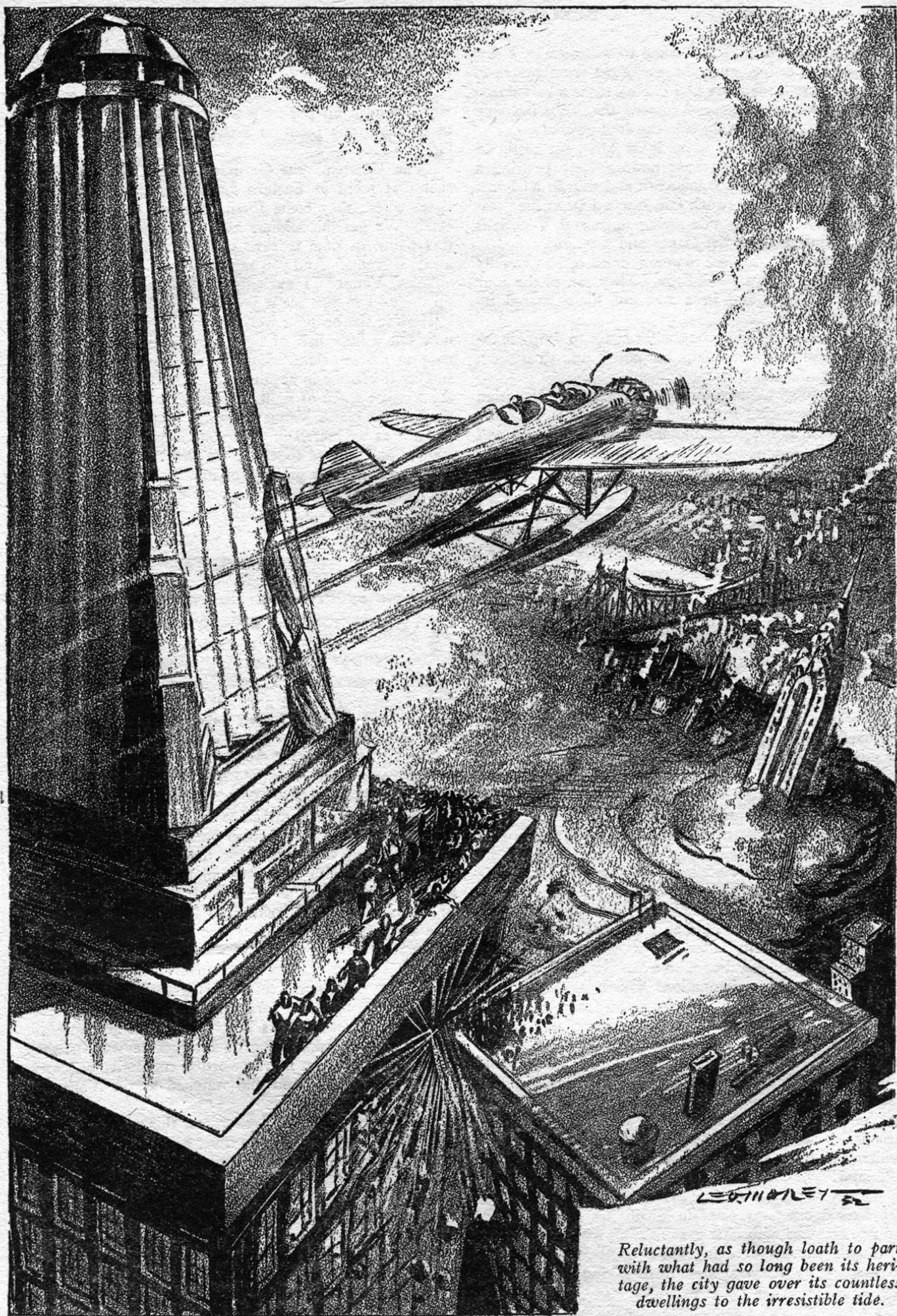
We men of earth have for the first time come into direct contact with beings of another world, who were at least as intelligent as we are. In the Venerians' view of us, as told to Dr. Jackson by Nebo, we humans who rule earth so unquestioningly, for the first time see ourselves as others see us. And what we see is not pretty!

No! We see that to beings with even a little more civilization than ourselves, such as the Venerians, the races of men appear a fierce, hostile and cruel species—a species that utilizes its best intelligence and greatest powers for the conducting of internecine war between its own divisions, an untrustworthy, combative and merciless race to be feared and watched as the Venerians feared and watched us.

To us self-styled civilized races, this view comes as a shock. Is it justified? we must ask ourselves. Were the Venerians wise to distrust us to such an extent as to use any means to prevent us from ever reaching their world? Or have the Venerians been misled by surface aspects and taken precautions which they might have spared themselves?

I think that any reflecting person, who looks without bias at our world and what we have made of it, must agree that the Venerians showed wisdom in the course

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Reluctantly, as though loath to part with what had so long been its heritage, the city gave over its countless dwellings to the irresistible tide.

Wrath of the Purple

By Howard Melvin Fast

IT happens frequently that some marvelous discovery made by a brilliant scientist for the good of humanity proves fatal and catastrophic instead, but that fact is not going to prevent brilliant and enterprising scientists from continuing their painstaking search for something new and startling. How can any man foresee dire results from apparently innocent experiments? The answer is here proved once more—he can't.

Illustrated by MOREY

IT is strange how changed the aspect of a thing becomes when one looks at it in retrospect. Men laugh at a war which devastated the earth a generation before, and belittle a flood which brought doom and destruction upon half a nation. Thus it is not strange that the great catastrophe of 1939 should lose the place of prominence which it has occupied for the past decade.

It is only when one flies above the wasteland, above one of the fourteen states which the Purple Life devastated, that the full immensity of the catastrophe is realized. It is only then, when one sees with his own eyes the stark mountains from which the forest has been stripped, the scattered underbrush making futile efforts to cover the barren ground, and the countless ruins that were once prosperous hamlets, that a storm of wrath overtakes him and he curses the perpetrator of this horror. And he will curse, as millions before him have cursed, the name of Doctor Richard Carter.

I do not write this as an apology for Doctor Carter, nor as an eulogy. His was a crime, a crime against all humanity. But he also saved a world from doom, a doom which threatened to wipe from the face of the earth every living creature but one.

He is dead. He has paid the supreme penalty at the hands of a wrathful mob. Try to think kindly of him, to know him as I know him, as a great scientist and a humane man, as one of those many who gave their lives to humanity.

To his memory I dedicate this account of the happenings of the winter of 1939.

The Purple Life: strange, is it not, that that thing which caused destruction unparalleled in history should be called life? But it was life; that I have always insisted, although Doctor Carter thought differently. He

said—but let me tell it all, from the night I received the message from Doctor Carter.

My acquaintance with Doctor Carter began at college. I was taking a pre-medical course. He was an instructor in biology, one of the youngest of the staff. He was my senior by only a few years and we struck up a fast friendship. We worked together quite frequently. His specialty was cellular research. I was interested in bacteriology. Our branches of work were closely enough related for us to be of assistance to each other. Then I graduated and went to Glasgow to complete my studies.

Upon my return to America, I set up a research laboratory in New York. Here again my work brought me into contact with Doctor Carter. During the next five years our friendship was renewed. We collaborated in several volumes upon cellular research. Then I received an offer as a government bacteriologist, which I accepted. My work took me to Washington and kept me there for seven years. It was at the beginning of my seventh winter there that the two events occurred that changed the entire course of my life.

I was appointed head of the government bacteriological staff, and I received the following telegram from Doctor Carter. The punctuation is added.

"Come at once. Matter of utmost importance. Threatens to involve entire nation. Cannot explain other than to say I have blundered upon something which may destroy civilization itself. Will be waiting at Duplex Hotel. Come at once."

To say the telegram surprised me would be to put it mildly. It certainly served to stifle my elation at the news of my appointment. The message itself was as unlike Doctor Carter as anything conceivable. He was essentially the scientist, coldly calculating and not given to emotional outburst. Only in a case of urgent neces-

sity would he send such a message. He was not the man to magnify a trouble. If he said the matter was one of national importance, I could rest assured that it was. Only one course lay open to me. I wired that I would leave for New York immediately.

As head of the bacteriological staff my time would be much my own. Accordingly, I gave notice to my subordinates that I was leaving for New York upon official business, and that they could reach me at either the Duplex Hotel or the home of Doctor Carter.

I had seen Doctor Carter only three months before. The difference between his former hearty self and the man who met me in the magnificent lobby of the Duplex Hotel, was startling and almost unbelievable. He had aged twenty years in those three months. His hair was gray and his eyes dim and sunken. His face was haggard, drawn, as is the face of a man who has looked upon death and found it terrifying.

He was obviously relieved at my presence, and grasped my hand as a drowning man would a straw.

"FRANK!" he cried. "You came, my boy! God, if you could only know what a relief it is to have you here, to have someone to talk openly to, to confide in. Frank, you will never know what I have gone through these past three weeks.

"But you must be starved. Come, we'll sup in the roof garden. Later you can have my story."

A thousand and a half feet above New York, in a glass-topped conservatory, we had our dinner. The city sprawled at our feet. North, south, east, west—as far as eye could reach lay that pattern of blocks, relieved here and there by slim fingers of stone, glass, and metal. New York! New York the living, the pregnant, the imperishable! Never could I look at it without having that same thrill of achievement, of pride in all man has accomplished. And now it seemed more alive than ever; seemed to whisper to me and give me a message I could not translate. I turned to Carter.

He was leaning forward, regarding the city with the strange fascination of one who looks at tragedy, grim, stark tragedy. Then he shook himself and looked about him, as if he were coming out of a stupor.

"Frank, look at it." His voice was low; it was like the voice of a man who speaks of death. "In a few weeks it will be gone, all gone, crushed, destroyed by that which I have created. For God's sake, Frank, help me; I need it."

I was convinced, somehow, that he spoke the truth, and pressed him for an explanation, but it was not until we were in his car, driving toward his home, that he gave me the story.

"You know, no doubt," he began, "why I changed my residence from New York to a mountainside in Ulster County. My work involved certain dissection and vivisection; it was work which I could not perform in a crowded community. Thus, I established my laboratory in one of the few remaining isolated sections within convenient driving distance of New York.

"There, for the past three years, I have been engaged upon cellular research in a seemingly futile quest for the secret of life. My ultimate object has been the restoration of organs of the human body.

"In the beginning, I confined myself to the grafting of limbs upon animals. Then a new thought occurred to me. I would search for the secret of life itself, would discover the basic organization of protoplasm. Once the

idea had taken hold, it became an obsession with me. Life, I reasoned, had been originally created, either by accident or by design. What had been done once, might be done again.

"You have heard of the theory of spontaneous generation?"

"Yes," I replied. "A theory long discarded."

"True. It has been discarded, but it has never been entirely disproved."

"But surely," I said, "you do not, in this age of exact science, accept spontaneous generation."

"Why not? That in all probability was the manner in which life came into being. And how do you account for new diseases, new bacteria, new protozoa? No! Not only do I believe in spontaneous generation, but I have seen it occur."

"You have seen it occur?" His awful earnestness held me.

"Yes. I have seen certain elements combined in correct quantities under given conditions assume that which we speak of as life."

My senses whirled. "You have overworked, old man. You need a rest." But I believed him in spite of myself. I tried to tell myself that he was mad, when I knew him to be sane, mercilessly sane.

"No," he said. "Would to God that I were mad, but I am not, unless you mean the madness of fear, of worry."

"Then you have done what man has dreamed of doing throughout the ages—you have created life?"

"Either life or something that resembles life more than anything man has heretofore produced."

"Why man," I cried, "do you realize what this will mean to humanity?"

"Yes," he said slowly, "it will mean death, ruin, destruction, and ultimate doom."

He spoke no more, but gave his attention to the road. Knowing Doctor Carter, I did not press him for further explanation, but turned over, in my mind, what he had just told me. Undoubtedly, he was preparing me for what was to come.

We were well out of New York now, and swirling along the new West Shore speed highway. A slight fall of snow had covered the ground, and the road, a bright white ribbon in the moonlight, stretched away before us.

It was almost midnight when he put his car up the last stretch of road, a rough lumber track which wound its way up a seemingly impassable mountainside. It was bitterly cold, and the snow upon the road made the going doubly difficult.

With a sigh of relief I sank into a commodious chair and stretched my feet toward the Doctor's blazing fire. After steaming tea had further fortified us against the bitterness of the night, we took our pipes to the library and the Doctor continued his story.

"Frank," he said, looking at me through the blue smoke that curled about his face and hair, "did you ever realize how greatly our imaginations are limited by what we know or have seen. What has man ever done that is truly creative? What has he ever conceived that is not a repetition of that which has existed before. True, he has introduced variety, but is he capable of imagining that which is a true departure from anything heretofore known? I do not think so.

"We know only one form of life, that which has the cell as a basis. Knowing only that form, we can con-

ceive of no other. Frank, can you picture life with no cellular structure; life that has no form; life that is not protoplasm; life that is life in name only? Can you picture elements, energized so that they can absorb nourishment from the earth or the air, and yet having no discernible means of doing so? Can you picture such a thing doubling its size every three or four days and disintegrating all organic matter which it comes into contact with? Can you picture that thing, let loose upon a peaceful countryside, increasing its bulk at an unthought of rate, destroying, like some grim reaper, all in its path? Calculate its rate of increase and you will know what I know, that if that thing is not destroyed within thirty days, not only America, but the entire world is doomed."

THIS was too much for a finite mind to quickly grasp. Either the man was mad—but no, his face gave no lie to his sanity. He spoke the truth.

"But come," I said, "take the funereal expression off your face. If such a thing exists, it is not invulnerable. We must act quickly and destroy it while it is yet small enough to control."

"Small enough to control!" He shook his head wearily. Slowly he got to his feet and passed a worn hand across his brow. Motioning for me to follow, he led the way through the house to one of the rear rooms. Here he threw open a window, unlocked the storm shutters, and pointed up the hillside.

"There," he said, "does that look small enough to control?"

I drew back in surprise. From a point about two hundred yards above us to another point three hundred yards further up, the mountain side was dull purple. The silver rays of the full moon lit its surface with an unearthly radiance. Almost it seemed alive, like some great omnipotent monster lying in wait for its prey. In shape it was roughly circular, its height, as nearly as I could judge, was over thirty feet. Its strangest feature was the illusion of transparency it gave an observer. I imagined that I could see into it, deep into its violet core, and discern dull purple fires. I did not need the words of Doctor Carter to assure me that it was alive, potent.

Carter pointed to the center of the purple mass. "That was my laboratory."

Silently, we returned to the library. I had a strange reluctance to speak, to discuss that thing upon the hillside. A feeling of lethargy, of futility had overtaken me. Wearily, I sank into a chair. The Doctor stood before the hearth, his drawn features outlined in the crimson glow of the flames.

"We have three days here—in this house. Then it will be gone." His voice was tired.

I said nothing. I was thinking, or rather trying to force my harassed brain to function. Now, looking back, I wonder that I did not suggest some plan of action, some method of attack. Perhaps it was due to the feeling of helplessness, of despair which the Purple exerts upon all who see it for the first time, or perhaps it was because I suddenly realized the vast responsibility which would rest upon me, as head of the government bacteriological staff.

The Doctor was speaking again. "My assistant slept in the laboratory. I left him there—with the Purple. In the morning he was dead—in the Purple. His body——"

His face was working, straining as he lived over that

fatal morning, when we saw the first of its victims.

"Since then, I have attempted to destroy it. I tried everything—gas, heat, bacteria, dynamite, acid—all to no avail. Once, intense heat might have killed it. Now it is too late. It thrives upon cold. Acid makes almost no impression upon it. You could explode a thousand tons of dynamite in it and every minute fragment would live and grow. I have injected it with bacteria, with every obtainable species, yet they have less effect than they would have upon the earth itself. I have attempted to grow molds and fungus upon it. All was futile. It destroys all that is organic, acts as a powerful corrosive."

He held out his hands. The fingers were covered with the scars of recently healed sores.

"This," he said, "is the result of a first contact." Then he stood at the hearth, silently, while I gazed moodily into the fire. When he spoke again, it was not to me but to the swirling flames. "You will have to inform the authorities?"

"Yes," I answered. "That will be my duty."

He sighed, and his bowed shoulders slumped just a bit more. "I put it off as long as I could. I wanted you to know first, to see for yourself. And then, it is doubtful as to how the populace will react."

"You can reassure yourself upon that score," I said. "It will be kept from the public as long as possible."

"And how long do you think that will be, once it begins to cover farms and cities?"

"That will not be for some time."

Doctor Carter shook his head. "You do not realize the speed with which that thing increases itself. In a few days it will cover this house. A week or two more, and the entire valley will be inundated. In another month, New York; then the North Atlantic seaboard; then count the days, before North America becomes a sacrifice to this thing I have created."

But now, away from the brooding significance of the Purple, I was recovering my assurance. I cleared my throat and spoke more buoyantly than I had since I received Doctor Carter's telegram. "Something there is that will stop it; something that will destroy it, as remorselessly as it destroys all in its path. Tomorrow, we will leave for Washington. The entire resources of the government will be placed at your disposal. My staff will be constantly at your command. Surely, before the week is up, you will have discovered something, something with which to fight and destroy this menace."

The next morning I had my first intimate view of the Purple. It had increased appreciably since last night, and now, as I stood before it, I could feel it swell and grow. Its smooth gelatinous surface suggested, ironically enough, grape jelly. I had an insane desire to taste some of it, to plunge my hand into it and press it to my mouth.

Doctor Carter turned to me, a curious smile upon his face. He had changed visibly since the night, had thrown off the mantle of gloom which hung about him, and now he seemed a different man. He was as one who has been given a challenge and braces himself to meet it.

"Looks pretty harmless, doesn't it?" He held a walking stick in his hand and now he plunged it into the jelly-like mass. For a moment, nothing happened, then the wood seemed to wilt and crumble away. Only then, when I saw that polished hardwood melt like butter, did I realize what we were facing.

DOCTOR CARTER salvaged the remains of his stick and cast it away. "That is what happened to Johnson's body; that is what became of my laboratory; and that will be its effect upon every organic obstacle that bars its path. You see, then, that we are facing ultimate destruction."

I had phoned for the county sheriff and when we returned to the house, he was waiting for us. I explained to him the situation and the developments we expected. From his attitude, I could see that he thought we were either mad or the engineers of a huge hoax. It was only after I had shown him my credentials and had given him a first hand exhibition of the action of the Purple, that the twin lights of fear and belief appeared in his eyes.

I explained explicitly the developments that were expected in the three days I would be gone, and how to meet them.

He was to communicate with the state police and have the district within a radius of two miles put under martial law. He was to order complete evacuation of the district and under no circumstance was he to give any information to the public or the press. I assured him that I would return in three days or less, and that, until then, no measures, other than those I had given him, were to be taken against the Purple. And lastly, I warned him against the deadliness of the menace. Its stroke was quicker and more decisive than the sting of a rattler. It killed with more certainty than the deadliest infernal machine. And the death it dealt was crueler than any man had known. No living thing must touch its deadly surface. The growing fear in his little eyes assured me that the precautions would be well taken. . . .

It was high noon when Doctor Carter and I stepped off the plane at Washington. We went first to the offices of the Secretary of the Interior and laid the entire story before him. Only after several hours' discussion did we convince him of its truthfulness. The samples of the Purple, which we had brought from New York, were the final factor in obtaining his belief. He was won over and asked us to present any plans which we had for the solution of the problem.

One of the strange features of those first few days was that no one of us connected with the battle against the Purple, excepting perhaps, Doctor Carter, realized the full imminence of this new menace. It was significant that the Secretary did not, at that time, reproach Doctor Carter. "We must," he said, "make great sacrifices in the name of science." And he was one of the men who later suggested hanging Doctor Carter as the perpetrator of one of the most terrible and destructive crimes against humanity. This, to show what panic will do to the most staid of mankind.

Firstly, I asked that all chemical and biological resources of the country be placed at the disposal of Doctor Carter, and secondly, that, temporarily at least, I should be placed in charge of all measures taken against the Purple.

The Secretary assured me that this could be done, at least for the time, and then asked what steps I proposed to take.

"I desire," I told him, "to test the effects of gas, electricity, and rays upon the Purple. Failing in that, I will attempt wholesale destruction by chemical flames.

"I also want you to use your influence to have the army and the navy placed at my disposal, and to grant

me absolute authority within the area defined by a radius of five hundred miles from Ulster county."

The Secretary and Doctor Carter gasped in astonishment. What I was asking for was virtual dictatorship over the center of the country's industrial and commercial section.

The Secretary shook his head. "I am afraid," he said, "that what you ask cannot be granted. Nor does the situation seem to warrant such drastic action. It would be more customary, in such a predicament as this, to place the authority in the hands of the army or the local authorities."

Inwardly, I cursed his narrow-mindedness.

"Can't you see," cried Doctor Carter, "that this is not an ordinary occasion; that this is an emergency unlike anything heretofore encountered by man. We must work quickly. In speed lies our only salvation, our only hope. We cannot wait for the official machinery to function. Both the army and the local authorities will be slow, entangled in the conventional red tape, as they are. If unchecked, even for weeks, the destruction wrought by this thing will make the Great War harmless by comparison. The fate of our nation, the United States of America, hangs in the balance. This is not a matter of politics, of territory, of state or city rights. It is a crisis in the existence of humanity itself."

"And what," asked the Secretary, "makes you believe that your colleague is the man for the dictatorship?"

Doctor Carter leaned forward. "Sir," he said with grim earnestness, "forget, for once, about your army, your navy, your police, about all means of force. Science has created this thing and only science can destroy it." He pointed to me. "He is a man of science." The calm assurance of his words seemed to quell the Secretary's last doubts. He was won over.

The Secretary was to return to New York with me. Doctor Carter remained at my Washington laboratories. He was convinced that all my efforts would be futile. Before I left he had a few words with me, alone.

"Frank," he said, "once I thought I created life; now I know differently. We call it life because we can conceive no other name for it. But it is not life. Nor is it lifeless. Perhaps there has been a certain change within the very atoms themselves. Perhaps we have chanced upon something so different that we cannot venture a thought as to its identity. The human mind is very finite. This thing is too big for me. It leaves me bewildered and terrified.

"But Frank, I have the formula and I have the method. What I once did, I can do again. There must be a reagent which will destroy this thing. From a strange world I drew the Purple and from the same world I will draw its doom."

I clutched at his arm. "For God's sake, Doctor, leave that formula alone. Burn it, destroy it, but don't chance letting loose another menace such as this upon the world."

"Frank," he retorted, "unless the Purple is destroyed, there will be no world of man to let loose another menace upon. No Frank, we must fight this thing with a weapon yet unknown to man. It is our only hope. . . ."

THE next afternoon the Secretary and I left for New York. His special plane touched the waters of the Upper Bay in less than an hour.

Immediately after landing, we directed our steps toward the City Hall, and were closeted for several hours

with the Mayor. He was already cognizant of the situation, having received daily reports from the up-state officials. It seemed that the thing had increased at an unbelievable rate, far beyond anything which the Doctor or I had expected. We explained to the Mayor what developments might be expected, and asked him to be prepared to take measures to evacuate the city. The Secretary then asked that all resources of the City be placed at my disposal. At a time like this State and City rights must be submerged to a common good.

We were leaving the City Hall, when the first blow fell. The voice of a news boy was bawling through the street. "Wuxtry! Read all about the Purple Menace! Wuxtry!" I bought a copy and stared in bewilderment at the heavy black type.

"Country Doomed By Purple Menace!" it read. And beneath that, sprawled over the face of the page, was the entire story of the Purple Life. And the papers had spared no efforts to make it sensational. Maps, covered with circles to show the advance of the Purple; first hand pictures of the Purple itself; pictures of the land before and after the Purple had wrought its wrath; yes, those papers certainly saw their point and played to it. Forty days existence were given to the United States.

The Secretary tore the paper from my hands, and turned blue as he read it. "Someone will pay for this," he roared. "I'll break their damned sheet."

I shrugged my shoulders. After all, this was to be expected. According to the papers, the thing was over two miles in diameter. Nothing of that size could be kept from the public. And perhaps it was best that the populace should be warned when the thing was yet comparatively small; it might avoid later panics.

We planned our campaign. The Secretary would return to Washington. He would have to confer with the President as to the mobilization of the nation's forces. He left me with full authority to undertake those measures which I had suggested, and even went to the trouble of chartering a plane for my own use.

Blasé New York took the matter calmly. People discussed it at their dinner tables, and it became a subject for intellectual controversy, but they held little doubt as to the ability of the authorities to control it.

I made provision for the transportation of the chemicals and the gas, and then took a taxi to Curtis Field. There, I obtained the planes needed in the work and provided for the establishment of a base in the vicinity of the Purple.

Then I flew to the scene of action. The fact that the place was under martial law did not serve to dispel the crowds of the curious. One of the small country towns had already been partly buried by the gelatinous mass. The State Police were attempting to clear the streets and the houses of angry citizens. One old lady protested that she had lived in that village for sixty years and was not prepared to move before a pile of grape jelly. That little incident cast a shadow of coming troubles. Would millions of people part with their most cherished possessions willingly? Would they be passive, or would we witness mob revolt unprecedented in history? I wondered.

One glance at that quivering violet pile convinced me of the futility of my efforts. A solid wall of purple, perhaps a hundred feet in height, stretched away upon either side. Its movement was clearly perceptible now, and like some grim monster, it came on, destroying all

before it. I thought of that glacier, which was some day to cover the earth with a blanket of unending ice. Ruefully, I reflected that the story was not far from consummation, only this time it was not ice.

TROOPS were arriving in a steady stream, and I could hear the low hum of planes. Several loud detonations came from the Purple and making out a squadron of bombers, I remembered Doctor Carter's words. "You could explode a thousand pounds of dynamite in it and every minute fragment would live and grow."

Futile, I thought, all is futile. No efforts of man can destroy that bulk.

When the chemicals and gas came, I proceeded with my experiments. The pitiful insignificance of my materials chilled my heart. It was all so useless, so terribly futile. As I expected, the Purple remained unaffected. Tear gas, mustard gas, chlorine, hydrogen, helium—all were tried and all failed. On the morrow I would proceed with my plan of chemical combustion. The Secretary had pulled the wires well. Thousands of tons of combustibles were arriving hourly. But no hope rose in my breast. The Purple was too great, too powerful. The chill about my heart increased.

Before dark I took an observation flight over the Purple. One speaks easily of three or four miles, but it was not until I had seen the Purple from above, had seen that livid blot upon the peaceful landscape, that I realized how very much land could be included in a circle of that diameter.

In the dark of the night I was awakened by a trooper. The Purple had increased at a rate beyond that which we had expected. It was at our very bedsides. I slept no more that night.

In the gray of the dawn we commenced operations. Plane after plane circled above the Purple and dropped continually a living stream of fire. Soon the face of the Purple had become a leaping mass of flames. For two hours operations continued and then the supply of chemicals was exhausted.

It was a last crushing blow to look upon that unruffled purple surface. If the flames had done any harm, it was too insignificant to be noticed. Life, then, seemed very, very hopeless.

The next days were reminiscent of the retreat of some defeated army. Step by step we gave ground to the Purple. To what purpose the government massed their troops about the Purple, I do not know. It is strange that in times of stress man's first thoughts are of force. But the troops only sat by their guns, although now and again they moved in orderly retreat.

Water was a last futile hope. Would the advancing purple tide cross the Hudson River? Anxiously we waited and then we saw—saw our last hope dashed to pieces. The Purple overtook the stream, and, like a monster animal rolling its bulk in some tiny water hole, dispersed it.

Then the Nation awoke to the crisis. Not yet with panic, but with the grim seriousness of a country going into war. And like a nation going into war, they mobilized their forces of relief and opposition. Then, I was proud of my country.

I need not weary you with a detailed account of that which you know so well; the advance of the Purple through New York State. Sufficient to say that I aged a lifetime in the next week. In my dreams I live over

those days, and often I wake, cold and wet, to see again those proud cities smothered beneath the mass of the Purple. Arrogant in its omnipotent wrath, it crept down the Hudson River, overwhelming and destroying, one by one, the cities that had arisen upon her banks. Poughkeepsie, Newburgh, Tarrytown, Irvington, Yonkers, each in turn surrendered to the unhalting mass.

I was in New York when the great exodus began. New York was being abandoned. New York the great, the jewel of America, the most magnificent metropolis of a world, was spread upon the altar, a sacrifice to the Purple.

From the tower of the old Empire State Building we watched the advance of the Purple. It seemed that notwithstanding the efforts of the police to clear the city, the greater part of the populace had delayed their departure until the last moment. Now, like crawling streams of ants, the cars and people poured over the bridges that were the outlets of Manhattan. Now one of the lines threw itself into a tangle. Women screamed, whistles shrilled, automobile horns sounded, and the cars and people piled up in an ever increasing mass. The streets were black with people for blocks around, with a shrieking, groaning, fear-ridden mob. Later, we learned that almost a thousand lives had been snuffed out in that mad scramble to leave the doomed city. The bridges and streets were still choked with frightened humanity, when the first of the Purple came into sight.

Slowly, majestically, like some deliberate stream of water, the Purple poured over the city. Reluctantly, as though loath to part with what had so long been its heritage, the city gave over its countless dwellings to the irresistible tide. First to yield was the residential sections of Bronx and Manhattan. Easily, the Purple made its conquest there. More stubborn were the skyscrapers of midtown. Even after the Purple had passed them, they held themselves aloft, cried that they would not bow, that they were New York the eternal. Silently we watched it until the Purple was beneath our very feet. The city was dead now, cleared of all humanity, except a few observers who retreated before the Purple. We were the last to leave that silent place. Step by step we gave ground to that rolling tide.

Hours later my plane circled over New York. It was a vast tombstone, a city that was dead. Where streets and houses had been, where traffic had roared and millions of people slept, only the purple tide eddied. Now and then a faint crash would mark the yielding of another proud skyscraper to the weight of the Purple. A noble city had died.

All America unselfishly joined in the relief work. Millions were homeless. The task of feeding and housing them was one to stagger the stoutest of nations. And, added to those were the millions daily made homeless by the advance of the Purple. Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, New Jersey, Pennsylvania, one and all they felt the relentless grip of the Purple Life.

THE world was first awakening to the imminence of the new menace, and it was with the wild fearfulness of the cornered hart, who sees the hunters approaching but is kept at bay by the dogs. A wave of panic swept the world. There was talk of an exodus to Mars or Venus in the new rocket ships. Others suggested digging vast caverns into which the people would retreat after the Purple had conquered the world. Fanatical

preachers screamed of the Judgment Day, while gray-haired scientists shook their heads in despair. A world-wide panic, which dwarfed into insignificance the depression of ninety thirty-two, gripped the financial world.

Then began the great American emigration. One thought superseded all others: that America was doomed. Thousands fled to Europe, until the European nations threw up immigration barriers and forbade further refuge upon their shores. Then they turned to Canada. At first refuge was not denied; then when the Canadians saw the Purple approach their border, they forbade immigration. Troops were thrown along the border and in places pitched battles were fought. There would have been war then, were not war so futile in the face of that greater menace, the Purple. In Mexico the situation was different. At first, Mexican troops were thrown along the border. Then the Southwesterners grew desperate. They stormed the border and in parts broke through, although those that did, were wiped out as soon as they were in Mexico proper. The world from an orderly group of nations, became an uncalculating mob. Rioting grew in all countries. Two thousand years of civilization were forgotten. Pandemonium reigned.

And then a voice above the others cried out against the perpetrator of this crime. And the cry was taken up by the masses until the name of Doctor Carter was cursed in every country upon the face of the earth. A second Judas, they called him—a man who had not only betrayed his master but humanity itself.

And then I received a message from Doctor Carter—the first since we parted at Washington. "Am on the track," it read. "Come quickly if possible." I left at once. Anything was better than to watch the Purple in its remorseless advance.

When Washington fell beneath the Purple, the Government moved to Columbus, Ohio. There, in the building that had been set aside for our use, I met Doctor Carter. He had changed, changed in more ways than one. His hair was white and his face was thin to emaciation. But the difference lay in his eyes. They were bright, shining, as are the eyes of a man who has been snatched from the jaws of death. And in them was hope, such as I had not seen in the eyes of any man for days.

"Frank," he said, "these past days have gone badly with you. You have worked hard, too hard." It was typical of Doctor Carter that at a time when he was prepared to disclose a secret that gave life to man, he should inquire as to my health. He was ever thus, thinking little of himself and much of others.

"There will be no rest," I answered gloomily, "until the Purple is gone or the earth becomes a place of dead memories."

Doctor Carter was smiling now, the first smile I had seen for many long days. "And it will be gone, Frank, as soon as we can manufacture enough rays to destroy it."

"Ray, rays?" I shook my head. "Destroy it?" Again I shook my head. Something in the scheme of things was wrong, radically wrong. I should not be here, listening to wild speculation; I should not be gathering hope; I should be back there, back with the Purple, fighting it, building futile barriers, lighting pitiful fires, fighting, always fighting. I should not be here. I should not hope. There was no hope, no hope, only the Purple, the Purple. Suddenly the room flashed with a thou-

sand fires. Purple flames darted about and above me. All was Purple! Purple everywhere! Then the Doctor was bending above me.

Half laughing, half crying, he led me into his study. He gave me a drink and it served to bring me to my senses. Things began to right themselves and the Purple flames died away. He shook his head reassuringly. Just a simple reaction, he said; the news was too much and too good, after the terrific mental tension. I sighed and dropped back in the chair.

Then, suddenly, I sat up and looked at him. "You weren't fooling me, you weren't jesting! Tell me you weren't jesting."

He shook his head. "I was not," he said slowly. Then he walked to the center of the room and laid his hand upon a small replica of one of those great power-lights they use on landing fields. "This," he said, "is our salvation."

"But what—"

Again he shook his head. "I cannot explain. I hardly understand it myself. You remember that it was with a ray that I brought about the change in matter that created the Purple. That ray did something to the atoms, changed some part of their inner structures. I have been experimenting with that same ray, attempting to create life again, attempting to find something that would destroy the Purple. Then I thought of varying the wave length of the ray and chanced upon this." He pointed to the thing in the center of the room.

"But what is it?" I exclaimed, "what use is it?"

He made no answer, but turned to a large cabinet. He swung open the door, and I started back in surprise. There was the Purple, throbbing and glowing in all its malignancy. He swung the ray projector about until its lens faced the cabinet. Then he touched a button upon its surface. There was a blue flash, a rush of air, and where the Purple was, showed only the metal sides of the cabinet. Holes gaped from its rear panel and the wall behind it was similarly scarred.

The Doctor turned to me and smiled, for I was still gazing at the spot where the Purple had been. "It is very dangerous," he said. "Had I left it on for another moment, the house would be down upon our heads."

I WAS speechless. I could only gasp, "What is it, what is it?"

The Doctor turned to the projector. "A practical disintegration ray. . . ."

It is said that we are possessed of a certain sixth sense, an intuition. Perhaps it was this that made the Doctor so carefully instruct me in the manufacture and use of the ray. He warned me not to delay, but to strike at once. Time was precious. Each hour, thousands of people were being made homeless. The whole country must turn to the manufacture of the ray projectors. "Hurry," he urged me, "time is precious."

And then from without there came a murmur; like the rising power of the surf, it rose and swelled. A rattle of stones sounded against the broad windows. The Doctor and I stepped towards them. A huge mob of homeless men and women had gathered in the court, and now they surged back and forth, calling out Doctor Carter's name.

The Doctor turned to me, a strange smile upon his

face. "I will tell them," he cried, "we are sure of success; let them be happy too." And before I could move to stop him, he stepped out upon the tiny stone balcony.

He raised his arms for silence. There was something dynamic in his presence, something which quieted the mob, as oil quiets troubled waters. Then he began to speak.

His voice was powerful, musical with suppressed gladness. Slowly he spoke, begging them to forgive him, to forgive him for what he had done and now had the power to undo. Then, from somewhere in the mob, there was a shot. Doctor Carter crumpled back into the room, hands clenched at his breast. The mob, caught with sudden fear, melted away.

I knelt beside him and lifted his head. He murmured a few words about the ray projector, and died. I knelt there, warm tears rolling down my cheeks.

The next day the nation, from depths of despair, was lifted to heights of wildest exultation. They had a martyr and they had a cure. Life again was good. But I could think only of my friend, lying before that window, dead.

What need to tell more? What need to tell of those next days, days through which I moved as does one who is in the grip of a nightmare, and always with the face of that white-haired scientist before me. But they are part of this chronicle, and happy days they were; happiness that, to me, was mixed with grief, grief over him who was my friend.

As an individual, the nation turned to the manufacture of the ray projectors. Every available factory ran day and night. The projectors poured forth in an unending stream. Day and night the blue flames crackled; day and night men fought the Purple. Foot by foot it gave ground. More projectors came forth, more blue flames darted against the Purple, and more ground came from beneath its grasp. It was a hard fight, but not a losing one. Each new bit of ground that emerged gave the fighters further hope. Then, twenty-one days after the day on which I first saw the Purple, the last of that dread menace disappeared into nothingness. The world took a deep breath and sighed. . . .

There are those who say that good came of the Purple Life. Perhaps that is so. Perhaps nothing God ordains is without good, yet—

"The old order changeth, giving place to the new."

The Purple Life devastated fourteen states and a good portion of Canada, destroying the very flower of North American civilization. The mighty New York of the past, the rich cities of Pennsylvania and Massachusetts, and the great ports of the North Atlantic Seaboard, are gone.

But in their place has risen a new civilization, a new New York mightier than its predecessor, a new and better East, an East that man has long dreamed of. A harried nation is righting itself after a great crisis.

They honor me for what I have done in halting that devastating tide, but the praise hurts.

For upon a little hillside in Ulster County is a stone. It is a rough stone, unpolished and hard, and often, as I stand there, looking up the bleak mountainside, I think of him who lies beneath it, and then, the words graven upon its face mean more than the praise of a nation.

It reads thus:

"TO THE MEMORY OF DOCTOR RICHARD CARTER, THE SAVIOR OF A NATION. MAY HE REST IN PEACE."

THE END

The Man Who Fought a Fly

By Leslie F. Stone

Author of "Out of the Void," "Across the Void," etc.

WHEN you stop to think about it, perspective is exceedingly important in the consideration of the "rightness" of any decision. With a change of perspective or point of view, as it were, conditions must necessarily appear in an altogether different light. Just so is it true in the matter of size. The reactions of some foreign element—human or otherwise, to certain aspects of our environment—have been written about before, but our well-known author gives us something entirely different in this very clever story.

Illustrated by MOREY

THERE was no reminder of the medieval alchemist with his dust-laden tomes, his belching forge, his stuffed crocodile and empty skulls, in the bright, pleasant chamber that housed Professor Duncan Trent's laboratory. It was a converted conservatory in the old home he maintained as his residence and workshop. Three sides were of glass, the roof a skylight pouring sunlight down upon the healthy flowering plants set in boxes in a ring around the floor under the windows or on stands. Even when the sun was not shining it was a pleasant room. Only the low tables with their clear glass receptacles of every size and shape, the chest of shelves along the back wall, with its rows of bottles tagged with strange scientific names and an occasional strange pungent odor told one that this was a room devoted to science.

It was the duty of Mike Turey to keep his laboratory neat and clean. Each day he swabbed the red and blue tile floor with sudsy water, ran his duster over tables and machines, and washed out the glasses the professor ordered to be ready for his ministrations. Then carefully he watered the potted plants, brought in cut-flowers from the garden to set in the many vases and bowls about, weeded and trimmed the flower boxes. Mike was also the some-time assistant to the professor, helping the scientist when a second hand was needed at some delicate task. A crippled war veteran, he had found congenial surroundings in the professor's pleas-

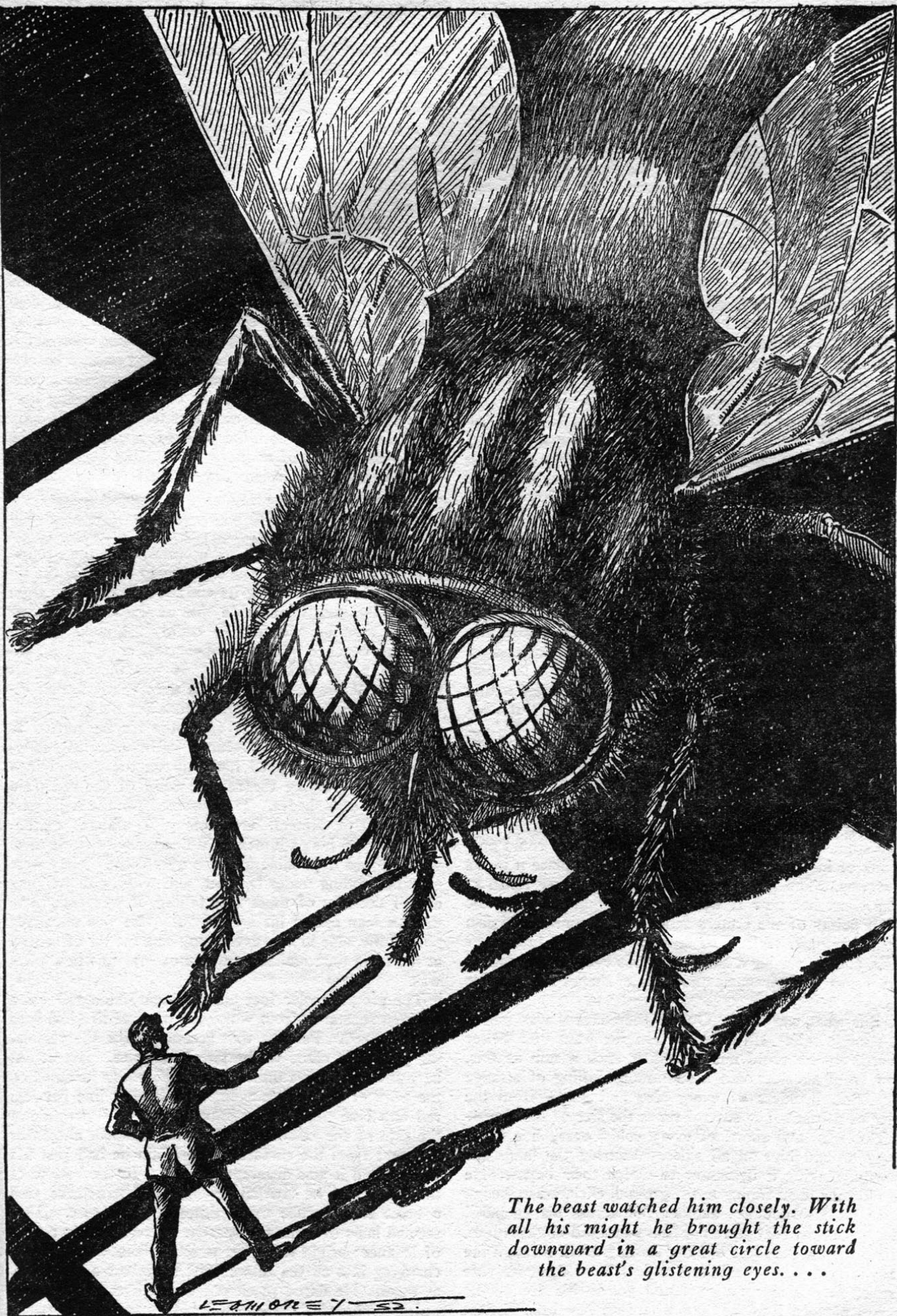
ant employ for himself and his wife. Trent liked him and often discussed his latest discoveries or failures with the ex-service man.

Today everything was finished in the laboratory except for the watering of the plants. Mike was a little late with the watering because he had taken time out to wash the flower vases and bowls. Now he came stumping into the laboratory weighted down with his watering cans, his limp just barely noticeable. It was a darkish, cloudy day in April, and on such days his leg ached a bit more than usual.

"Mary!" A crash, the gurgling splash of water on the tiles as the watering cans dropped from nerveless hands and Mike, the efficient, stood rooted to the ground just within the French window of the laboratory, staring agape at his wife settled in one of his master's chintz-covered chairs, hands folded in her lap, her head and body bathed in the golden glow of a light from a lamp over her head.

That the lamp was not an ordinary one was evident at first glance. Its shade was a bowl-shaped affair of shiny metal on a tall stand, and the golden light issuing from it seemed to have a malevolent gleam in its depths. It cut the grayness of the room like a knife.

"Mary!" Mike's second cry was a shriek, for it is not given every man to see his plump wife shrinking into a child again, which was exactly what was happening. From a big-bosomed, comfortable sort of a woman of five feet four inches tall, she had already shrunk to



The beast watched him closely. With all his might he brought the stick downward in a great circle toward the beast's glistening eyes. . . .

a woman four feet five inches when her husband first caught sight of her, and from his first to second cry, she had shrunk even more. Nor did she stir at his calls and Mike saw her eyes were closed; her breathing spasmodic.

His second cry aroused Mike from the apathy of his first fright and the next instant he was a hurtling body that crossed the intervening space between himself and his wife in an astounding shortness of time. But the lamp-cord was his undoing. It caught his bad foot and sent him crashing forward, the momentum of his body overturning his wife's chair and the lamp in one blow, cracking his head upon the tile floor with such force that he lost consciousness for several minutes.

The cataclysm that had carried the lamp and chair to the floor with Mike, had acted as a catapult upon the woman's diminishing form, flinging her across the nearest flower box. And there she hung, her head upon the box's edge, her feet dropping over the side, only, as she continued to shrink in size, it could be seen that the box would soon be large enough to contain all of her. And the spreading fan of the golden ray from the lamp still shone upon her, as it now shone upon the prone body of her husband huddled close to the flower box!

SOME minutes later, Mike raised his aching head, but that was not the only part of him that ached; every bone, every muscle ached as if he had indulged in some new sort of bodily exercise that brought every muscle in his body into play, more than he knew he possessed. A groan pushed its way up his throat, then another; he found he enjoyed groaning. For several minutes he practiced this until he found the groans cost him unnecessary effort and he desisted. Instead, he tried sitting up and was surprised to find he could do it. But what strange place was this?

All around him, for what seemed miles, was a red plain, a deep red, a plain that might have been called flat, though of exceeding roughness. He could not call them hills; they were more like rough pits, crater pits such as he had known in the war, only his mind was too stunned now to associate such ideas. He could only think of his immediate present, and try to place it in his memory. The plain seemed to have a glossy finish at one time, but now it was dulled, roughened, only the high points of the craters retained a reminiscent polish from the past. A sort of diffused gray light hung over him, and by placing a hand above his eyes and squinting, he could see strange, undefinable shapes in the far distances.

But what was this? Out of the heavens was falling a strange rain. He called it rain for want of a better word, but he could not remember such a rain as this, for from all sides was a continuous falling of strange particles, boulders of every size and shape from the size of a baseball to several times the size of his head—sticks, long and short, of every color, every hue dropping around him on all sides, obscuring the landscape partly, making it necessary to dodge their blows. He could hear them falling to the ground, click, crash, boom. One hit his shoulder, another fell across his extended legs. Luckily they were not heavy and did not hurt him, but he knew the large boulder coming down through the air toward him would hurt unless he dodged it. He rolled to one side under it and got to his feet. The mass plopped into the spot where he had been sitting, lightly, as if gravity did not matter much here. He

looked at it carefully. It was cube-shaped and had the appearance of iron. It was smooth to his touch and cold.

The air cleared a moment of the falling debris and he gazed around him. Far to his right was the dark line of a crevice in the plain, grayish in color, a ravine of shallow depth. On its opposite side lay a second plain, blue in color, a dull grayish blue. Looking to the left, he could discern a second ravine more distant than the one on his right, and beyond it lay a second plain of blue. Before him the red plain was wide and he could just make out the crack that enclosed it. But turning on his heel, he saw that less than forty yards from where he stood was a fourth crevice and a fourth blue plain. It seemed the most natural thing in the world to him that he should be standing on a red plain cut by four straight dikes with blue plains on their other sides. He tried to recall where he had seen that pattern before, but so strange seemed his awakening, he could not quite recall the past beyond the point of his awakening here on the red plain. It was an effort to try to think. He could feel a bump on the side of his head and he attributed his loss of memory to it.

With the idea of orientating himself still further, he studied the landscape beyond the four coulees. All the blue plains seemed identical, as far as he could see, but for the fourth, where he discerned in the middle distance a great thick column sloping upward from the ground at about a thirty degree angle, rising so high into the air that he was unable to see its end; it seemed to go right up into the indistinguishable blue of the heavens themselves. And beyond that he could just make out, in the hazy distance, what was apparently a high wall, but that did not interest him yet. It was the column set alone in all the vastness of this great pattern that attracted him; it was his whole future for the present.

Amid the falling things from the air he started to pick his way toward the column, half-consciously dodging the debris that piled itself up on the ground in a hotch-potch, varying the natural color of the red plain with their own shades. They seemed for the most part fragments of animal, vegetable and mineral matter. They blocked his path making it necessary to circle them where it was impossible to climb over them. They were unstable, rolling under his feet, and what with jumping out of the way of those still falling, it was enough to drive a man out of his senses, but Mike was unusually phlegmatic, able to take everything as a matter of course, at the same time realizing how unnatural this new place was.

The ground under foot did not seem like a soil, but a vitrified substance from which the original life had been decarbonized. Perhaps that accounted for the remaining gloss that clung to the pitted surfaces. But at last he was able to leave the red plain behind, as he stood on the edge of his first canyon, the dividing line between red and blue plain. Carefully he made his way down the side of the ravine which seemed sanded, altogether different from the surface of the plain he had just left behind, and it was different in color. In the bottom of the depression, he saw half a dozen odd structures, each a great round globe many times his own size. They seemed balls of some transparent matter, held in a state of balance; bright things in which light seemed at play, changing into all the colors of the rainbow as he stared at them. He dared reach out to touch the side of the nearest sphere. It was elastic; it dented at his touch. He pushed hard upon it with the full force of his hand,

and to his horror the sphere bulged outward and became a round sticky mouth that sucked him to the sphere's surface. In the next instant he found himself dragged over the surface, spun around in a miniature whirlpool! One foot and hand remained free of the stuff, but for the rest of him he was caught like a fly on a sticky paper, unable to move, unable to grasp anything by which to pull himself free.

After his first fright was over, he ceased struggling long enough to consider what this strange ball might be. He noticed that whereas the stuff was sticky, elastic, it did not seem to wet him at all; there appeared to be some sort of skin over the surface of the globe that held its contents together, protected it against contact with him, while it held him prisoner. Minutes, hours seemed to pass, and then he noticed how cold he was. It was the sphere that was cold; however, it seemed to be losing some of its original size. At the same time, it was animated with a strange interior force that lifted and stretched it with terrific power. Then the man felt himself falling. There was a violent shock, as if an explosion had taken place quite near him and he found himself on the ground. The ball had disappeared.

Without a minute's pause Mike picked himself up and ran wildly up the slope of the gulch to the blue plain regardless of the bruises he had sustained from his fall. He stopped, breathless, on its edge to look backward at the transparent spheres below. Not one was left. All were gone, exploded!

The surface of the blue plain hardly differed from that of the red plain. It also looked as if it were ossified, and there were the irregular piles of debris fallen from the sky, mounting as more came down. His crippled leg began to pain him as he pushed on and on toward the strange tilted pillar set over in one corner of the blue plain, and after what had seemed an indeterminable length of time he reached it. He was tired, weary and hungry, but there was nothing edible to be found hereabouts, nothing in this wild dreary land, nothing in the pockets of his blue working jeans. He stood gazing at the column for a while, trying to peer upward to its end. It was several times his own girth, its surface of no material he could place. It seemed fibrous, filled with hundreds of little cracks, rough, pitted. He decided the pillar must be very ancient.

It was, however, he concluded, hardly worth the bother of coming to see. He turned his back upon it and gazed off in the distance to the high precipice etched across the far sky. It seemed a great unbroken wall of a mighty mountain range, rising several thousand feet into the air, stretching further than eye could see in both directions. Mountains suggested trees, verdure, water, food perhaps. It suggested something else beside. For on his trek across the plains a single word had seemed to crop persistently into his mind. "Mary, Mary," his sluggish brain had repeated. Now something was suggesting that Mary was to be found on the mountain top, though for the life of him he could not tell where that odd thought came from, and exactly who Mary was!

He decided to start off immediately, but then he realized how tired and worn out he was. First he must sleep, must rest his weary bones, his crippled leg. He noticed suddenly that the rain of particles from the sky was less heavy on the opposite side of the leaning pillar from that which he had come. At its foot, practically no debris fell at all. He would lie there, huddled against

the pillar's foot and sleep awhile.

Mike never knew exactly what had awakened him, but suddenly he was wide awake and frightened. He felt eyes upon him; the hair on the nape of his neck was rising. He gasped when he saw the thing facing him, a great black creature with six hairy legs and two eyes that were divided and sub-divided into a thousand different parts, each part carrying a reflection of himself. And never had he seen an uglier or more gruesome face. Between the eyes the face was flat but below them it bulged out into a most fearsome mouth with heavy jaws that seemed more like tusks. In size it was as big as an elephant, while on its back was a pair of gorgeous, transparent wings, half-open now as if the thing was prepared for flight at a moment's notice. It exuded a strong penetrating odor that reminded Mike of decaying flesh, putrefaction.

How long the creature had been surveying him he did not know. A scream rose to his throat as it took a step toward him. A step backward brought Mike's back against the great leaning column. Its solidity felt good there behind him. It was safety of a sort, and he took another step backward, pressed against the pillar away from the creature. The beast, in consequence, took a step toward him, trying to outstare him with its many eyes while two long horns that Mike had not noticed before waved in front of its face. His own eyes darted this way and that in search of a weapon of some sort, and he saw a long rough stick that could serve him as a club lying close by. It meant, however, taking a step toward the elephantine animal, and in his extremity, Mike even dared this. He was surprised to see the beast take a step backward as he moved forward. Ah, the thing was cowardly.

The club was heavy, almost too heavy for Mike, but by grasping it with two hands he succeeded in lifting it above his head. The beast watched him dumbly, and Mike took the offensive. With all his might he brought the stick downward in a great circle toward the beast's glistening eyes, but when the stick landed, the thing wasn't there. He heard the hum of its wings as it took to the air, then around him grew the sound of a roar, a deep booming noise like thunder coming from its thorax. He wheeled about to see the creature dropping to the ground on the other side of him, and again he struck out with his club.

This time the club caught one of the creature's wings, tearing it across so it could never use it again. It started back from him, but changing its mind, charged upon the man. Again Mike raised his heavy club, to bring it down on the beast's clumsy head. One of the waving horn's was broken, and the jagged head of the stick cut a furrow through the left eye of the beast, half-blinding it. The roar of the beast grew louder and again it charged and again Mike struck out with his club. A hairy claw racked his back, but it did not touch the skin, merely tearing the cloth of his jeans off his shoulder. He lost count of its charges as he placed his heavy blows with precision, and each blow counted against the beast. One eye was entirely gone, the other had only half its sight, two legs were crippled, the second wing was frayed. It seemed to have lost all sense of direction when another blow tore the other horn away from the top of the beast's head. Now it no longer roared, and suddenly gave up the battle, crawling hastily away from the enraged man. But Mike, with the lust

of battle in his veins, was not through yet. Bringing the club high above his head and as far back as his arms would go, he gave a mighty heave that sent it after the retreating creature. The point entered the hard black body just between the sagging wings, carrying it to the ground. It lay where it fell, legs twitching, a low murmur issuing from its body.

It was a gruesome sight with red sticky blood oozing from its many wounds, but Mike did not have it in his heart to pity it. He stood off to survey it, wondering what it was, what was so familiar about it.

"Why! It's a fly," he said at last, and after he had spoken the words, he wondered at them. A fly? What was a fly? Why, What? Why should he recognize the creature? Why was he here? What was he doing in this oddly familiar land that after all was unfamiliar?

One after another the man put these questions to himself, but he was at a loss to answer them. His mind was in a queerly muddled state. Faint, dim memories came to him; he was always on the verge of understanding things, yet on the other hand, his mind refused him the answers, was unable to collect them properly and catalogue them for himself. He was aware of the fact that something untoward had happened to him, that this was not his natural world, that nothing around him was natural. He remembered falling asleep here on this blue plain beside the leaning column; he remembered the ravine he had left behind, but he could not remember what lay there before his awakening on the red plain.

And here was this fly incident. He seemed to recall that in the past he had killed other flies, many flies, that it was his business to kill flies. He could turn his back on it and leave it to kick away the rest of its life without compunction, but that did not explain what a fly was, why he knew it for what it was.

Shrugging his shoulders, he turned his back on the pillar, his eyes toward the mountain range dimly visible in the distance. The queer rain from the skies was less now, and rarely a boulder came within touching distance of him and he could see it falling toward him long before it reached the point where he had been. A second coulee opened to him and across it lay a second red plain like the first he had left behind. In his mind he called the plains, squares, but like the fly incident, he could not find the source of his knowledge. He was suddenly thirsty and that desire transcended every other thought.

Standing on the edge of the ravine, a shout welled to his lips, for in the bottom of the crevice was a shining river. Water! He fairly ran down the side of the ravine, but at the water's edge he came to an abrupt halt. Certainly he had never seen an odder stream of water. It had no movement, it did not appear to flow, yet it wasn't stagnant; it was clear. It just lay there in the hollow, inert, and wherever it touched the shore, its edges curled up, hollowed out rather, and it became concave. A large boulder lay in the stream a half a dozen feet from where Mike stood, and the water also seemed to repel it; it was, in fact, indented all around the boulder, forming a hollow depression around it!

Strange, strange world!

Puzzled, Mike bent down toward the water, determined to taste it, to learn if it were truly water. But no—as he bent toward it, it moved, came forward to meet him! He drew back, frightened and suddenly remembered the antics of the sphere in the bottom of the first canyon. In his mind he was able to associate the two, but he could not explain them. A sigh escaped him. Was

there no succor for him in this hard land where all natural laws seemed topsy-turvy? Just how long was he going to be able to exist without drink or food?

And how was he to bridge this unique river? Could he throw enough debris to form a bridge to cross on? Stopping, he picked up a small boulder close at hand. The river received it without a splash, but the thing did not sink immediately. It was a slow process before the water-stuff sucked it below the surface. He shook his head wearily, realizing it would take hours to fill in a causeway at that rate. Instead, he decided to walk on and discover if he could not find a bridge already prepared.

Ten minutes of walking brought him to a place where the river came to an end. Although the canyon floor was no higher, the river simply ended abruptly. He concluded it was a lake instead of a river. The climb up the other side of the ravine was difficult, for here was a heavy mass of sky-debris that impeded his progress, but at last he climbed to the surface of the second red plain. He lost all count of time as he headed for the mountain range. His body appeared to be a number of individuals all crying for attention. There was his thirst, together with hunger and the lame leg all clamouring for service. He stumbled on and on until the red plain suddenly came to an end. He was ready to stop there and lie down to die, but on lifting his head his blurred eyes showed him that this was the last ravine before he should reach the foot of the mountains. He thought he could descry something green a few hundred feet above him, on the side of the mountain. In that bit of green, he saw promise of food and maybe of drink.

Only, God! What was this thing hurrying down the ravine toward him! So might a dinosaur have appeared to primitive man. He saw a long yellowish green serpentine body, several times his own length, topped by a massive, hideously ugly head, while set along the length of the body were small upright bunches of bristles at intervals. Although the beast walked the bottom of the coulee, the bristles showed above the edge of the gulch.

Mike started back, frightened almost out of his wits, as the Thing suddenly turned toward his side of the ravine and started up the side! Its head was on the level with his own, before he could control his shaking knees, but before he could take a step backward, the beast switched from his path and passed the frightened man without a second glance his way. Mike smelt the heavy, earthy odor the beast exuded as it passed him by.

"Lord! It's a caterpillar!" he found himself ejaculating and he was recalling that caterpillars after all were harmless creatures, herbivorous. He scurried down the bank of the depression and up the other side.

On, on he trudged over the rough terrain of the plain, his head sunk between sagging shoulders, only occasionally lifting his head to see how much of the distance toward the mountain he had covered. He glanced back only once, but found he could no longer see the leaning pillar that had been his first goal. Distances were strangely deceptive in this weird land, possibly due to the quality of the light, but he was beyond questioning anything. He could only think of that patch of green, far up on the mountain side, which he could make out more plainly now, but he eyed the mountain itself in fear. It seemed a great perpendicular cliff, rising straight up to the heavens, impossible for a man to climb. The plain appeared to end abruptly at the cliff's foot, as if the mountain was not part and parcel of the land, but

had been placed there at some later period than placing of the plains, but as he drew nearer and stood at the mountain foot, he realized it was not as unscalable as it had appeared at first. The surface was fibrous and pitted with irregularities, where boulders and soil had taken footing, and he could make out a number of long crevices mounting upward. There were innumerable hand and foot holds in which he could find easy purchase. He wondered at the queer structure of the cliff itself. It was certainly different from any mountain he had ever known; at places it was soft to the touch, giving under hand or foot, breaking under him sometimes and sending flakes of tissue falling behind him.

Thirst and hunger were forgotten as he began to make his way upward, but every few feet he had to take time to rest. Then, after an indeterminate passage of time, he reached the green verdure that had beckoned to him from afar. It was a small plot of moss and lichen clinging to the mountain wall. A small, green bush, covered with red and yellow berries, had taken root in the moss. Food!

He knew it was food, for here were two bright green creatures hardly four feet in length, ugly, but harmless as they proved, feeding on the berries. They scurried away at his approach and immediately he appropriated their dinner. The berries were sweet, juicy and filling. Practically all the berries were gone before he filled his stomach. They gave him new life, they quenched his thirst. Almost regretfully he deserted them, but the mountain was calling him upward.

He was more than three-quarters of the way up the mountain, when he glanced backward. Now he saw the regular pattern of the red and blue plains he had left behind with their geometrically straight crevices, crossing and recrossing as far as eye could see. Dimly he could discern great shapes in the greater distances, but he was at a loss to name them; yet, again he felt their familiarity, felt that he had known them in his past. He felt a yearning to be back in the life he could not recall, a yearning for his own kind, for life as he had once known it.

But now he was tired, weary, too weary to go on. He needed sleep more than he needed anything else. He looked about seeking a safe spot where he might stow himself, while renewing his life's forces. A shelf a dozen feet or so above his head jutted a few feet over the cliff's edge. It offered haven. Hand over hand he pulled himself toward it head down as he picked out safe holds for hands and feet. Thus he was unaware of the creature emerging from a cave that opened upon the ledge he sought. The creature, however, saw him!

And what a creature. More than six feet high it stood, reddish brown in color, with an abnormally long body separated into three segments—head, thorax and abdomen, the thorax and abdomen being separated by an incredibly narrow waist. It was six-legged and it had a pair of multi-faceted eyes that had the power of seeing in practically every direction, but it depended more upon the finer selectivity of the pair of antennae sticking out from the head just over the eyes that waved constantly in the air. Its mouth was a most savage one, great heavy mandibles that looked as if they might bite the climbing man in two at one stroke. It stood perfectly still in the cave mouth, eyeing the unwarned climbing man. And although not a sound issued from its throat, it was suddenly joined by a fellow creature, who came likewise from the cave and now stood beside

the first peering over its shoulder at the on-coming prey.

Poor Mike! It was an unfair fight from the first. Tired and weary, he did not raise his eyes until he had climbed over the abutment. Then it was too late and though he gave a good account of himself, the pair of ants had the advantage as they rushed from two sides at once. The first ant lost one of its antenna horns in the struggle, the second lost one of its middle legs. Then Mike felt the first ant plunge its mandibles into his shoulder and as soon as the sting bit into his flesh, all fight departed. He was a prisoner.

Although the first of the two red ants was larger than its fellow, it was the second creature who picked up Mike's suddenly limp form and tossed him over its shoulder. Mike knew nothing of the journey through the dark tunnels of the Hill. It was the bump that occurred when his captor dropped him on a hard packed floor, that shook him back into consciousness. But consciousness did not bring movement in its train and Mike found his body numb, paralyzed from the bite of the insect that left only his mind awake.

After a while he could make out indefinite shapes in the darkness around him and realized that he lay on some soft decaying stuff that hurt his nostrils with its fetid odors. He felt rather than saw the comings and goings of his captors through the chamber in which he lay. Something dropped across the small of his back and lay there heavily, adding its heavy smell to the others that nauseated him. Lying there, he tried to piece together the events that had brought him here, but the poison the beasts had injected into his blood seemed to dull the edge of his brain.

He was unaware of the fact that now he was "cold storage" in the warehouse of the red ants—"preserved" against the time when he should become "provisions" in the ant vernacular (if they had such a thing). Nature has a number of tricks up her sleeve, and, lacking proper refrigerant methods as devised by Man, she nevertheless has provided her pets, the ants, with a means of their own to preserve food against the time when it is needed. This is a mild poison injected into the body of the victims, which paralyzes the nerve centers so that whereas they are still alive, they are incapable of crawling away again, and must simply await the hour of their doom.

The paralysis of his nerves had caused Mike to lose all sense of time, and he did not know how long he had lain in his quiescent state. He slept intermittently, awaking every now and then to the ugly odor of the nest and decaying life around him, but at last he believed he could feel a loosening up of his muscles. He could move a finger, then a hand, then his head. Possibly, the fact that he came of a more highly developed genus than the ordinary victim of the ants was the reason why the paralysis was deserting him. He flexed the muscles of one arm, then of the other and tried to sit up, but the weight lying across his hips held him down. It took a number of squirms to release him, but at last he was free.

Stretching his body, he took several deep breaths, only to be nauseated anew by the thick odors surrounding him. He wondered heavily how he was to get out of this noxious place. Something told him he must be away before the next returning forage came with its burden. Dimly he made out the faintly illuminated circle that was the doorway from this chamber. Cautiously he

crawled toward it, hoping to escape from his prison.

There seemed to be some sort of faint light filtering down the tunnel that opened to him, so he could see the passage walls losing themselves somewhere ahead. If only he had a weapon of some sort, he thought; but he was unarmed. Moving forward about a hundred feet in the tunnel, he heard a noise coming his way. There was a dry scratching, as of feet upon the hard packed floor, and of something being dragged along. A new odor came to his nostrils. It was an ant bringing part of a butterfly wing. Mike backed up slowly away from the approaching sound and so he stumbled and fell heavily. Something hard lay under him, and he felt for it with his hands. It was a fragment of rock that he had tripped over. He wrapped his fingers around it, hefted it and felt better because of it. A darker blot in the darkness of the tunnel told him the on-coming ant was almost abreast of where he crouched against the wall.

The thing stopped. There was an almost illusionary gleam of light where its eyes were, and he heard a slithering sound as the ant dropped its burden. Mike heaved his rock where the eye had been. He heard its scrunch against something brittle, then panic seized him. It gave momentum to his feet carrying him swiftly up the tunnel in the direction from which the ant had come. And he was in the midst of a half a dozen beasts before he knew it. Two tunnels crossed each other at this juncture, the party was herding a number of aphides (ant-cows) back to their stables, but when the creatures found a new being in their midst, the combined thought was to recapture him. This time Mike used hands and feet to full advantage. A hairy leg snapped under one hand, and it in turn became a bludgeon against his enemies. For several moments he crouched under the abdomen of an ant, and here it proved difficult for the others to reach him, until the ant itself managed to twist its body about so as to make his strategy of no avail. Fighting with flaying arms and feet he managed to reach the nearest wall. The tunnel seemed to overflow with ants, and the herd of cows increased the *mêlée*, so that the beasts became so jammed they found it impossible to move one way or the other as more and more came piling in from all directions.

It was almost a noiseless battle with only the scraping and grating of dry feet on the soil or of chiton-covered bodies rubbing against each other, and the deep, panting breath of the man fighting for life and freedom.

Mike's greatest care was to keep the mandibles of the beasts from any part of his body, to prevent a second injection of the formic acid into his system, but though mandibles snapped around him, they were poorly aimed, so closely packed were their wielders. Only those ants on the edge of the pack against the wall of the tunnel could reach the man who was creeping as close to the floor as the forest of legs would permit.

As he battled, he crept forward, an inch at a time, leaving a trail of broken legs, twisted antenna and maimed bodies behind him. His clothing hung to him in tatters, his face and hands were scratched and torn, blood flowed from a wound on one temple, getting into his eyes, and there were several long scratches on back and chest. His breath wheezed as it came through his clenched teeth, blood trickled from one distended nostril, and his blows were growing weaker. It was only a question of minutes now before the very weight of numbers would pull him down. He hardly knew what

happened when the wall crumbled behind him and he fell headlong into the narrow opening thus revealed. A pair of mandibles snapped harmlessly over his head as he fell, and there was a scraping of rough feet as the beast tried to widen the mouth of the hole into which Mike had fallen.

Hardly aware of what had saved him so providentially, the man sought to rise only to bang his head sharply against the low ceiling of the chamber in which he found himself, bringing kindly oblivion. He awakened to a new sense of motion to find he was being dragged along the low tunnel into which the crumbling wall had catapulted him, for his cave turned out to be a tunnel running at right angles to the one in which he had fought. Even now the ants were trying with feet and mandibles to widen the tunnel mouth for their bulky bodies, but the passage proved too low and narrow for them. The ant, who had been behind Mike when he fell, even now lay crushed by the numbers in the opening behind it, and the others were trying to remove it piecemeal.

For a moment the darkness here seemed blacker than in the tunnel he had just left behind, but after a few moments of concentration, Mike managed to make out the shapes of the creatures dragging him. They seemed a smaller edition of the ants he had left behind. One had him by the hair, the other had caught its mandibles in the shoulder strap of his overalls. The pain of being dragged by the hair had restored him to consciousness. With a mighty effort he managed to twist his body around so that he could put his hands upon the floor of the tunnel even though the movement caused him frightful pain, and he was ready to do battle again. But he was saved that. The first ant dropped its hold upon his hair at his first upheaval, and the other little fellow was frantically trying to tear its mandibles from the shoulder strap. It succeeded just as Mike gained his hands and feet, and he could hear the pair running hurriedly from his proximity.

Carefully Mike felt the tunnel walls about him, and learned that nowhere was the diameter of the tunnel more than two feet. It meant he would have to crawl on hands and feet its entire length, but considering the inclination of the floor, he gathered that the passage eventually rose to the surface. He guessed that he was safe from his erstwhile six-foot enemies, but it was a back-breaking task to crawl along for what seemed hours on hands and knees. Twice he came to cross-tunnels, and he grew aware of small creatures scurrying away from his lumbering approach. Only their ant-like appearance gave him clue to what his rescuers were, but he knew too little of ant-life to guess at how the tiny robber-ant constructs its nest to dovetail with that of the large red ant. Like the mice preying on a human household, these tiny foragers made their excursions into the storerooms and granaries of their unwilling hosts, fleeing to their narrow tunnels where the larger ants could not follow when their thieving proclivities were discovered.

As he continued upward, Mike noticed the tunnel growing brighter as light filtered in from some source far ahead. Then he thought he descried a pin-point of gray light, and it gave him new life. The pin-point of light grew steadily larger and at last he reached an opening. A guardsman ant stood in the entrance, but it scurried away at his approach, and he was free to step into the green world of the mountain top. The robber

tunnel had led him directly up to the plateau of the mountain-range!

Before him lay a wide land beyond which he could see a mighty forest of every sort of tree and plant imaginable bedecked with flowers and swept by sweet fresh clean breezes. Paradise after Hell!

Cautiously he crawled forth, peering on every side for lurking enemies. His first thought was a weapon. A round dry stick lay close to the tunnel opening and this he quickly appropriated. A small, round stone that fitted to his hand tempted him next, and he dropped it into his pocket for safe-keeping. He saw that here again the air was filled with falling rocks, fibrous woody sticks of *débris*, blocks of solid metal. The forest offered protection from the attack from the skies, but it was a long way off. Still there was no reason to linger here, and he feared that the nest of the red ants might have their exit somewhere near.

The way across the barren-lands, as he named the space lying between him and the forest, was exceedingly difficult. The ground was spongy under foot, and the landscape almost mountainous. He had to pick his way carefully, usually following an arroyo that seemed the remains of a dry water-course, using every out-jutting promontory as a protection from the raining skies.

He was hungry, thirsty and weak from his past experiences and loss of blood. At times, everything went black before his eyes, he grew dizzy and went reeling and stumbling along, not caring what should happen. Then when he thought he could not take another step, when his tongue felt like flannel-cloth in his mouth, he came upon a bed of moss in which grew a bush covered with red and yellow berries like those he had found on the mountain side. Again he feasted ravenously and thought of lying down for some sleep, but twice when he sought rest he had been attacked by the horrible beasts of this terrible world, and besides there was no cover from the skies, and he had to go on, on to the trees.

Climbing to the top of a tor, or small hill that stood higher than the surrounding country to take his bearings, he was suddenly elated by the sight of a monstrous statue set alone in all this wilderness. It reminded him of the leaning pillar that had interested him back on the plains. There was no path leading to it, but he felt that, if he could reach it, many things would be explained.

The statue represented an ugly, foreign, yellow face with squinty almond-shaped eyes. Its garments were strange, foreign looking, and there was something familiar about it. He tried to remember where he had seen a like statue. A vague glimmering of the truth assaulted his brain, but again he was unable to trace out its meaning; his mind seemed to refuse to function past a certain point. The statue, however, was a sign, a sign that there must be creatures somewhere around who had built it. He climbed to the pedestal and gazed in all directions, and thus he caught a gleam of water in the distance, and a great high bridge crossing it! Now far beyond the water, lay the outpost of the forest.

He started to run toward the lake, but his muscles rebelled, so he was forced to take it at a walk that was hardly more than a crawl, as he was creeping painfully around the obstructions that filled his path, sometimes losing his direction, continually dodging the *débris* from the skies. Then he came to the lake.

Chagrined, he stared with popping eyes. It wasn't a lake after all, but a hard clear surface that reflected his image. He gazed at himself in disappointment. What

a sight he was. An inch long stubble covered his face, his hair was a sweaty mass caked with dried blood, dirt streaked his face and hands where they were not scratched and bruised, his jeans were in tatters, hanging to him by threads. His face was thin, haggard.

Getting to his feet, he stared at the bridge crossing the mirror lake. He sneered. What sort of people were they who built a bridge over a surface of such a type. He disdained to use the bridge and stepped upon the imitation lake instead. It was not so smooth as it appeared at first glance; it was bumpy with irregularities in its surface, bubbles showed just under the skin, and it was difficult to walk upon, like ice. But anything was better than the surrounding country, and he wanted to reach the trees. Sky *débris* fell upon the mirror as on everything else, adding to his difficulties; pebbles rolled under his feet as he walked.

The mirror-lake did not reach to the edge of the woods, and carefully he began picking his way anew over the rough, uneven ground. There it was he heard the first call.

"Help, Help. For God's sake, someone, save me. Mike! Mike!"

A voice, a living voice! And wonders and wonders he knew the voice. It was calling him. "Mike, Mike, save me!"

"Mary, I'm coming, I'm coming!" He was surprised to hear his own voice answer.

It came from the middle of the trees ahead. Mary needed him. He did not stop to question who Mary was. He knew. Mary was part of him; Mary was his, and she needed him.

He was running now between hillocks, unconsciously dodging the falling fragments from the sky. Everything was forgotten. His weariness was of the past; he forgot his lame foot. He reached the trees, great, thick-stalked trees many times his own girth, that had queer, straight branches out of which grew giant leaves many yards across. Then there were strange blade-like growths rising straight from the ground to unguessed heights. Gargantuan flowers topped the strange trees, and filled him again with a sense of his own puniness, but this was not the time to consider such things.

"MIKE, Oh Mike, will you never come?"

"I'm coming, I'M COMING!"

Here the trees were at well spaced intervals, but as he hurried on toward the voice, he found himself plunging into a wild tangle of rank undergrowth—the like of which he had never seen. Saw-toothed grasses, taller than his own head, brambles, spine-covered vines tore at him, held him back, and every step he took was a fight in itself. He had only made a few feet of progress toward the moaning voice, when a great shadow swept over him and the air was filled with a roaring thunder of sound.

He ducked to the left without looking, into a thicket of brambles that cut him cruelly, but the brambles were better than the death swooping upon him in the shape of a long, snake-shaped body upheld by twin pairs of wide transparent wings, iridescent wings, each yards across. He cowered among the thick, fleshy leaves of the bramble-bush, realizing he was safe from the monstrous flying thing. It seemed ages before the dragon-fly gave up hope of an easy meal and departed with an ear-crushing whoosh of its lovely wings.

Mike did not climb from the brambles for several minutes after the fly was gone, then he painfully ex-

tracted himself from the thorns, leaving a good part of what remained of his clothing adhering to the vicious spikes. Again he heard the beckoning, terrified voice calling. And he renewed his efforts to push through the clinging jungle.

Then he saw her. She was almost in his path, and at first glance he thought she was merely standing there, looking at him, but the second glance showed her a prisoner, a strange, shapeless bundle, hanging in a cocoon within a foot or so of the ground, wrapped around with thick heavy cords, as thick as his thumb. There were other ropes, dirty white ropes caught to the leaves and branches of two great trees, and he traced them upward to a spot high above him, where they seemed joined in a hub with innumerable other ropes coming from all directions. On one of the ropes, high above the hub, was the round, black, eight-legged figure of the owner of the web. He knew it for a spider immediately and realized that Mary was the spider's prisoner.

She saw him as soon as he saw her, and tears sprang into her eyes. "Mike, where have you been? Come, get me out of here before that devil from hell comes this way. I . . . I . . ." she began to sob pitifully, uncontrollably.

The man's heart was full at the sight of her. He wanted to take her in his arms, to soothe her fears, but first she must be freed. He came to her side and grasped one of the ropes to try its strength, only to find it horribly sticky so his hand adhered to it. It took real effort to pull the hand away. If only he had a knife! But in lieu of that, he looked for a sharpened stick. The ropes he found were quite elastic, their real strength lying in their sticky covering.

"He's coming, he's coming. Quick, Mike, he will stab me again!"*

He looked up to see the spider hurrying down a rope towards them. It had felt the shaking of the rope and was coming to investigate. Mike remembered the stone in his pocket and let it fly at the oncoming arachnid. The missile seemed to stun the creature for a moment, but again it came on. Mike espied a long pole lying in a tangle of brambles. He could use it as a spear to keep the spider away from Mary at least. Mary was moaning, then suddenly she was filling the air with one prolonged shriek after another.

PROFESSOR DUNCAN TRENT ushered his eminent friend and guest, Dr. Yowell Morely, entomologist, into his pleasant laboratory after the long drive from the station. Dr. Morely had hurried from New York to see his friend on receiving a note, requesting his presence there in regard to a new ray Trent had just discovered. They came into the bright room laughing and talking, wholly unprepared for the sight to meet their eyes.

"My T-Ray Lamp!" It was Trent who cried out as he pointed a shaking finger at the spot where his latest invention lay on the floor beside a fallen chair. His friend was forgotten as he rushed to pick up the lamp, examining it to see if it were damaged.

"Someone's been using it," he ejaculated; "the bulb is still warm, though it has burnt out. They were here less than ten minutes ago, for the ray burns out the filament in that time. Oh, the vandals, the . . . oh Mike, MIKE! MIKE!" And calling the name of his man-of-all-work, the professor ran out of the laboratory. Morely

could hear his voice resound throughout the house. Then it came from the garden.

The doctor left to his own devices, shrugged his shoulders, smiling a little to himself. He bent over and picked up the fallen chair that lay against one of the window flower-boxes. He dropped into the chair and sat there, his eyes ranging over the flower-boxes so artfully arranged. Pains had been taken to make the box appear like a Japanese garden with little men and women, pretty bridges and what not set about among the plants. With the aid of a small mirror a lake had been formed. A dragon fly hovered over some blossoms and there was the open door of an ant-hill to be contemplated by the entomologist. An ugly little weed caught his eye, and reaching down, he removed it. Then there was something else that drew his wandering attention.

He saw a tiny, newly constructed spider's web stretching across two small ferns, amid a tangle of some more weeds that had been neglected. He could make out the agitation of the web's tiny owner, and, because his vocation was also his hobby, he drew out his magnifying glass to see what troubled the tiny home-maker. He brought it close to the scene, taking place there among the weeds, and a whistling exclamation escaped his lips.

At that moment Professor Trent reentered the room half-talking to himself. "Can't find that confounded fellow anywhere, or his wife either. Well, of all the blankety-blank . . ." Coming in through the French window he had not noticed where he was going and the air was suddenly blue, as the man of science shook water out of his shoes. He had stepped on the edge of one of the fallen water cans, tipping the remaining water over his feet.

"Dunc, old man, come here. You had better identify these . . ."

Trent recognized the excitement in his friend's voice and the next instant was peering with unbounded wonder at the spectacular drama taking place under the lense of the magnifying glass. He saw an incredibly tiny man battling what to him must have seemed a monstrous spider, while in a cocoon in the spider's web hung an hysterical woman.

"Good Lord! Mike and Mary. The ray! A complete success! But whatever possessed Mike to . . ."

Morely interrupted as he drew forth a pair of pincers from an inner pocket. "No matter why they're there, we've got to rescue them. He'd never kill that spider with that straw!" As he spoke, he picked the spider from the nest with his pincers and crushed it. "A piece of paper, please," he added to Trent as carefully now he drew the threads of the spider silk away from around the woman. A few moments later, he was placing the frightened, almost microscopic woman on the broad expanse of white paper Trent had brought. The man was placed beside the woman and under the magnifying glass, the two saw the tiny man take the woman's fainting form into his arms.

Carefully transferring the paper to a table-top nearby, the doctor looked at Trent with twinkling eyes. "Indubitably, my friend, your new rays are a success, but have you the means of returning these unusual specimens of *homo sapiens* to their original size?"

"That will be simple. You see, I perfected the s-ray, or enlarging ray, before I ever thought about this reducing ray at all. In fact, the t-ray is simply a by-product of the s-ray I have already mentioned to you. But what

*Spiders like the ants anaesthetize their victims against the time when they need them for food.

I can't understand, is what led Mike to do such a thing. He's a steady sort of a fellow. Never did a prank like this before in his life."

Morely inclined his head toward the spilled watering cans. "I'd hardly attribute this 'prank', as you call it to the man. According to the position of the ray-lamp and the chair and that can over there, I should suppose the man was in the act of rescuing his wife when he fell, carrying everything to the floor with him. You see . . ."

"By George, you're right. But Mary is supposed never to come in here. She has none of the intelligence of Mike, and I don't like her fussing around in my laboratory."

"Has she a touch of rheumatism or something of the sort?"

"Why, perhaps. I've never inquired," said Trent stiffly, not seeing where this questioning was leading to.

"But haven't you noticed, my friend, that you have mounted the t-ray apparatus in a lamp shade similar to those sold on the market for dispensing the beneficial ultra-violet ray? If I'm not mistaken, there's its mate in the corner!"

"By George, that is a sun-ray lamp over there. I used it on some cultures with which I wanted to prove my experiment to you . . ."

"Um, and your Mary must have gotten them mixed."

"You're right. I see it all now. Here, help me rig up this s-ray paraphernalia. Better put them on the floor, hadn't we?" As the pair discoursed, Trent had been putting together an odd-looking machine with which he intended to "bring back" Mary and Mike.

IT was a matter of minutes before the now unconscious man and woman were almost back to their original size. Morely watched them grow with a scientific eye, exclaiming at their rapid return to normalcy, noticing that as they grew larger their bodily growth seemed to slow down correspondingly.

"There," exclaimed Trent, "that seems to be about right. I think that is Mike's normal size. Don't want to make a giant of him," and he turned off the red ray of the apparatus from the pair.

Morely sucked in his breath. "Your man looks like very much of a tramp, Dunc. I think he might shave occasionally. And what a slattern his wife is." The pair still under the coma induced by the ray, could not hear his biting slander.

"What's that? Why, they are a sight, aren't they? But Mike was clean-shaven this morning, and I've never before seen Mary with a hair out of place, let alone a soiled apron. By George, of course. Let me see. You remember I said the bulb of the t-ray was still warm when I picked it up. That means that they were under the influence of the ray not ten minutes before we appeared on the scene, but think of it, Yo, those two had endured all sorts of hardships in that few minutes. What seems minutes to us must have been days, if not weeks, to them in their reduced state, for naturally with the reduction of size, came the speeding up of heart-beats and of bodily actions. That accounts for Mike's unshaven appearance. And look, how tired and haggard he looks. I bet he's lost some weight, too."

"Quiet, Mike's coming out of it." That was Morely.

A deep groan came from the man on the floor. He winked his eyes against the light, closing them quickly again as if it made him dizzy. But he opened them directly, and tried to sit up. Trent said not a word as he

permitted the man to get his bearings. Now the woman was moaning, making mumbling sounds under her breath.

Morely helped Mike to sit up, feeling his pulse as he did so. The man became aware of those administering to him, tried to get to his feet. "Take your time, Mike, it's all right," put in Trent.

It was some time before the pair were fully cognizant of their surroundings, however. Trent and Morely had gotten Mary to a couch against a far wall, and left her there to recover by herself; then they were helping Mike to orientate himself once more. But gradually it was coming back to him. He wanted to speak, and, after the men had insisted upon him seating himself in the chair Morely had quitted earlier, he began to talk, first in disjointed sentences, then more rationally, and they heard his story as he relived his experiences of the past ten minutes or so.

In the middle of the telling he suddenly drew in his breath sharply. "The spider—you saved Mary and me from, sir?" That part seemed vague to him.

"We'll tell you about that later," observed Trent. "Tell us all you remember from the beginning while it's still alive in your mind. Do you recall everything?"

"Everything, sir. It's all clear now. Now I understand all I could not comprehend . . . down there . . ."

"You know what happened to you? How it happened?"

"Why yes, sir. It was Mary, begging your pardon for her, sir. She's had a touch of neuritis, though I told her she wasn't to use your sun-ray light for it. Well, I was late in watering the flowers, and I came in to see her sitting under your new-ray lamp, shrinking . . ."

"Yes, what did you do when you saw her under the ray?"

"I knew immediately that she had switched lamps, sir. I dropped my cans and made a dash for her, only I must have tripped and the next thing I knew I was sitting in the middle of a red plain . . ."

"A red plain?" The professor stared at the floor, his face bright. "You mean one of those tiles there?"

"Yes, sir, I was in the middle of one of those red tiles and it looked like a vast plain, all rough and hilly and when I stood up, a could see the blue plains beyond the cracks. Then I saw a great leaning pillar. Good Heavens, sir, that must have been a leg of this very chair in which I'm sitting," and he went on to describe the appearance of the "pillar."

From this point Mike told the whole story, his discovery of the transparent spheres in the first coulee, his fight with the fly, the strange stream of water, the appearance of the caterpillar, *et cetera*. The others heard him through to the end, and now Mike insisted on rising and placing the chair as it was when Morely found it. They located the exact spot where the chair leg had stood, when the body of the dead fly was found unmolested where it had fallen, and there was still a tiny trickle of water in the "canyon" where he had found his "lake."

"That's one of the things I could not understand, sir, the queer action of the water. I seemed to know it was water, and yet it acted so strangely . . ." and he explained about the surface skin of the sphere and the "river."

Trent explained to him the law of capillary attraction, together with the law of expansive forces. The body of water, which Mike discovered in the cement between the

tiles, lay on an absorbent substance, therefore, the edges had appeared conclave, although had it been an non-absorbent substance, it would have appeared just the opposite. The surface tension of the "skin" was due to the molecular forces in liquids, that tend to bring about cohesion of all parts.

"And those spheres that grabbed me up and then exploded?"

"Water droplets, nothing less. You'd just finished mopping the floor, you know, and those droplets had not yet evaporated. When they did evaporate into vapor, the expansion force produced your 'terrific explosion.'"

"Then, there were those falling particles in the air. At first they were troublesome, but beyond the chair-leg, the fall was lessened, until I reached the top of the mount—er flower-box."

"They were dust-motes, Mike. You can appreciate the fact that our air is filled with dust particles. We see them more readily when falling through a beam of sunlight, but we know they are falling continually because of the manner in which they collect on surface, our bodies, furniture, *et cetera*. Under the microscope, these dust motes appear to consist of organic, mineral and metallic particles. That you did not find so many beyond your 'pillar', was because you were under the chair seat, which partially protected you!"

Continuing to trace his pilgrimage across the tiles, Mike found the spot where he had begun to mount the side of the flower-box, which he had taken for a mountain-cliff. By using the magnifying glass, they could find the cracks and crevices that had been his footholds, the bit of lichen, that had taken root in the moss where he had dined on microscopic berries. Morely plucked the tiny plant and put it away carefully for later analyses. Next, they found Mike's ledge and the ant-hill entrance. They even saw an ant on duty at the entrance. Neither man spoke when Mike put out his finger and squashed the little beast. It was revenge!

He laughed when he saw the wilderness through which he had wandered. The statue was one of the Japanese statesmen he himself had put in place. And the mirror caused him to chuckle. How it had fooled him! And what idiots he had thought the giants were, who had placed a bridge over the imitation lake! And his trees were the small plants he had set out. Had he but cleared away those tiny weeds yesterday, he would not have had such a struggle through the morass to get to Mary. Shreds of the spider web were found scarcely two inches from Mirror Lake. How far it had been to the poor, flea-high man that he had been!

Morely was most interested in the events in the ant-hill. He told Mike what the tiny creatures were to whom he owed his life. It was Trent, however, who brought up a point in Mike's story that seemed most puzzling. "It seems strange, Mike," he observed, "that you appeared to have no cognizance of the fact that you had been so reduced in size. You speak of your adventures as if you imagined you had been transplanted to some strange land with only the hazard, unreal remembrances of your true life. Surely that crack on your head wasn't enough to . . ."

"Wait, Dunc, I think I could explain that better," put in Morely. "It's this way. 'By rather elaborate algebraic calculations, Cuvier and Eugène Dubois, the learned physiologist, celebrated for discovering the Pithecanthropus of Java, when he was in the Colonial service there, afterwards Professor in the University of Am-

sterdam, have established the fact that the specific brain-weight of a species of animal cannot fall below a certain proportion in relation to the weight of the body, if the normal intelligence of the species is to be maintained! Among the monkeys, which are the most intelligent group of anthropoid mammals, the individual cannot be smaller than an ouistiti, which has a brain one twenty-fourth the weight of his total body-weight of ten and one-half ounces. Imagine this monkey one-third the size and you find that he will need a brain one-sixteenth of his body to enjoy the same degree of intelligence. On the other hand, less intelligent animals, like certain insectivora, have a weight of barely one-tenth of an ounce and a brain one-fortieth their weight, which is sufficient for their slight mental activity. By the same calculation, it is shown that a man to possess average intelligence, can not weigh less than thirty-three and a half pounds.'"

"Now in Mike's case, his reduction in size meant a relative loss of brain-activity, thereby giving him just enough intelligence to safeguard him in the new world he found himself in, and of consequence memory and constructive, rational thinking were practically beyond him. He could name things he saw, because they were so thoroughly impressed upon his brain, but when he tried to use his thinking processes, they simply rebelled. He was more animal than man, unable to hold to abstract thought-process long enough to comprehend things clearly. He was motivated to climb the 'mountain' because reason told him there he would find food, water and shelter. He was, however, enough man to hold to his original purpose once it developed in his dulled brain. There was also the sub-conscious desire for his own kind; as he has already told you, this thought reoccurred at intervals. That was the reason he could not visualize Mary or remember her clearly until he actually came into physical contact with her."

"Ah, but Mary remembered Mike. She called him!"

"Mary recalled Mike's name because he was the only protector she knew, and she used his name as a child, frightened in the dark or hurt accidentally, voices a call for its mother, its protector."

There was more said before the two scientists realized that Mike was in no condition to sit talking. His cuts and bruises needed immediate attention. Then Mary awoke from a nap she had taken, herself once more, puzzled by her untidy appearance. The men came to her side and when she saw her husband's condition, her face went white. "Then . . . it really happened! I didn't dream about the jungle and—the spider?"

Piecemeal they got her story out of her, how she had awakened in a topsy-turvy world where sticks and boulders larger than her head fell instead of rain. She had not moved from the spot where she first found herself for some time, too frightened to move, she was. Then hunger drove her searching for food. She found some berries to eat, but she was disturbed by a fly. The fly paid her no heed but she went running wildly over a ragged country, dodging through the dust motes, stumbling over every irregularity of the soil, a grain was hill-high to her then. She had come to "Mike's lake," but she climbed the bridge and found a large building (a tiny summerhouse on top of the miniature bridge) which she took for some sort of a temple. There was already an inhabitant there, a green aphid, and she fled, running

*Quoted from fourth chapter of UNSUSPECTED MARVELS OF THE UNIVERSE TO BE UNFOLDED IF OUR EYES, NOSE AND BRAIN WERE IMPROVED by Professor Rene Thevenin appearing in the Sunday American Weekly, December 22, 1929.

and tumbling down the bridge. She had gone on to the jungle Mike had found, only she discovered a way where the weeds were not so thick and then she had stumbled into the spider's web. The spider anaesthetized her with its sting and, when she came to, she was wrapped around and around by the heavy cords of spider-silk. She had called for help from the only source she knew, Mike, and when she thought she could not keep up her courage any longer, he came to her. She had shrieked when she saw Doctor Morley's pincers descending upon her from the heavens.

She admitted this had not been the first time she had used the professor's "sun-lamp" for her neuritis. Mike had mentioned the professor's new ray, but he had failed to say it was operated as the sun-ray was operated. She was duly contrite over her offense and began to assure Trent she would never make use of his laboratory again, but the professor waived aside her apologies.

"You've done me a greater favor than you know,

Mary. I would never have dared use a human being under the ray. I knew how it would react upon organic matter, and I was content to experiment with mice, *et cetera*. You've done science a great turn today at the expense of your own nerves, and I shall see that you get a sun-ray lamp for your own use."

That was not all that Professor Trent did for Mike and Mary. He put a substantial sum of money in the bank in their name, and sent the pair on what he called a second honeymoon to Niagara. The results of the ten-minute sojourn in microscopia was written up in scientific journals and was consequently pounced upon by a tabloid editor, who played with the story for several weeks to the great enjoyment of the public, so that for a long while after Mike was known as the Man-who-Fought-a-Fly. Mike, however, went on as if nothing had happened, though the affair left its mark upon him. In the first place, he discovered that he was an inch taller than his normal height, and he had what amounted to a fanatical antipathy toward flies, ants and dragon-flies!

THE END

Upward

I.

Buried in dust of ages,
Lost in Ocean's slime,
Gone are the cities of ages old,
Echoes in halls of time.

II.

Born on a world still warm from birth,
Man has struggled up,
Meeting defeats at every turn,
From the giants of the earth.

III.

Cankers in brain of mankind,
Greed and fear and lust,
Driving him on to higher things,
Knowing that die, he must.

IV.

When the world of now has rotted to naught,
The builders at work again;
Man will have made an upward step,
Which his forefathers' lives have bought.

—DONALD HINSON.



"Like to see a demonstration?" interrupted the Professor. "Well, here it is, arranged especially for you and for a court and jury if necessary. . . ."

IN this short story our new author gives us some extremely interesting variations on tales of radiation of electric heat waves and radio control, which provide unusual side-lights on the dangers of far-reaching inventions.

Infra-Calorescence

By R. I. Melhorn

Illustrated by B. BAMONT

KEMPTON had just witnessed the largest and most spectacular fire of its history. Some twenty years ago, the Keystone Mill had been the largest planing-mill and wood-working establishment in the Susquehanna valley. Now the red demon of destruction had come along and, in a few hours, had reduced it, from a huge two-story frame building covering a whole city block, to a vacant square, littered with charcoal, brick and other débris. For the last six years it had been abandoned and all its machinery and equipment had been removed. The land that it occupied was of low realty value, and this, along with its huge size and dilapidated condition, made it a white elephant in the hands of its late owner, Colonel Jackson. When the Colonel died two years ago, he left this property, along with another, smaller, abandoned factory, to his son, Horace Jackson, Jr. After his father's death, young Jackson made a number of unsuccessful attempts to sell these properties, and then had left town, and nobody had heard anything of him since.

Then, one night, the Keystone Mill had burned in a most spectacular way. A patrolman, going his rounds, had discovered a small blaze down in one corner of the first floor. By the time he had rushed around the corner to an alarm box and back again, the whole first floor on one side was burning in a number of places. A few minutes later, when the apparatus arrived, almost half the building was in flames. With such a start, there was no chance of saving the place, and most of the efforts of the Fire Department were directed towards soaking nearby houses to protect them from flying sparks and brands. Of course, in such a weather-beaten and dilapidated structure, a fire would spread only too quickly, but in this case it spread so fast that it seemed to fairly jump along! As patrolman McGuirk later remarked to the chief: "Why, you'd see part of the old place where there wasn't any fire or sparks at all, mebbe forty or fifty feet from the nearest place that was blazin' . . . look back there a few seconds later and you'd see enough flames to swear there had been fire there for five minutes!"

Hardly before the ruins were cold, an investigation was in progress. Chief Anderson of the Fire Department and Elliot, Captain of Detectives, had secured the services of two deputies from the State Fire Marshal's office at Harrisburg. The two insurance companies also sent a number of investigators to learn as much as they could about the whole business.

They took up the problem from all sides, and carried the investigation as far as they could, but no tangible evidence as to the cause of the fire, was forthcoming. About all they had succeeded in doing was to convince

themselves that it was a case of arson. But, as to how it was done, they had not the faintest idea.

Suspicion, of course, pointed at once to Young Jackson. But practically nothing was known about him or his whereabouts. Rumor had it that he was engaged in some post-graduate work in a western university at the time of his father's death. Somehow, the family fortune had diminished and when the Colonel's will was read, it was found that little remained besides the old Keystone Mill and a smaller abandoned factory up on Wyoming Street. Young Jackson, a tall, lanky and clean shaven individual, had immediately sold the family mansion and then tried to dispose of the two factory properties. In this he was unsuccessful and a short time later he left town. Where his income came from, what he did or where he was, nobody knew.

The ruins of the mill had been thoroughly and repeatedly searched for any clues or evidence, but nothing of a peculiar or suspicious nature was found, except a number of what appeared to be small glass marbles of a grayish-blue color. These seemed harmless enough and surely didn't look like the parts of any "infernal machine." But the fact of their being found in such a place, at such a time, gave rise to some conjecture among the investigators. Finally, out of curiosity, more than anything else, a few of these were sent to Harrisburg for analysis. They were found to be composed of crystalline quartz, with a slight percentage of carbon impurities, to have a very high melting point and, in short, they were incapable of any incendiary purposes.

By this time the investigation had reached an *impasse*. The men from the insurance companies gave up the hope of getting any evidence and left town to locate young Jackson, who, from what information was available, seemed to be traveling somewhere in the south. The two deputies from Harrisburg also gave up the case for the time being, and left for parts unknown.

NOW, one Saturday morning, about three weeks after the fire, Captain Anderson and Chief Elliot were in the Captain's office, going over the case again.

"But, Chief," said Captain Anderson, thoughtfully chewing an unlighted cigar, "the insurance was all in young Jackson's name, so he's the only one to gain by it. He's supposed to be out of town, but what's to stop him from sneakin' back here and firin' the place? Then, when everything's quieted down, he'll come back to collect his money."

"Mebbe so," grunted Chief Elliot, "but how you gonna prove it? Nobody saw him around . . . even the insurance people haven't found him yet, and, you can bet that, if he did do it, he'll have a mighty good story cooked up by the time they find him. What's more;

what evidence have you? So far, you have nothing but suspicions!"

"Well, . . . we still have those funny little blue marbles, or whatever they are," mused the Captain.

"Bunk! Why it's ridiculous to think that those quartz balls could burn down a building! Even if they did have something to do with it, how're you gonna prove that young Jackson, or anyone else, for that matter, was the . . . ?"

"Yeah, I know," interrupted the Captain, "but just the same, I'd like to know more about those little blue pills. . . . By the way, remember Professor Clark . . . physics teacher up at the High School? I've mentioned him to you before. He's the fellow who helped me out on that dope case last year. Just a young fellow, but believe me, that fellow sure knows his science. Besides, he's no dub at practical, commonsense reasoning. Seems to get a huge kick out of playing the amateur detective now and then. Anyhow, I thought I'd see if he couldn't help us out, so I gave him a ring and told him to come around here this morning as I had another little problem for him to exercise his cranium on. . . . He ought to be here any minute now."

"Humph!" grunted Chief Elliot, "lotta good that'll do. But I suppose we can let him have a few of those little balls to play with . . ."

"Come in!" barked the Captain as a knock sounded on the door. "'Morning Clark!" he addressed the sophisticated-looking young man who had just entered the office. The captain introduced Chief Elliot to the Professor, sat down, and then began:

"Well, Professor, you've probably read the accounts in the local papers about the fire at the Keystone Mill a month or so ago?"

"Yeah," drawled Professor Clark. "Saw the thing from beginning to end. I happened to be in the neighborhood when the alarm struck, so I dashed over. Acted mighty funny, didn't it?"

"That's just it," replied the Captain. "Now to make a long story short, we're almost sure it was a case of arson, but we have no clue or evidence as to how it was done . . . except, maybe these:" he said, as he reached across the desk and handed the professor a cigar box full of the small quartz spheres. We sent some of these to Harrisburg for analysis and they were found to be composed of crystalline quartz with a trace of carbon impurities. Of course, we don't know that they had anything to do with the fire. All we got is the suspicion that naturally arises from finding such things in such a place. What we want you to do, is to take these things along with you and find out if there is any possible way in which they could be used for incendiary purposes; and if so, how."

"Rather a stiff order, eh?" mused Professor Clark, as he closed the cigar box. "By the way, young Horace Jackson owned the place, didn't he?"

"Uh-huh," replied the Captain.

"Hasn't been in town lately, has he?"

"Not to our knowledge. Insurance people haven't even found him yet."

"So-o-o!" drawled the Professor. "You know, I wouldn't be a bit surprised if these little spheres should turn out to be the clue you're looking for, Captain. But I quite realize that you want concrete facts. There's a great gulf fixed between ye humble clue and the evidence that convinceth the jury," he grinned. "Anyhow, I'll let you know as soon as I get any results," he said as

he took up his hat and his box of marbles, and departed.

DURING the next few days Captain Anderson often wondered if there really was anything in the fantastic idea that those little spheres could have had anything to do with the fire at the Keystone Mill. He had seen or heard nothing of the Professor. Of course, it was quite evident that the solution of this mystery would take time, so. . . . Well, the Professor had assured him that as soon as he got some concrete evidence, he would let him know. But as the days went by and still nothing was heard from the Professor, the matter slipped from his mind in the daily and nightly business of manipulating the long arm of the law.

But one morning, on his way to the office, he saw and talked to Chief Elliot of the Fire Department for a moment. The Chief was all steamed up about an accident that had happened the day before. It seemed that two of his pumpers had side-swiped each other up at Norcross Street and 6th Avenue while answering a false alarm. They were dented up rather well and would be out of service for two or three days.

As the captain sat down at his desk and reached for a bunch of reports, someone opened the door and entered:

"Good morning, Captain!"

"So it's you, Professor," said Captain Elliot as he turned to greet the intruder. "Thought it was one of my men who got here too early! Sit down and let's hear about it. I suppose you came about our little mystery of the quartz balls?"

"Yes," replied the Professor nonchalantly helping himself to one of the Captain's cigars.

"Did you learn anything from them, Prof?"

"Did you," asked the Professor, disregarding the Chief's question, "know that Horace Jackson owns any more property here in town?"

"Why, yes," replied the Captain in a puzzled tone. "He owns a small factory up on Wyoming Street next to the P. R. R. freight yards. They used to make novelty leather goods there. But it's been shut down since the Colonel's death . . ."

"Yes, I know," interrupted the Professor, "but, is it insured, and if so, how heavily?"

"Huh?" demanded the Captain. For a moment he stared at the Professor, who was placidly smoking the cigar and gazing at the ceiling. Then he got up from his swivel chair and started towards a huge metal filing case on the other side of the room. In a moment he was back at his desk again with a bunch of papers.

"There are two fire insurance policies on the place," he remarked, glancing over one of the pages. "Both are in five figures."

"For a moment, the Professor continued to smoke and gaze at the ceiling. Presently he asked in a desultory tone, "By the way, Captain, did you hear about the accident up at Norcross Street and 6th Avenue, yesterday?"

"Uh-huh," grunted the Captain, "but let's stick to . . . Say! whatin'll you drivin' at?" he demanded.

"Well, use your imagination," replied Professor Clark, now suddenly alert and business like, as he rapidly continued: "Now, I'll lay a wager, that if there's any more arson around here soon, it's going to be tonight or tomorrow night. Believe me, the person who engineered that job at the Keystone Mill is clever—damnably clever! It was arson, all right, as you suspected. I

know that now and can prove how it was done before any court. Also, I'm morally certain who did it, but if we can catch this person red-handed, so to speak, it will save a lot of time and miles of legal red tape. This person made a mighty smooth job of it the last time, and he knows it. It worked so well that he'll probably try it again, if he gets a good chance. And now, with those two pieces of fire apparatus out of commission for another forty-eight hours or so, it would seem that fate is playing right into his hands. If he is the clever plotter I think he is, he won't pass up this opportunity!"

"Then the idea is to keep some of my men in, and around the place up on Wyoming Street for the next few days?" asked the Captain as Professor Clark paused to relight his cigar.

"No! They wouldn't find a thing or see a soul. The only good they'd do would be to turn in the alarm, once the fire did start," replied Clark.

"But how is . . . ?"

"What I want you to do," interrupted the Professor, "is to get me an ordinary closed delivery truck. You can beg or borrow one some place in town, if necessary. Any small enclosed delivery truck will do."

"But what the deuce has a closed delivery truck got to do with catching criminals?" demanded the Captain.

"Now get this," said the Professor. "The person who started the fire in the Keystone Mill wasn't in the place or around it when he did it. Not really close, anyhow. The same will be true the next time. If there is a fire, the person who perpetrates it won't be very close to the building when it goes up in flames."

"Time clock on his infernal machine?"

"No, there won't be any 'infernal machine' in the place, any more than there was in the Keystone Mill. Just get me this truck as soon as you can this morning. I'll install in it some of my apparatus which I have already constructed. Then, tonight, you bring along three of your plain-clothes men and we'll drive around in the vicinity of this property on Wyoming Street. If the infernal machine, as you call it, is started, my apparatus will give its location and then we'll go there and get the operator at his work. Of course, if no attempt is made to fire the place, then we'll have to go about it in the usual way, but I'm rather confident that that won't be necessary."

"You think this fire-bug works by radio, then? We drive around and if his fire broadcaster starts in, we get its location and go there and nab him?" grinned Captain Anderson.

"That's about what it amounts to," replied the Professor.

"Well, I hope you know what you're about. Anyhow, it's worth a try, so come on. I think I know where I can get a truck," said the Captain.

"Wait a second, Captain. You'd better give the Chief a ring and have him expect a call to that place tonight or tomorrow night."

"Right! I didn't think of that," replied the Captain as he returned to the phone on his desk.

THE leather goods mill was a three-story frame building, some two hundred feet long and half as wide. It was in the middle of the block between 9th and 10th Avenues, while on the other two sides of it were the Pennsylvania freight yards and Wyoming Street. Across from it on Wyoming Street were small shacks and frame buildings of the poorer class and

about half-way down the block was a small twenty-four-hour-a-day "greasy spoon" restaurant that catered to the men from the freight yards.

On both sides of the truck, in weather-beaten letters, was painted: SMYTHE AND SON, LICENSED PLUMBERS. The driver, in a dirty pair of overalls and a battered hat, was busily engaged in puffing on a corn-cob pipe and piloting the truck. Beside him, apparently half asleep, was another, just as seedy looking individual, in a heavy sweater and greasy cap. To any person who might take the trouble to notice, the outfit presented all the appearance of Smythe and Son, licensed plumbers, returning from a late, emergency job. But, inside the truck, instead of pipe, tools and such implements of the plumbing fraternity, there were three men. In the back end, hunched against the doors, were Captain Anderson and one of his men. In the front part, directly behind the driver, sat Professor Clark who had on a pair of ear-phones and was busily engaged in slowly turning two dials on what appeared to be a small portable radio set and direction finder. But instead of the usual loop aerial, there was a very fine mesh wire screen, built in the form of a parabolic reflector. Inside the reflector were two stiff copper wires, each one about half an inch long, mounted end to end and separated by a small glass insulator. This arrangement was mounted much like the regular loop aerial and could be pointed in any horizontal or vertical direction.

For some time this strange outfit drove up and down Wyoming Street and the intersecting avenues, never going more than a few blocks from the leather goods mill. Except a few men from the railroad yards, entering or leaving the "greasy spoon" on Wyoming Street, nobody was about.

"Looks like your suspicions ain't so hot, Professor," drily grunted the Captain, scrooching around and trying to find a more comfortable position in his cramped quarters.

"Mebbe so," replied the Professor as he glanced at his watch. "Give 'em time. It's only a little after one . . . there's hours yet."

"Huh!" snorted the Captain. "About another hour of this and I'll be a cripple for life!"

As they were coming up 9th Avenue towards Wyoming Street, a large moving van rumbled past them, turned up Wyoming Street and ground to a stop in front of the restaurant. As "Smythe and Son" passed it, two tough looking characters emerged from its cab and leisurely made their way into the "greasy spoon." After the delivery truck passed it, the driver turned around and gave the Professor an inquiring look.

"Go on a block or so, then turn around," said the Professor.

A few minutes later they were again nearing the restaurant. Just after they had slowly passed the parked van, a faint whistle came from the Professor's headset and then just as suddenly it ceased.

"Go down to the end of the block, then come back and park in front of that van!" quickly whispered the Professor to the driver. Then to the Captain: "They're at it now! . . . Must be using a directed beam, as I could only get it for the space of ten feet or so!"

By this time they were down near the end of the mill and once more that peculiar whistle came out of the professor's headset.

"Seems to be turned on this end of the place now," remarked the Professor. "It either comes from the

place where the restaurant is, or else from that big van in front of it!"

They turned around and once more started up the street. When they passed the lower end of the mill, the sound was again heard, and as they neared the van, it again suddenly stopped. As they passed the van and pulled into the curb in front of it, the Professor removed his earphones and turned to the Captain.

"Let's go! We'll see what's in that van first. If there's nobody there, it's into the restaurant for us!"

Quickly the five men got out of the small delivery truck and started towards the van. Inside the restaurant, the two men who had left the van a few minutes before, could be seen at the bar, busily engaged in eating. The waiter was at the far end of the room and had his back turned to the door.

As the Professor and the four detectives neared the van, a faint humming sound could be heard above the idling throb of the motor.

"It's in the van!" whispered the Professor. "Sounds like a motor-generator outfit!"

The Captain directed one of his men to go into the restaurant to keep an eye on the two drivers of the van and to arrest them as soon as they started to leave the place. Then the others silently and quickly went around to the back of the van. The entire back end was made up of a large double door and fastened by a heavy spring latch with loops for a padlock, but fortunately, no such padlock was in place. Reaching up, the Captain grabbed the latch, gave it a tug and quickly threw back the two halves of the door.

Just inside the door, on one side of the van, was a dark skinned and heavily bearded person, in the act of rising from a small folding chair. In front of him, on the other side, was what appeared to be a compact but exceedingly powerful short-wave transmitter. In the front part of the van was a large motor-generator set busily humming away. The whole interior was brightly illuminated by a small globe in the ceiling.

"Up with 'em and get tha'll out'a there quick!" rapped out the Captain. The tall, haughty looking individual so addressed, stared for a second at the three business-like automatics pointed at various parts of his anatomy and then reluctantly started to get out of the van.

"Put the bracelets on him quick!" cried the Professor as he jumped into the van and reached for a large knife switch above the motor-generator set.

"What's this little melodrama all about?" indignantly demanded the prisoner. "Can't a scientist carry out some experiments with a portable radio set without . . . ?"

"Save that for the Judge!" snapped the Captain.

"But I demand an explanation of this outrage! You'll suffer for this blundering," snarled the prisoner as the handcuffs were deftly snapped on his wrists. "Just what do you expect to charge me with?"

"That!" said the Professor, who had emerged from the van and was now pointing towards the far corner of the mill. There, behind the first floor windows, was a flickering rosy glow and already wisps of smoke were seeping out around the windows and from between the boards of the frame walls! Just then, around the end of the van, muttering and cursing, came the two previous occupants of the restaurant with their hands above their heads. Directly behind them was the other officer with an automatic in each hand.

"Quick, Professor!" called the Captain, "into that

restaurant and send in an alarm while we put these babies in the van!"

A moment later, as the Professor dashed out of the restaurant, the big van was already slowly starting off. He made a wild dash for it and leaped into the front seat beside the officer who was driving.

"Everybody back there?" he puffed, jerking his thumb over his shoulder.

"Yeah!" grunted the officer. "Captain's probably givin' 'em the third degree already. But we gotta get out of this neighborhood fast! . . . I know the way some of those guys on the fire department drive, and with this old barn, I wouldn't care to pass any of 'em!"

The next morning, the Professor went down to Captain Anderson's office in the City Hall. When he got there, the Captain and the Chief were engaged in deep conversation.

"Well, Captain, did you learn anything from your prisoners of last night?" said Professor Clark after he had carefully selected one of the Captain's cigars and lighted it.

"Not a thing!" replied the Captain. "But first, you had better hear what the Chief has to say."

"Just this, Professor," immediately began Chief Elliot: "Thanks to the tip you and the Captain gave us, we got to last night's fire before it had too much of a start and got it under control and stopped it. After any fire, one of my men and myself always make a round of inspection through the property. Of course, in this case, I kept a sharp lookout for any of those little blue spheres. Well, we found some . . . and in the most significant places! For instance, we found a handful in a pile of old packing cases; some more in a scrap heap of paper and rags . . . and so on. After the part that had burned cooled off enough, we picked around among the charcoal and what-not and were lucky enough to find a dozen or so more." The Chief paused as he reached in his pocket and drew out a handful of the peculiar little quartz spheres. "I've got a big box full back at my office," he added.

"I knew they'd be found there," said the Professor, "but I'd like to know what your prisoners had to say."

"Well," growled the Captain, "the two drivers of the van said they didn't know a thing about it. They owned the van and did trucking and moving jobs. Late Thursday afternoon, a stranger came into their office and chartered their van for last night, gave them their instructions and paid them well. He said he was a scientist and that he wanted to carry on some experiments with a portable radio. The pay was good and they didn't stop to ask questions about other people's business. Then when we got that far with our examination they both started to holler for a lawyer."

"The operator of the radio, or whatever it was, said his name was Schuman and that he was a scientist experimenting with short-wave portable radios, and that he didn't know a thing about the fire until you pointed it out to him. Then he also started to bellow for a lawyer."

"All our bluff and third degree stuff didn't phase any of the three a bit and they wouldn't say another thing. An hour or so ago I had the Radio Engineer from our local 'half-pint' broadcasting station over here to take a look at the apparatus in the van and to tell us what he thought it was. He said he'd take an oath that it was only a short-wave radio transmitter of exceptionally high power and that its radiations were no more capable

of starting a fire than are the radiations of any other broadcasting station. So there you are . . . !"

"Huh! I wonder what correspondence school that 'Radio Engineer' authority of your's graduated from," snorted Professor Clark. "Why, anyone who is acquainted with radio transmitters, could see at a glance that that outfit was far from an *ordinary* short-wave transmitter! Anyhow, that's beside the point at present. I wonder, Captain, if you would let me have a little private chat with the operator of this '*ordinary*' short-wave transmitter? I think I can inject a little verbal stimulant that will greatly increase the vocal prowess of your bearded law-breaker," grinned Professor Clark.

The Captain thoughtfully frowned for a moment and then arose. "All right, then, come on!"

Quickly the three men made their way to the elevator and thence to the basement, where there was a cell block for prisoners awaiting hearings. A moment later the Captain unlocked the door of the cell in which the operator of the strange radio set was temporarily boarding. Professor Clark nonchalantly strolled in, left the door ajar and sat down on the three-legged stool. The Captain and Chief Elliot took their stand farther down the corridor where they could keep a sharp lookout, though they were not quite near enough to hear the muttered conversation within the cell.

For half an hour the Professor remained in the cell. The Chief and Captain Anderson impatiently shifted from one foot to the other and watched the prisoner smoke Professor Clark's cigarettes as he talked. Finally, Professor Clark slowly rose and started for the door. As soon as he was out in the corridor, the Captain relocked the door and enquiringly turned to the Professor.

"Get anything out of him?" he asked as they went down the corridor to the elevator.

"He's willing enough to talk now, and tell you what you want to know," replied the Professor. "But, that can wait. But if you two gentlemen have an hour or so to spare, I wish you'd come up to the High School with me. Nobody's around Saturday mornings, so we'll have the place to ourselves. There I will give you the explanation to this little mystery of yours . . . and a practical demonstration."

SOME fifteen minutes later, the three men were assembled in the physics laboratory of the Senior High School. Chief Elliot and the Captain, each perched on one of those high back-breaking laboratory stools, were expectantly watching the Professor as he fumbled among a bunch of papers in a desk drawer. Presently he found what he wanted and tossed a sheaf of papers upon the desk.

Leaning back in his chair, he announced, "There's a complete written report of my findings in this case, which, by the way, were confirmed in every detail some fifteen minutes ago, by your prisoner, who is none other than Horace Jackson, Jr.!"

"Huh?" exploded the Captain, "Is that young Jackson I got back there in the jug?"

"None other! The dark skin and the brushworks were temporarily assumed to fool anyone who might recognize him and to befool any wary minions of the law that he might accidentally stumble across," grinned Professor Clark.

"But, Prof, how did you find that out . . . ?"

"Didn't I tell you that I got him to confess?" inter-

rupted the Professor calmly as he lighted a cigarette.

"Yeah, but what's . . . ?"

"Now just wait a second and I'll start from the beginning," said the Professor.

"It was probably just a lucky guess, or maybe, one of those intuitive 'hunches' you hear about, that gave me the key to this mystery. When you gave me those little spheres, I noticed at once that they were of a blue color. Crystalline quartz is white, or rather, colorless, like glass. Undoubtedly the blue color was due to the carbon impurities. Was the quartz fused by the heat of the fire so as to mix with the carbon from charcoal? Hardly! No such fire could be hot enough to melt quartz. What's more, this was in a crystalline form and not fused. Besides, crystals don't grow in spherical forms. Hence they must have been mechanically ground to that shape.

"Of course, I was taking for granted, for the time being, that these spheres did have something to do with, or were the cause of, the fire. These thoughts flashed through my mind in the few seconds I was looking at them. Then I suddenly remembered that any body, when cold, absorbs the same waves that it will emit when heated. The spheres were blue, therefore they absorbed the shorter waves. That was the idea that put me on the right track. It didn't explain the fire by any means, but it pointed out a line of investigation and experiment to follow. Then, in a hazy way, I saw how it *might* work out. After a lot of experimenting, I found that my idea was right." The Professor paused for a moment, tossed his cigarette into a nearby sink and then went on:

"The thing as a whole is simple enough, but the actual tracing out of the process, step by step, each grounded upon facts and proof that would hold before a court of law, was another matter entirely. I'll try to explain it as briefly as I can, but in order to show you how it is possible, I'll have to digress into the realms of physics for a bit.

"To begin with, we know that electric waves, heat, light and so on, are only waves or vibrations in the ether, and differing from each other only in wave-lengths or size, and in frequency or rate of vibration. As the wave-length is shortened, the frequency becomes higher, and *vice versa*, according to the simple formula:

$$\text{Wave-length in meters} = \frac{300,000,000}{\text{Frequency in seconds}}$$

By the use of this formula, we can arrange a long table of etheric vibrations, which you can think of as the music for the keyboard on some huge piano.

"Way down at the bass end of the scale are those huge electro-magnetic waves used for trans-oceanic wireless communication. These are anywhere from about 25,000 to 5,000 meters long. By the way, a meter equals approximately 39.37 inches. As we go up the keyboard a little, we come to those familiar waves used in radio broadcasting, and going down to about forty meters in length. Next come those very short radio waves that are being experimented with so much at present. These short radio, or Hertzian waves, go from about forty meters down to about one meter and less. Continuing on up our keyboard, we find shorter and shorter Hertzian waves. The very shortest of these have a length of about one-tenth of a millimeter. Now go just a few 'notes' higher until we come to waves about .067 millimeters long. Here, instead of 'radio'

waves, we have waves that we can perceive with our senses. In short, heat waves. These take up quite a space on our keyboard and go from about .067 millimeters in length down to about .0008. Going just a little higher up the scale, we come to waves about .00068 millimeters long. Here another remarkable change takes place. The waves become visible to us as red light! As these get shorter, we go through all the colors of the spectrum until we reach the extreme of visibility in the violet waves about .00043 millimeters in length. Beyond this, the ultra-violet is next, and so on. You can readily see by our formula that the frequencies of heat and light waves are really tremendous. So it will be easier to speak of them in terms of wave-length rather than in frequencies, although it may make my explanation a bit more involved.

"Now I must add a few words on the general structure of matter and its reaction to these etheric waves. Take, for instance, a solid body. It is made up of an almost countless number of minute bodies called molecules. These molecules do not touch each other, but are held together at varying distances by the forces of attraction and repulsion and hence, are capable of vibration. In crystalline substances they are arranged in certain definite geometrical patterns. How rigidly these forces hold them together depends, in a very general way, upon the properties of the body and the condition it is under, such as heat or electrical influences.

"These molecules, in turn, are built up of a relatively small number of still smaller things called atoms. The atoms in each particular kind of molecule are arranged in definite patterns, somewhat analogous to the arrangement of molecules in crystals. They can also vibrate within the molecule, even as the molecule vibrates as a whole within the solid. Now even the atoms are made up of still smaller divisions. Some of these, called electrons, and protons (which are positive electrons) are also capable of vibration within the atom.

"It is evident that the vibration of each molecule will be slower and hence have a longer wave length than that of the atoms within the molecules. Also, that the vibration of the electrons in the atom will be more rapid than that of the atom as a whole. In a very general way, when a substance is exposed to heat waves, the molecules vibrate integrally. When still shorter heat waves are applied the atoms vibrate within the molecules while the molecules themselves are in vibration, and as still shorter waves, such as light, are applied, the electrons vibrate within the atoms.

"Any body capable of vibration has a fixed rate of frequency. What this frequency is, depends upon a number of factors which I don't have to mention here. This fixed rate or frequency is called the fundamental. When a body is vibrating at its fundamental, it is vibrating as a whole. Now, under certain conditions, it may be vibrating at its fundamental and yet be divided into aliquot parts, which in turn, are vibrating within the body. Remember how the atoms vibrate within the molecule, while the molecule itself is vibrating? Secondary vibrations are called overtones or harmonics and their frequencies bear a simple numerical relation to the frequency of the fundamental. For instance, call the fundamental frequency two. The second harmonic (the first, really) of this, would have a frequency of four; the third, eight and so on. These overtones also produce many other frequencies amongst themselves, due to interference and beats. Also, under certain conditions, a very strong

harmonic may become the fundamental for still higher harmonics. In a general way, the number of overtones produced, largely depends upon the strength or energy in the fundamental.

"Now let's apply this to the structure of matter in our solid body. Suppose a very strong, and rather long, heat wave strikes this body that has the right properties. What happens? . . . The molecules will vibrate integrally at the fundamental frequency of the heat wave, the atoms within the molecules will vibrate at harmonic frequencies to this and will produce more heat waves, but of a higher frequency. If the fundamental is strong enough, the electrons within the atoms will vibrate at still higher overtones and produce light! This action of changing heat waves into the shorter waves of visible light is called calorescence.

"Now if you remember, I said before that in crystals, the molecules are grouped into geometrical patterns, much like atoms are arranged to form molecules. It is quite obvious that even a small crystal is far too large to vibrate as a whole to any heat wave. But, here's the strange thing about it; some crystals, if carefully ground to the correct size, will vibrate when subjected to radio waves! This is a well-known fact and is being made use of in the broadcasting stations. The crystals are used as frequency regulators to produce a steady unwavering frequency.

"Suppose we have a crystal of this kind and cut it down until its fundamental corresponds to a very short wave length. Then expose this crystal to a very strong radiation of the same frequency. The crystal will then vibrate as a whole to this frequency, while the molecules and atoms will vibrate to the higher overtones of the fundamental. The crystal will now be radiating heat waves of many different frequencies. In short, we put a radio wave into the crystal and got a whole flock of heat waves out of it! If the energy put into the crystal is sufficient and the molecular and atomic structure is of the right type, the crystal will also emit light waves. Then we have an incandescent body, whose light and heat is produced wholly by our radio wave!" The Professor paused for a moment, to light another cigarette and then went on:

"Quartz is one of those crystals I have just been talking about. Now, here is where the real cleverness of these crimes comes in. Ordinary quartz crystals would never produce heat waves, let alone incandescence, when acted upon by even an extremely powerful transmitter at such distances as a few hundred feet. The loss of energy would be entirely too great for one thing. The crystal would only vibrate at its fundamental along with the first few harmonics, which would only give more radio waves of a shorter length. All the received energy would be frittered away in these low harmonics and there would be none left to activate the very high ones that would produce the heat and incandescence. The simplest theoretical way to overcome this difficulty would be to cut out the low and useless harmonics, leaving only the real high ones which are needed. You can readily see that, in practice, this would be an almost impossible undertaking. But, this is exactly what the genius who committed your crimes did!

"I carefully analyzed some of those little spheres and, as your report said, found them to be composed of quartz with a slight percentage of carbon. But, a real careful analysis proved that the carbon used was an isotopic form, hitherto unknown. This isotope had an atomic

weight of exactly eleven, while the regular carbon atom has an atomic weight of 12.005. By adding a certain percentage of this peculiar kind of carbon to the quartz in some unknown way, a crystal was produced, that when ground down to the right size, would give a few very high harmonics of great strength. These, in turn, also acted as the fundamentals for another group of overtones necessary to produce the incandescence. By the use of a very powerful transmitter with a narrow highly directional beam, enough energy was received by the crystals, within the buildings, to produce the calculated results. . . . So, there you are. The rest is rather self-explanatory now, isn't it?"

Chief Elliot and the Captain, incredulous amazement written all over their faces, sat there staring at the Professor.

"Sure listens all right, Prof. . . . but I'd . . ."

"Like to see a demonstration?" interrupted the Professor. "Well, here it is, arranged especially for you gentlemen, and for a court and jury if necessary," he said as he went across the room to a table full of apparatus.

"Here is a duplicate of that transmitter that we found in the van. Of course, it's a lot smaller and less powerful, but for a short distance it works just as well. By the way, the School Board didn't pay for this apparatus; it's some of my own that I fool around with for my own amusement and edification!" he added with a laugh. Then in a serious voice:

"See those quartz spheres on the asbestos pad on the table in front of you? Well, keep an eye on them while I turn on the power." He threw a switch on the wall above his apparatus. A loud humming sound became audible and two large vacuum tubes began to glow. To get a better look at what might happen, the Captain got up from his stool and leaned over the table, with his back to the Professor and his apparatus. For a moment nothing happened as the Captain and the Chief continued to stare at the little crystal spheres.

"Wow!" exploded the Captain, suddenly becoming erect and jumping aside a few steps as he put his hand over his shoulder and felt his back. "What the . . .!"

"What's a matter?" grunted Chief Elliot. "Gotta bite?"

"Bite, hell!" retorted the Captain.

Just then a loud chuckle came from the other side of the room. The Professor was standing beside his apparatus and seemed to be enjoying the situation thor-

oughly. Finally his merriment subsided to a broad grin.

"Seems that animal tissue is even more sensitive to these short waves than crystals!" laughed the Professor. "You see, Captain, you were standing directly in the path of the beams from my transmitter here, and its wave produced heat vibrations in your body, much like it would in the crystals! I remember now, reading that when WGY and KDKA were first experimenting with ultra-short wave transmitters, the bodies of the men working about the transmitters would become warm and after some time they would even get a fever!" explained the Professor.

"Huh! Nice thing to do to a fella!" grunted the Captain, still gingerly feeling his shoulder-blades.

"Look at those crystals now!" ejaculated the Professor.

"Well I'll be . . .!" announced Chief Elliot as he gazed in fascination at a number of little balls of reddish-yellow light on the asbestos pad. He put out his hand and slowly passed it through the air about a foot above the glowing spheres. "That's hot enough to start any frame building!"

"You'd be, too, if you were sitting in front of that infernal machine over there!" replied the Captain, still nursing his back.

Professor Clark shut off the transmitter and came back to the swivel chair behind his desk.

"How'dya get Jackson to talk?" asked the Captain after a moment's pause. "By just proving to him that you knew his whole process?"

"No," replied the professor as he lighted another cigarette. "After I convinced him I knew how he had done it, he just laughed at me and dared me to take such a story before any court and jury and make it stick."

"Then what?" impatiently queried the Captain.

"Oh, I just casually mentioned a few modifications in his process that might make it quite practical for the transmission of power by radio. Then I added that he was just a young man and that the Pennsylvania laws only give from one to five year sentences for burning to defraud insurance companies. That loosened him up and we talked things over . . . Simple enough, wasn't it?"

"Well I'll be . . .!" offered the Captain, staring at Chief Elliot.

"Ditto!" agreed Chief Elliot, staring at the Captain.

THE END



Then began the greatest fight of Meriden the Sarvonian. Before that battle was over, each of his three jaguar-hilted swords had drunk deep of blood, and his own blood stained the rocks.

The Swordsman of Sarvon

By Charles Cloukey

Author of "Anachronism," "Paradox," etc.

IN the concluding chapters, which seem peculiarly fitting to this type of story, our author introduces several clever and ingenious scientific problems with attending possible solutions, which might easily become a working basis for some aspiring and imaginative embryo scientist. Since it is with the future progress of science that we are here mostly concerned, this serial will be found exceedingly provocative of new ideas.

Illustrated by MOREY

What Went Before:

THE scientists of Cor, one of the two rival city-nations of Venus, have succeeded in exchanging identities across the void of space. The Corians are planning to overrun the earth, and the three Dorians in the bodies of the Dornn brothers of Vienna, desiring the people of the world to wipe each other out, so that the Corians can conquer it, are at the point of leading the world into war, in the year 2180. The world does not know of the alien intelligences. The hordes of Howard Fu-Zhse, dictator of United Mongolia, are preparing for a sudden attack, which is to precipitate a war of scientific horror, decimating the earth and paving the way for the Corian conquest. On Venus, Cor is building three gigantic space vessels to invade the earth. The first is very nearly completed. The Corians are also faced with the necessity of destroying Sarvon, the other Venerian city-nation, which wants friendship with the earth and is opposed to conquest. To destroy Sarvon, the Corian scientists have developed a ray that causes steel subjected to it to become more brittle and fragile than glass; a large airplane carrying a projector of this ray is on its way to utterly collapse Sarvon, which, like Cor, is one immense unified structure of steel. These two civilizations of Venus are each a strange anachronistic mixture of greatly advanced science and utter primitiveness.

Harrison Ives, a scientist killed by the Corians in terrestrial bodies, had left, in intricate code, the secret of atomic power. The Corians in the bodies of the Dornns, intending to send this stolen code to Venus in a small rocket, were tricked. The code sent to Venus is a meaningless fake, and the real cipher is in the hands of the greatest terrestrial cipher-expert, Brad-Henson Ecclestone, but he cannot solve it, either.

United Utilities, a gigantic corporation, had financed Professor Riccardo di Bargi's plan to build a rocket to reach Venus. On the rocket, besides the professor and crew, are Benny Jacobs, a television news-scout for a world-wide hook-up of radio circuits, and Burton Boyd, a detective employed by Robert Huston, acting president of United Utilities, to fight the Dornns. The rocket has just landed on a plateau between Sarvon and Cor. It is discovered that *terrestrials* are killed immediately on direct exposure to sunlight on Venus. They plan to leave the rocket only during the Venerian nights.

Some of the earth-identities, in Corian bodies, escaped death at the hands of the Corians, mainly because of Meriden, a giant sword-fighter of Sarvon. Among them are: The real Dornn brothers, who are helping Sarvon; Laura Ives, sister of the dead scientist, who had been imprisoned in Cor; and Lee Chilton, a daredevil flyer who, with the giant warrior Meriden, was flying to warn Sarvon of the Corians' "steel-fatigue" ray. Their plane crashed in impenetrable jungle. They fought their way to the plateau and are climbing the cliff which crosses it. Though partners in this adventure, they are rivals for the hand of Laura Ives, who, in her Venerian body, is called Izanne. She has escaped imprisonment in Cor and is hiding aboard the plane carrying the Corian "steel-fatigue" ray projector.

Enedar, a Corian scientist, is on earth, in a terrestrial body, carrying on important investigations which he has refused to disclose to the Corian Council of Nine.

ROBERT HUSTON, Acting President of United Utilities, entered the study of Brad-Henson Ecclestone, mathematician and cipher-expert. Ecclestone was slumped forward over a table, asleep. His hand clutched a black notebook—the notebook that contained the secret of intra-atomic power, in cipher—the notebook he had taken when he had substituted a cleverly done, meaningless imitation for the real thing, the meaningless imitation that had been sent to Venus. Huston shook the man. Ecclestone awoke, straightened up, and looked at the executive with bloodshot eyes.

"You look doped, Brad. What's happened?"

"I fell asleep. I've been concentrating on this cipher for seventy-two hours, using drugs, hoping to find the solution so that America can manufacture atomic power weapons. Otherwise we haven't a chance against United Mongolia. This war is coming sooner or later, and a delay of a few hours in the solution may be fatal to us. The job is hopeless, Bob. Hopeless."

"Hopeless?"

"Yes. It's no form of cipher known. It's new, and subtle beyond words. There are almost exactly ten thousand characters in the notebook, Bob. Even taking the very doubtful assumption that each of these characters represents some letter in the 'clear'—"

"I don't follow you."

"I mean that every letter in every group in the notebook represents one letter of a word in the solution. Of

course, every 'a' in the code doesn't mean 'r' in the solution—if it were as simple as that I'd have had it long ago—but the fourteen 'a's' in the first line represent quite probably each a different letter, obtainable by some intricate mathematical process depending upon its position, or the letter preceding it, or on some other combination of circumstances.

"Even assuming that the code is not padded with meaningless characters, and that single characters represent only single letters and not groups of letters or whole words, which assumptions are very doubtful, it follows by a simple mathematics that there are a number of possible interpretations equal to the ten-thousandth power of twenty-six, which may be approximately represented by the figures 5012 with 14146 zeroes after them. Of that unimaginable number of solutions, one is correct."

CHAPTER XXI

Up the Cliff

LEE CHILTON saw a slender, dark-eyed girl close at his side. She was stretching out a hand to take his, her eyes were tender, lips parted and very red. Her hand touched his, and the world of reality broke in on his dream. Light dazzled his eyes.

"We were saved from the jaguars," said Meriden the Sarvonian.

"How?" asked Lee, remembering the snarling pack.

"One of the Corians' meteorockets burst above our heads. The explosion frightened the beasts, in fact, fragments killed two of them, and wounded me slightly. We were both unconscious." There was a curious lack of color or emotion in the giant's voice.

"How did you learn what it was?"

"I recovered long before you. In the rocket, which was undoubtedly sent from earth, was a parachute, which opened as the rocket exploded, and floated down. The winds carried it about a half-mile from here, and it caught in the top of a tree. I saw it from the top of another tree. As near as I could make out, the parachute supported a book."

"The process sent from the earth! The cipher that only Izanne can solve!"

"I thought so," said the giant coolly. "Some Corians came in planes and got it. I could have reached it before they arrived."

"Why didn't you, Meriden?" The impersonal tone of the warrior was getting on the earthman's nerves.

"I could not leave you alone, unconscious, lest the jaguars return after their fright had worn off. I could not carry you so far. I started to, but then I saw the Corian planes, and knew I would not have time to reach it."

"You should have left me. Now they will torture her until she tells them how to read the code, and they will have another weapon with which to fight Sarvon and the earth. You should have left me."

Meriden turned away. Inadvertently, Lee had insulted him. Meriden, the Sarvonian, would never leave a comrade in danger. Then the swordsman thought of the earthgirl imprisoned in Cor. Had he been wrong to leave her there? Though he knew now that she was an earthgirl, Laura Ives, he thought of her always as Izanne, of the Hot Planet. He turned to Lee.

"You were calling her name before you came back to consciousness. You love her, earthman?"

"Yes," stated Lee.

"You know that I love her too?"

"Yes," stated Lee. He knew now why Meriden was cool. He remembered that on Venus suitors fought to the death for the hand of a girl. He remembered that the Swordsman of Sarvon had killed all the other warriors who had dared make love to Izanne.

"Only one of us can have her," said Meriden calmly.

"So I understand," said Lee Chilton. "When would you prefer to kill me—now, or later?"

"I am puzzled," said the giant with a frown. "I do not think it would be honorable to kill you now. You have had only a few days' experience with swords. Besides, we are comrades in this undertaking. Perhaps you will withdraw your claim?"

"Certainly not. I love her."

"I knew you were not a coward. But—I would have no chance fighting with earth-weapons, would I?"

Lee thought of the Orgies automatic he was accustomed to handling on earth, and smiled.

"Not at all," he said.

"And you could not oppose me with swords. It is very puzzling. I do not wish to kill you dishonorably, but—"

"Suppose we take our quarrel to her and ask her to choose between us. That would leave bloodshed out of it—"

The swordsman regarded Lee closely. The earthman's point of view was interpreted differently by Meriden's mind.

"That would be the agreement of two cowards," he said coldly.

"Or two friends," said Lee Chilton. Then, as the Sarvonian warrior did not reply, "At present it would do neither of us any good to kill the other. We have a common purpose—to warn Sarvon, and indirectly aid in saving the earth. Cannot we continue as comrades until that is accomplished?"

"Yes," said the Sarvonian suddenly. "Though I am afraid that we will never accomplish it in time. We must surmount the mountain barrier and penetrate a hundred miles of jungle to reach Sarvon. If we are fortunate we can make a mile in five or six days. And the ray-projector will be ready any minute, to wipe out Sarvon. It is hopeless. The city of my fathers is doomed," continued the warrior moodily. "Probably we shall not live to see Izanne again. She may not live to see us any more in our lives—"

"We were wrong to leave her."

"Yes. They will torture her, until she explains the code—Yet, at the time, it was the best we could have done. It would have been suicide to remain, and if things had gone as we planned, she would have been rescued by Sarvon before now. Xavian would have ordered the attack at once, before the Corians could finish the projector. Let us push on toward the cliff."

The jungle was less swampy as they approached the mountainous region, but the undergrowth was no less impenetrable. After five days of hardship, they reached the base of the cliff and rested before starting the climb. They had spoken often, but never about the girl who was prisoner in Cor.

Then they started to scale the cliff. If they could cross the barrier in ten days, thought Lee, it would take more than two Venus-years to penetrate the jungle to Sarvon. The ray-projector of Cor would be ready in a few days

at the most, mounted on a giant plane that could travel from Cor to Sarvon in hours. There was no hope that they could warn Sarvon in time, yet a thousand feet a day through the jungle was better than standing still and waiting for death. They pushed on. After hours of strenuous climbing, they found a ledge where they could rest. Night was falling again.

CHAPTER XXII

Escape

"**I** TELL you again that even if I should desire to reveal the contents of that book to you, I could not do so," said Laura Ives to her inquisitors. "It is true that my brother invented a complex mathematical cipher, but the writings in this book are not in that cipher. I am not able to tell you what you want to know." She added, calmly, "And if I could, I wouldn't."

The Corian scientist, who had been cross-examining her, matched her casual tone. "We will give you one day's time to reconsider. Tomorrow at this hour, the plane will leave for Sarvon. It will be dark when it arrives at the city. They will not see the projector of the ray that will destroy the city. They have no chance. If you disclose the secret of this book before the giant plane leaves for Sarvon, we will give you your freedom. Sarvon and the earth will be destroyed. Why not join the conquerors? We will give you property and power. If, on the other hand, you should be so foolish as to defy us, our scientists will find means of learning what we want to know—to put it very, very bluntly, we can torture. It is not torture that kills, but torture that makes death a desired but unattainable release. You have until tomorrow at this time to reveal the scientific secret in that notebook. Your noble brother, who made the invention, would prefer that you disclose it rather than be tortured, would he not?"

"It was a Corian who killed him," said Laura Ives, tight-lipped. "Could you give me the universe, I would not aid you."

"Perhaps you will change your mind, before tomorrow. We must have this secret, though it would be a pity to torture one so beautiful."

"It will be useless to torture me. Even if I wanted to tell you what the notebook says, I could not do it."

The possibility that the girl might be telling the truth did not occur to the Corian. "You have until tomorrow," he repeated. "Tomorrow we shall destroy Sarvon."

Laura Ives laughed.

In the middle of the night she rose from her couch and moved silently toward the barred door of her cell. There were guards in the corridor outside, but so silently did she move that they were not disturbed. The one to the left of the doorway was asleep. His negligence had been observed by the girl several nights previously. Fifteen paces to the right of the cell door was another, a giant warrior standing motionless and alert. So much could the girl see from behind the barred door of the cell. She grasped one of the steel bars in her slender hand, braced herself, and pulled.

When the earth-identity Laura Ives had been transferred to the Venerian body of Izanne, she had gained supernatural strength, as had the Venus-girl who had taken her body on earth and had slain her brother. The heavy steel bar bent as she strained at it. Three minutes

of effort—effort that drenched her with sweat, and she had torn the bar out of its steel sockets. The noise awakened the nearer guard, but before he could gather his senses, the girl had swung the heavy bar on his skull and stepped out through the gap. The warrior to the right of the doorway ran up in a second, followed by those beyond him in the corridor. The girl raised the bar above her head and flung it at the feet of her nearest pursuer. It struck across his ankles, breaking them both. He went down and the one nearest behind him fell over his body. As she ran, a strange exultation seized her, giving wings to her feet and redoubling her already superhuman strength. In two seconds she saw her way blocked by another guard, lifting his sword to throw. She had carefully planned her escape, and in the fraction of a split second she acted.

She leaped completely over the astonished guard, but, quick of mind and muscle, the warrior turned in an instant and hurled a gleaming weapon after the fleeing Izanne. It all but missed her, yet cut a sharp, clean wound in her shoulder as it hurtled by. Painful, but not serious; and it left a trail of blood drops behind.

Before any of the outwitted guards could follow, Laura Ives had reached a junction of two corridors, had turned into a transverse passage. In five minutes she had outwitted and outrun the warriors, and had gained the traffic corridors. Here, feeling herself momentarily safe, she had paused to gain breath, and she first noticed the wound. Few Corians were abroad at this hour, yet occasionally a citizen passed without giving her more than a casual glance. Conscious now of the throbbing pain, she made her way toward the upper levels, walking laboriously up the long ramps.

After half an hour of fruitless search, the guards had found the blood trail. An alarm was broadcast to all Cor. Slowly the guards followed the trail of blood-drops, but they were few and far between. By dawn the entire city was on the watch, and the trail had been followed all the way to the topmost level. Here the searchers lost the trail. It was suggested that the girl might have managed to elude the guards and steal a plane. Yet every skyboat was in its place, and the guards of the upper level denied the possibility of anyone eluding them and reaching a plane.

She could not have left Cor, therefore she was still in the city, said the officials, but, unfortunately, they could not find her. Sooner or later, they assured the Council, she would be discovered. It was only a matter of time. If the Council would be patient.

Late that afternoon the ten-ton warplane carrying the projector of the steel fatigue ray left the city. The scientist in command expected to reach Sarvon after dark and finish the work of destruction before daybreak. Sarvon would be out of the way, and the city of Cor would feel safe in sending its picked warriors to the earth in the first completed space-ship. It was three days before the inferior conjunction of the Earth and Venus.

Laura Ives was aboard that plane, wedged in the narrow triangular space between three cylindrical fuel-tanks. She had contrived to bandage her wound with a strip torn from her tunic-like dress, and she had slipped by the half-asleep guard at the plane's hangar, opened the unlocked door of the plane with the greatest caution, and had selected her hiding place.

She had not been able to provide herself with a weapon.

CHAPTER XXIII

Light and Death

BURTON BOYD floated down from the ceiling of his stateroom in the *Interplanetarian* as Riccardo di Bargi pushed open the door and floated in.

"Spacesick, Mr. Boyd?"

"No, Professor. I got over that a long time ago, though I never can get completely used to this weightless condition. How about the stowaway?"

"Most peculiar case. The man was in rather poor physical condition, and the spacesickness hit him much harder than it hit any of the crew. We found him raving incoherently, and I'll swear that he was speaking some foreign language, though I don't know what one."

"I'm not such a bad linguist myself, Professor, but I never heard anything like that gibberish of his. One of the crew just told me that he regained consciousness and tried to kill you."

"He did." The Professor half smiled as he relaxed comfortably near the ceiling. "I had taken the precaution of unloading the gun he had with him. The muscular effort of drawing it and pulling the trigger was enough to confuse the man's balance again. He wasn't used to weightlessness, and had another fit of spacesickness. He's tied in a bunk now. I believe he intended to kill us all and capture the rocket. Demented, I guess. He's quite evidently cursing us roundly now, though we can't understand any of it."

Benny Jacobs entered the room, swimming awkwardly through the air, aiding himself more efficiently when he happened to come in contact with a wall.

"What news, Benny?"

"Not much, Mr. Boyd. We've had to completely rebuild the television unit. The sudden acceleration shattered it terribly, and it's deuced awkward to do electrical repairs without gravity. I've been dodging hot drops of solder for what seems like eternity. They float around the room in the most annoying manner, and burn like hell when they touch you. It's so hot in this rocket now that the solder stays molten for a long time, you see. The technical fellows in the news-gang are spending every minute in repairing the unit as well as they can, but even the most modern televisions are complicated and delicate things. The announcer and I have been trying to make ourselves useful by taking any little discarded box or any other container we can find in one hand and a lid in the other hand and floating around the room trying to capture some of the stray solder. It'll never be my favorite indoor sport, Mr. Boyd, but Joe, that announcer of ours, has developed quite a technique at it. He's got to the point where he corners some solder almost as often as some solder corners him."

"How long do you think it will be before your gang can establish communication with the earth?"

"That's been worrying me. Universal News and all the people it serves are depending on News-Unit Thirteen to give them the radio and television news, and we're falling down on the job. The world must think we're all dead. If we work steady, we might finish in sixty hours, Mr. Boyd. I hate to fall down on the biggest scoop in the history of radio news-service."

"In sixty hours," said di Bargi, "we shall have arrived on Venus."

"Yes?"

"Yes. You'll begin to feel her gravitational influence very soon. You'll probably be sick again as weight returns, but it will make your work easier. I should have taken more precautions to protect our cosmic radio. Are you repairing the receiving apparatus?"

"We're concentrating now on the transmitter and the televisor, Professor. We want to have at least voice, and maybe voice and vision when we arrive. I bet the main office is swearing at us now for not sending any news through, but I couldn't help it."

Benny wiped his forehead with a handkerchief already so wet that it would have dripped if the conditions of gravity had been favorable to dripping, and managed to leave the room, audibly wishing that he had a propeller and rudder attached.

Boyd recaptured a notebook that had floated out of his pocket. "Where are you going to land on Venus?" he asked curiously. "Have you any plan?"

"I have. When I photomapped Venus a few years ago with the hyperteleoscope, I located two immense centers of activity—cities, we may as well call them, though each is enormously larger than any terrestrial city—even New York. During the limited time, I was able to observe them before the temporarily removed cloud-blanket of the planet returned to stay, I saw and photographed airplanes moving from one to the other. Each one is surrounded by jungle, they are some two hundred miles or so apart, and there is an enormous mountain barrier between them, with a plateau, that, as far as I can tell from the photographs, would be an ideal landing place for the rocket. It could not land in the thick jungles, and I don't think it advisable to try to land too near either of the cities, even if that were feasible."

"You intend to land on the plateau?"

"I think it the best plan. I can easily calculate its location from the maps and the accurate chronometers on board the rocket. We can drop through the clouds confident that we will land on the plateau, not in the jungles."

"We've made exceptionally good time, haven't we?"

"Yes. About 35,000,000 miles, more or less, in one full month. For a short time, about the fifteenth day, we were making almost 500,000 miles per hour, and from that point I slowly decelerated. At present we are moving slowly, not more than a mile a second, and as soon as we begin to notice the gravity of Venus, I shall slow down to 100 miles an hour. The negative acceleration, plus the Venus-gravity, will give you back your weight rather suddenly."

"Will you slow down as violently as you speeded up when you left the earth?"

"No. It won't be necessary. The radio apparatus will not be wrecked this time."

"If it is, Benny will go crazy."

"I don't doubt it."

It was sixty hours later, almost to the minute, when the *Interplanetarian* came to a cautious landing on the plateau, just below a thin layer of cloud. It was late in the day when the rocket's enormous propellers ceased to beat the foreign atmosphere. From the thick windows of the observatory, the rocky mountain top, barren and rough, was eagerly surveyed by the interplanetary pioneers. The sun could be dimly seen through the clouds, yet, because the planet was so much nearer to the sun than the earth was, there was none of the depressing gloominess that characterizes cloudy days on earth. Even

when the cloud blanket is thickest, the sunlight, brilliant though diffused, eliminates the Hot Planet intensely.

Some of the atmosphere was taken into a test chamber. After a short wait the bespectacled chemist of the party proclaimed it breathable, though it contained a greater percentage of carbon dioxide than had been expected or detected from earth, and in spite of the profusion of plant life to take in the dioxide and liberate oxygen, the percentage of the latter was a trifle smaller than on earth. The order to unseal the door, a process requiring some ten minutes of work, was given.

No one can blame John Carton very much for his ambition; he paid dearly enough for it.

Carton was a member of the crew. Since the rocket left the earth he had cherished a secret plan—to be the very first earthman to set foot on an alien planet. While the chemist was testing the air, Carton was unsealing the door, unknown to di Bargi. All except Carton were in the chemist's laboratory or the near by rooms; Carton was alone in the main storeroom, to which the outer door gave access. With an oxyhydrogen blowpipe Carton cut away the seal of alloy that made the rocket truly airtight. After the seal was cut he swung back the circular door on its massive hinges, and stepped out into the sunlight.

After the air-analysis was finished, they found John Carton moaning with pain on the ground just outside the door.

Burton Boyd leaped forward to pick up the sufferer, yet before the detective reached the door on his errand of mercy he felt hard fingers grasping his shoulder. With a strength remarkable for a middle-aged scientist, Professor di Bargi hurled the detective back. "If you value your life, stay inside."

Wondering comprehension dawned in the mind of the chemist.

"Actinic rays!" he gasped, and darted out the door. Working as fast as was humanly possible, he half lifted, half dragged Carton into the rocket. Di Bargi pushed the balanced door shut.

"Why could he go out, if I couldn't?" asked Boyd of di Bargi, who was busy directing the chemist to place Carton on a bunk. Di Bargi replied over his shoulder.

"You mean the chemist? He took an awful chance, but at least he was wearing glasses."

The chemist appeared with a hypodermic, and Carton was drugged to relieve his pain. The distorted face relaxed, and Boyd saw that the man's eyes were literally burned out. Boyd and the others turned away, leaving the chemist and the doctor and di Bargi alone with the patient. The chemist emerged from the room twenty minutes later. Boyd questioned him.

"What happened to the man?"

"He was exposed to the direct sunlight too long."

"Not more than seven or eight minutes!"

"Too long. The sun sends out light rays of all wavelengths. Above visible light are the ultra-violet waves vital to life, and above them are other invisible light-rays that are extremely destructive. These do not penetrate the earth's atmosphere, but Venus is so near the sun that even its thick cloud blanket can't keep out the actinic rays. Actinic light means light, not necessarily visible light, that has power to produce or cause chemical changes. I never dreamed it could be so terrible on Venus. When he stepped into the glare of the sun, even though the clouds diffused the light somewhat, it got

his eyes right away. Caused them to oxidize—burnt them out. He stumbled and fell with the pain—blind, poor devil, and exposed his whole body to them until I got him in. Clothes are not much protection. I took a chance. My eyes were protected by these goggles I wear—the glass is opaque to the rays. We're safe inside the rocket, but if we ever go out, it will be at night. Carton's body was burnt, too. A few more minutes would have been fatal. I didn't expose mine very long, and I'll tell the world I didn't look at the sun."

"Could anything live on the planet?"

"Probably. A matter of acclimatization. They would have to have bodies sufficiently different from ours to resist the effects of the unfiltered sunlight. Ordinary light doesn't hurt us, yet it might quite conceivably kill a being who had lived all his life in a place where there was absolutely no light. We could probably live here if our skins were tough enough, and a few other little details of our anatomy were changed. Even on earth, some people tan readily, and others are painfully and even seriously burnt from imprudent exposure to the sun. It's a matter of degree."

The doctors came out with the news that John Carton was dead.

CHAPTER XXIV

Victim of Fate

HOWARD FU-ZHSE, the Second, though he was far too proud to show it outwardly, was very much afraid. An intelligent boy of sixteen, he knew that America was holding him as hostage because America was desperate. America knew it could not hope to withstand the onslaught of the yellow hordes. For a century America had known it. Fu-Zhse the Younger knew it too. He hated America because it was keeping him prisoner. Of course they were treating him well, as well as a prisoner could be treated, but he could not communicate with anyone. He did not know where he was. As a matter of fact, he was in a building in a small town in Kansas, a building that looked perfectly innocent.

The boy often wondered if the Americans would really carry out their threat of death if his father attacked the country. They were afraid of his father, these Americans! Would they dare really to kill a helpless boy. Certainly they were very worthless and cowardly people if they would kill a boy. Musing, and trembling a little, Howard Fu-Zhse II turned over in his bed, snapped out the light of his soundproof cell, and fell into a restless slumber.

Lee Chilton was wanted by the police for jail-breaking. At least, so said the notices and so said the television announcers. Of course, the real personality Lee Chilton was on Venus, in a Venus body. The Corian possessing his body had broken out of his cell at Fort Severn quite easily, and after a month was still at large. A very dangerous man, said the police, and they were right. If they had known just how dangerous this individual was, everyone in America would have been doing nothing else except searching for him.

It was he who discovered the place where the boy-hostage was concealed. With stolen phosgen he gassed the house before the guards were aware of trouble. Masked, he entered the house. Perhaps he knew that

he was throwing his life away; perhaps he thought he had a chance to live. The gas-detectors in the house sounded alarms at Army Camp 5509, just outside the town, and in seconds motorized troops were on their way to the house. The plain-clothes guards in the house, masking themselves as soon as the detector gave the alarm, soon found that each of their masks was defective. The alien brain had managed to bring that about, also, by a clever interception and exchange of packages when the new masks were being sent to the house. He had planned his course of action very carefully.

In the seconds before the troops arrived he took the keys from the dying guards, entered the cell, and stabbed the boy to be sure of his death. He did not take the chance that his victim might survive. The troops caught him and killed him while the knife was still in his hands. There was a gun in his pocket, they found later, yet he had killed the sleeping scion of Fu-Zhse with a knife. They also found the stolen canisters, each with its little red label "CARBONYL CHLORIDE." But it did them no good. The boy was dead. As soon as Fu-Zhse heard about his death all restraint would vanish. The Dictator of United Mongolia would strike to revenge. America would be erased. All this and more ran through the mind of the commanding officer, yet he was human. He looked down at the bleeding body of the pitiful yellow-skinned boy, and turned away.

"I'm sorry for the kid. The little chink got a tough break." And he proceeded to report the matter to Washington, probably knowing quite well he was to be court-martialed. The problem of guarding the boy and yet keeping secret his whereabouts had been delegated to him, and he had failed.

One should not fail, if the life of a nation depends upon success.

There was another who reported to superiors, a spy in Camp 5509, and the Three in Vienna were roused from their slumber to learn that the hostage was dead. They looked at the harmless-appearing cable containing the code-word they had agreed upon, and smiled. Then they put through a call to Peking, where the Dictator was in retirement. The three Corians at Vienna waited impatiently for the connection. This time there could be no further delay. The first step of the Venerian plan to wipe out the terrestrial population was under way. Fu-Zhse held the power to eliminate America, and Europe would soon join against the western hemisphere. The three from Venus knew that. They were still in political control of Europe.

Howard Fu-Zhse answered the radiophone call.

Brad-Henson Ecclestone opened the door of his apartment to admit the commanding general of the New York Defense Region. The general wasted no words.

"Have you solved the cipher?"

"No. Have any of your staff solved it?"

"No. I guess this is the end. The boy was killed an hour ago. Our last chance to hold back Fu-Zhse is gone. Now that the boy is gone, he will attack immediately."

"We could not hope to withstand Mongolia without atomic power, could we?"

"I doubt it. And Fu-Zhse will show no mercy now. It will be war, and we're on the losing side."

"I'm sorry that cipher eludes me."

"It can't be helped. We know you've been trying to solve it. If it contains what we think it does, we could

put up a real fight. You do not see any hope for us?"

"I've made no progress, except to eliminate certain possibilities."

"Too bad. We'll make what preparations we can for defence."

At that second, the Dictator of United Mongolia was making preparations for offence. His chief of staff told him that it would take precisely forty-two hours to wipe out America if they could attack by surprise. The air fleet made ready. There would be no recall this time. The Americans were to be annihilated before they could resist. Through the Mongolian army circulated the story that America had deliberately killed the son of the dictator after guaranteeing that he would not be harmed if peace continued. The Americans had broken their word. They were to be destroyed.

CHAPTER XXV

A Flyer and a Fighter

LEE CHILTON and Meriden, the Sarvonian swordsman, scaled the rocky ascent and found the *Interplanetary* just about the time Benny Jacob's gang finished repairing their instruments.

The two were admitted by Burton Boyd and Riccardo di Bargi, each of whom held a pistol at the ready. Then came the surprise of Lee's English, and during the next two hours, the whole story of the plans of Cor was unfolded.

Benny Jacobs completed the interplanetary radiovision circuit; again the announcer spoke into his mike, but not for long. He relinquished it to Lee Chilton and Burton Boyd.

The people of the earth, served by the millions of news machines under the control of Universal News and the great Eurasian Syndicate, learned from across space that it was Venus that was responsible for the impending war on earth; the secret agents of Cor had played the earth-nations against each other, had worked up festering hate.

The earth's reaction was instantaneous. The intelligent people of both hemispheres had not wished for war, because war was no longer hell; it was infinitely worse than any hell.

Almost on the second when Fu-Zhse was to order the start of hostilities, his grip was broken. The greatest mob-psychologist since Napoleon was Fu-Zhse. Hundreds of thousands of men had been willing to meet certain death for him, but the interplanetary circuit of Benny Jacobs broke his power. His own soldiers killed him, and sued for genuine peace. The Three in Vienna were destroyed almost as soon as Lee Chilton and Burton Boyd told the earth of their identity and their plans. The people of the world, released from the impending threat of war, established peace and friendship based on mutual understanding. Each race realized that the others were human like themselves. They immediately got together and made plans to resist the possible future arrival of Corians. The fighting power of the earth, as one unified defense system, was terrific, and the earth knew it. White man and yellow man and black man were no longer afraid of each other, and, together, they decided that they weren't afraid of Venus either. Let the Corians come if they dared! The splendid war-machines of the earth were ready and waiting . . . not

to destroy the peoples of the earth, but to defend them.

Two hours after the news-circuit was established, the announcer took his mike again. The technician checked his careful adjustments.

"Ladies and gentlemen of the earth, you have just been seeing and hearing the earthman Lee Chilton, in a Venus body, and Burton Boyd of the *Interplanetarian*. This is News-Unit Thirteen, which will be in constant communication with the earth from now on. As soon as arrangements are perfected, we will show you the landscapes of Venus. At present we will turn the mike over to Professor di Bargi, who will talk for a short time on the scientific aspects of our trip. Even here on Venus, Universal News is serving the world with popular and technical news. . . ."

EVERY word that issued from the *Interplanetarian* was intercepted in the City of Cor. The Council of Nine gave way to futile rage and hate. No hope to conquer the world, now that it was warned and prepared! What to do? The plane with the fatigue-ray projector was on its way to Sarvon. In desperation the Spokesman of the Council ordered his radio-operator to get in touch with the giant war-plane. They could at least take some revenge. This rocket from the earth was steel, too, and steel they could destroy! Of course, it would delay their destruction of Sarvon a little, but not for long. The hated steel city of their enemies would come next.

A messenger entered. "A cosmic radiogram has just been received from the earth. The scientist Eenedar wishes to be retransferred immediately to his own body. It is now very dangerous on earth for any Venus identity. Eenedar has made some very important discoveries about the earth, which he will report when he is returned to his own body here on Venus."

"Tell the scientists in charge to effect his return immediately," snapped the Spokesman.

THE *Swordsmen* of Sarvon fidgeted uneasily in the rocket while Chilton was discoursing over the radio. Meriden knew that the earth must be warned, but he was also anxious for the safety of Sarvon. Chilton had translated the welcome of the earthmen to him, and had then, of necessity, left the giant to his own resources. Shortly after the radio news-unit was through with Lee, Meriden, in tremendous agitation, called him, pointing out the open door of the rocket. The sun was almost setting, but there was light to spare. In the distance they saw an immense war-plane crossing the plateau a scant three hundred feet above it, and they recognized the plane for what it was . . . the carrier of the ray that made steel more fragile than glass. It was half way to Sarvon. It would reach the city after dark, and the city would collapse and carry its inhabitants down to death, unless . . . unless they could prevent the plane from reaching Sarvon. Sarvon was not warned; even if it had been, it had no way of protecting itself from the ray. Sarvon was built of steel!

In a few seconds Lee Chilton had outlined the situation to Boyd, who gave swift orders. One of the tiny two-seated planes was brought from the cargo-room, in pieces which were rapidly uncrated. The sun was still low in the sky. None of those in the rocket except Lee and Meriden could dare to venture outside, but Lee Chilton knew terrestrial airplanes. With the giant's help he

carried the uncrated units outside, and set to work assembling them. Inside the rocket the highly-trained crew, eager to assist, assembled the motor on a testing block they had brought along, checked every adjustment, tuned it up to perfection *plus*. And Meriden of Sarvon walked into the rocket, picked up the efficient power unit that three terrestrials could hardly have moved, and calmly carried it out to the almost assembled plane. When they were done and ready to take the air, the sun was yet lower in the cloudy sky. In an hour or so it would be dark.

Lee waved to the watching crew and gave the ship the gun. It disappeared in the clouds almost immediately in the direction that the feared plane from Cor had taken.

"You see," said the bespectacled chemist to Burton Boyd, "that the Venerians are immune to their destructive sunlight—a matter of acclimatization through the centuries."

Boyd hardly heard him. "A flyer and a fighter," mused the detective. "I wish I were with them."

A fierce exultation gripped Lee Chilton. He was again flying an earth-plane, a sleek little hawk with fangs. Delicate directional sound-detectors enabled him to locate and follow the enormous Corian plane in spite of the fog. The indicators told him that he was gaining on it ever so slightly. He opened the throttle to its ultimate; the propeller seemed to bite into the fog; he was gaining on the monster now, but it was still twenty miles ahead, and making almost as good time as he was. Could he catch it before its batteries and generators and projectors flashed that disintegrating ray on the helpless structure of Sarvon? He looked at his indicators again, and asked Meriden some questions about the relative location of Sarvon. Yes, if nothing went wrong, he could catch the Corian plane.

Concisely, he instructed Meriden in the use of the guns. The Sarvonian was quick to learn; but he had never handled any bullet-projecting weapon in his life. Lee explained how to use the automatically self-correcting sights, how to start and stop the deadly hail of explosive bullets from the Marvite machine-guns. Two were concealed in each wing-tip; others were mounted on the rim of the cockpit, controlled by hand. Lee regretted that he himself could not take over the guns, but he knew that he would have his hands full handling the plane. It would take some clever stunting to dodge that beam of invisible rays. If it once touched the plane, said plane would fall to pieces right out from under them. Lee only hoped that the Corians would send a visible light-beam along with the other. If they did, it would be perhaps a little easier for them to aim at the terrestrial ship, and it would also be easier for Lee to dodge. He fingered his parachute to reassure himself, and instructed Meriden concerning his . . . needlessly, for the giant was fully aware of the functions of a parachute.

The indicator needless of the sound-detecting apparatus suddenly jumped. Lee had not altered his course, and he was already making his maximum speed. There was only one explanation; the other plane had altered its course. It took Lee about thirty seconds to discover definitely that the warplane was doubling back on its course. He warned Meriden to be ready for immediate combat. The needles were approaching the limits of the dials; the other plane was getting close. Then the direc-

tional apparatus showed the Earthman that the returning monster was not coming exactly towards him, perhaps was not even aware of his existence! It was going toward the rocket.

The sun was just setting. The fog was getting darker gray. Blindly, Lee altered his own course to intercept the Corian plane. In a few minutes he thought he saw it, dimly, through the foggy mist. A short burst of bullets from one of Meriden's guns exploded against the armored side of the warskyship from Cor. Beginner's luck! It was several minutes before any of Meriden's other attempts were successful, yet he was doing his best to make his shots count, to wreck his enemy's plane, to save Sarvon. Meriden's first burst had injured the big plane only slightly. If it had hit the tail or wing-surfaces, things would have gone differently. It inflicted only minor injury on the armor that guarded the vital parts of the ray-generator.

But Meriden's shots came close, and the Corians soon began to realize that they were coming closer with every second. The unwieldy Corian ship could neither outdistance nor outmaneuver the terrestrial hawk.

Only at intervals was either plane visible from the other. Lee flew with seeming recklessness and with incomparable skill, darting up to give Meriden a chance with the guns, flashing out of sight, literally flying circles about the other. Meriden succeeded in getting in another direct hit that jarred the Corians, but did not wound the big ship. It held steadily on its course to the rocket. They were close to it now.

A brilliant beam of light shot out from the Corian plane, seeking the small attacker. It seemed to be manipulated with incredible speed by some skilled operator. A burst of bullets from the grim giant in the front cockpit went wild. Meriden cursed his luck, for neither he nor the cool Chilton knew, as they tried their level best to bring down the armored war-plane, of the unconscious stowaway wedged between three fuel-tanks. Meriden's first burst had jarred the plane, and the dark-eyed girl had struck her head against one of the tanks, and had slumped down between them. She was momentarily safe from discovery, yet if one steel-jacketed explosive bullet had penetrated one of those tanks. . . .

Lee banked suddenly to avoid that disturbingly quick, shifty, brilliant beam of light, and circled around to give Meriden another direct aim. The beam beat him to it, framed the little plane in brilliance for one second. Nothing happened; evidently the steel-fatigue ray was not being projected along with the searchlight. A continuous stream of bullets was flashing from one of Meriden's guns . . . somehow he had jammed a trigger. Lee swung around again toward the weirl beam of light that pierced the blackness. That stream of bullets shouldn't be wasted. Apparently Meriden couldn't stop the gun. As he swung into an advantageous position the supply of cartridges gave out. Lee cursed from exasperation, yet that circumstance had saved Izanne's life, at least for a while. Lee Chilton didn't know that she was aboard the enemy ship. . . .

The great searchlight beam was pointing downward, now. Suddenly Lee got a glimpse of the immense *Interplanetary*, plainly revealed in spite of the fog, outlined by the penetrating light. The character of the light changed; an unpleasant metallic bluish tinge imbued it now; and the great steel rocket suddenly collapsed. The steel had been rendered more brittle than glass by arti-

ficially produced steel-fatigue, a thousand times more severe than the natural weakness that very rarely occurs in steel structures after long use, the weakness called metal-fatigue for lack of a better name or a better explanation. Sometimes it seems as if the steel had just grown tired. The master scientists of Cor had learned to produce that same phenomenon, many thousand times as complete. Their ray destroyed not the steel, but the cohesion between the molecules of steel, so it crumbled like dust.

Lee Chilton saw red. He was no longer a cool daredevil trying scientifically to obtain advantageous positions for Meriden's guns. He was a madman determined to revenge the destruction of the rocket. He flashed through the fog within fifteen feet of the other plane. Meriden's guns were continuously going *staccato*, and it was having some effect on the big plane. One wing was damaged. . . .

The searchlight found the little comet again, and this time it had that alien bluish tinge. The earthplane flew to pieces just as an explosion rocked the Corian plane. Lee pulled the ripcord of his parachute as he had planned to do in case of emergency, devoutly hoping that Meriden had remembered to pull his as per instructions. Meriden had kept his nerve, however, and Lee saw dimly another billowing white mass close by. The two men were falling in almost the same path. Before he expected it, Lee was bruised by sudden contact with hard rock. Meriden was close, and the earthman realized that they had landed on the plateau. Perhaps they could join the rocket-crew, if any had escaped alive when the space ship had disintegrated. Di Bargi and Boyd would be desperate. The Venus-day would come again before many hours, and to terrestrials not actually possessing Venerian bodies, sunlight meant death. . . . They had no shelter.

Meriden gripped his hand. Their comradeship had grown deeper during that battle.

"At the very last," queried the giant, "you heard the explosion?"

"Yes. Your last shots must have been effective. It sounded like one of their fuel-tanks exploding. They probably crashed somewhere below the plateau, in the jungle. I saw a sheet of flame surround their plane."

"I am sorry about your friends, Earthman, but they will know the gratitude of Sarvon for that plane they gave us. At least we have saved my city from the Corian ray."

But Meriden, the Sarvonian, and Lee Chilton of the Earth were too blindly optimistic. To be sure, some fuel-tanks had exploded, some of the Corian crew had been killed, yet the giant plane had not crashed. It was a warplane, built for battle, built to withstand damage. There was enough fuel left, and the ray-projector was unharmed. It was limping toward Sarvon, and aboard it was a bleeding girl. . . .

CHAPTER XXVI

The Cosmic Balance

"I, EENEDAR, can wipe out the population of the earth in three days," said the Corian meteorologist to the Council of Nine. "It is indeed fortunate that your plan of warfare was not successful, for warfare would have wrecked and destroyed the great buildings and the great works of the earth, damaged that

which we wished to conquer. When my plan is put into execution, none of the earth-structures will be destroyed. We can take possession of the untold wealth of the planet at once. Furthermore, my plan is safe; it cannot fail."

The nerves of the Spokesman were on edge. "What is your plan?" he snapped. "Tell us at once." The other councillors leaned forward tensely. Surely Eenedar would not speak so confidently if he were not sure of himself. He had been to the earth, in an alien body, to investigate conditions there. He was known as a great and reliable scientist, so certainly his plan was worth hearing.

"Human life on the earth," (Eenedar commenced) "has developed for ages under a very delicate cosmic balance, a very exceptional combination of circumstances. The skins of terrestrials are very thin and delicate, in comparison to those of Venerians, and their tissues are also more delicate in composition. We, on this planet, are accustomed to an intensity of sunlight, even in spite of the clouds, that terrestrials could not endure. Certain actinic rays which have only a beneficial effect upon us would be deadly to terrestrials. These rays are always present in sunlight, but they do not reach the terrestrials because of a peculiar circumstance—the presence of a small percentage of ozone in the upper atmosphere of the earth. This ozone acts as a filter, straining out or eliminating the rays harmful to terrestrial life. It is a very delicate balance. If there were more ozone in the earth's atmosphere, it would filter out the ultra-violet rays, which are essential for life to exist, and if there were a little less ozone in the atmosphere, it would fail to screen out the destructive actinic rays of the sun. By increasing or decreasing the ozone content of the earth's atmosphere, we can insure the death of every terrestrial. It will be easier and quicker and more sure to destroy all ozone in the earth's atmosphere, rather than try to add some. In three days the earth will be cleared of inhabitants. We can take possession forever of the undamaged rich planet, and I assure you I have seen some of its incredible wealth. Our bodies are used to the rays which will destroy the terrestrials. . . ."

"Just how do you propose to bring this about?"

"It is very simple. Ozone is nothing more or less than a variant or allotropic form of oxygen. An ordinary molecule of oxygen consists of two oxygen atoms. A molecule of ozone is made up of *three* oxygen atoms. Oxygen is the more normal or stable form. Oxygen atoms, under most circumstances, tend to pair off in twos, forming oxygen molecules, rather than combining in threes to form ozone molecules. All that we need is a device to cause ozone molecules to split up, dissociate, and then they will naturally recombine to form mere oxygen, which does not have the ability to shield from the particular rays of the sun which are destructive to earthmen."

"But how can we change the earth's ozone to ordinary oxygen?"

"I perceive that the Council has not been kept well informed. When our scientists were developing the steel-destroying ray, which was so successful in destroying the terrestrial rocket, as has just been reported by radio, the ray which is soon to destroy Sarvon forever, their first successful step was the production of a ray that would break the *valence* of gases, causing gaseous molecules to dissociate into gaseous atoms. That ray is

in use even now, in our electrical factories and shops. Electrical machinery often generates quantities of ozone. Its odor is pungent and disagreeable, so even now in Cor we are using this ray to destroy ozone. Freed from the influence of the ray, the dissociated oxygen atoms recombine to form ordinary oxygen. It was later developments and modifications of this ray that we found to have the ability to disintegrate steel in a similar manner, by destroying the very cohesion between its atoms. . . . We have the method. Our first space flyer is almost ready. All we have to do is to circle the earth as a satellite, changing our course whenever necessary, exposing all its atmosphere to our ray. Of course whenever we destroy the ozone in some particular section of the atmosphere, the remaining ozone will tend to diffuse, to distribute itself equally throughout the atmosphere. But it will not be long until we will have destroyed so much, that the remaining amount, evenly distributed, will be insufficient to screen out the actinic rays. . . ."

"I hereby order that you, Eenedar, be given full authority and command over the forces of Cor. Proceed to carry out your plan with the greatest possible speed."

The Spokesman of the Council of Nine signaled that the meeting was at an end. ◀

CHAPTER XXVII

The Fury of Izanne

ALL that remained of the *Interplanetarian* was a heap of impalpably fine steel dust, rapidly oxidizing. The warm night-winds of Venus were scattering it in all directions.

A group of anxious men stood nearby on the plateau. Benny Jacobs was alternately crying and swearing. The ray from the Corian plane had destroyed only steel, but certain vital parts of his radio and television apparatus were steel.

Burton Boyd and di Bargi conferred for several minutes and called the men together. Di Bargi outlined his plan.

"Before day we must erect some shelter from the sun, or we'll all die horribly, like Carton. The glass windows of the rocket were not destroyed, though some of them were shattered when the rocket collapsed and let them fall. There was some wooden furniture aboard, and some collapsible shelter-shacks. We shall have to dig these out of the dust immediately. Try not to get any more of the dust in your nostrils than you can help. Everyone get busy at once. . . ."

Two newcomers appeared in the blackness. "You will hardly have time to recover your shelters and erect them, Professor," said Lee Chilton. "Meriden and I can guide you to a cave not far from here. It's some hundred of feet down the cliff, and there is a broad ledge in front of it. If you men have the nerve to climb down the vertical cliff. . . ."

Before dawn they were all safe in the cave in which Lee Chilton had first met the Swordsman of Sarvon. Lee and Meriden had gone down into the jungle beneath them in search of food.

BEFORE dawn the Corian warplane had passed over Sarvon time and time again, and the invisible ray had flashed down to the magnificent single structure of steel, miles in each dimension, that was the city of Meri-

den. The Corians did not send a visible ray this time with the ray that destroyed. They did not need to see. Delicate magnetic indicators enabled them to locate the city accurately, and they checked the needle's readings with charts of the city's location. Six million tons of steel cannot be hidden by darkness from a magic needle. Down through the warm fog stabbed the steel-destroying ray, and the murderous plane from Cor departed in the darkness. Then a member of its crew discovered Izanne.

She was bleeding from a jagged cut received from a fragment of the fuel tank that had exploded. The fragment had gashed her left shoulder deeply from the front, coming very near to the subclavian artery. It had miraculously missed damaging any bone, but the girl was deprived of the use of the arm.

The commander of the Corian plane, knowing how anxious the Council was to recapture the girl, ordered the surgeon of the warplane to give her the best of care. He treated the ugly wound carefully, but he was unable to bring her back to consciousness. The disabled plane continued toward Cor at half speed. News of its success was radioed to the Council of Nine. Planes were sent from Cor to meet it with fuel and to take the girl to Cor as quickly as possible. The plans of Eenedar were materializing with lightning speed. It would be a matter of hours only before he would be ready to leave with a few men in the one completed rocket, fully equipped to navigate space and to destroy the ozone of the earth. The other two space-ships would be ready to carry the bulk of the Corian population to the earth after the terrestrial hordes had been killed by the rays above the violet. It was a matter of hours before Eenedar left; and the Council intended to torture Izanne until she divulged the secret in the notebook. Atomic power would be useful to Eenedar, if they could obtain the key to the cipher before the rocket left. The surgeon worked unceasingly over the girl as the warplane headed toward Cor. She was breathing normally, but for some reason Izanne did not return to consciousness. Outside it was dark with the darkness that comes before dawn.

She was clever, Laura Ives. As a matter of cold fact, she was quite conscious for half an hour before the surgeon knew it, and he only lived to know it for a few insignificant seconds. Her good right fist crashed into his skull with the uncanny superhuman strength she possessed, strength and power acquired with her transfer of bodies. She had patiently waited for her chance to strike; the surgeon had come too near, and had died without even a gasp. Izanne rose from the table on which she had been lying and washed the blood from her fist in the surgeon's basin. She did not look again at the man whose skull she had crushed.

Single-handed, literally single-handed, she set about to capture the ten-ton warplane. Cold fury possessed her. She had five men to deal with; the surgeon and one of the crew were dead. The commander, the radio operator, and three of the crew were left. She sought the radio-room first; it was nearest to the surgeon's cramped quarters. As she entered the room, the operator wheeled to face her. As he leaped, his hand on one of the three swords always carried by Venerians, the girl leaped too, avoiding the keen blade by inches, and with one blow crushed the operator's skull. He fell against her bandaged shoulder, bruising the wound, but in spite of the pain, she took one of the swords and

smashed the instruments, cutting off all communication.

The noise was heard outside the radio-room. A few moments later the commander and another Corian entered with drawn swords. Instinctively Izanne hurled the heavy, balanced blade from her hand. It buried itself to the hilt in the breast of the second Corian. Almost at the same second the commander threw his sword with the uncanny skill of the trained Venerian sword-fighter. It did not wound her; the commander had not intended to touch her; but it passed so close to her side that it pinned her clothing to the hardwood wall. Before she could disengage the torn tunic-like Venerian garment, the commander, with an inscrutable smile, was holding the point of another of his swords at her throat. She was captive again.

Or at least, so the commander thought. He didn't live to think anything else. The anger that possessed Izanne was not passionate; it was deliberate and cold and calculating. She knew of her supernormal strength, and she knew that the commander was in all probability ignorant of it. She permitted him to bind her, broke the cords and killed him when he was expecting no resistance at all. She found the remaining two of the Corians together in the control-room, and killed one as he left. She entered the room and used the point of her sword to demand obedience from the one remaining Corian. At her direction, he headed the plane toward Sarvon; but told her that there was not enough fuel left to reach the city, and that it had been destroyed with the steel-fatigue ray; whereupon she ordered him to land on the plateau between the two cities. This he did. As the damaged plane jolted to a stop on the uneven rock, its lurch jerked the frightened Corian pilot forward upon Izanne's already-reddened sword. For a few seconds she sat frozen, looking at the dying Corian. Then the reaction came, and she covered her face with her good arm and burst into hysterical sobbing. She seemed to see her slain brother's face. "Harry, old chap, I guess . . . I guess you're avenged, now."

CHAPTER XXVIII

Retaliation

JUST before dawn, Meriden had killed, with a thrown sword, a fine buck of a species of Venerian antelope, nocturnal in its habits. In the pale light he and Lee were carrying the venison toward the cliff when they saw the immense Corian plane pass overhead and descend toward the plateau. It had seemed about to land.

Eagerly they climbed to the cave with their burden of meat, left it there with the cook of the *Interplanetary*'s crew, and continued up the cliff to the top of the ascent. It had been a fatiguing climb, even to them. The sun was well up in the always-clouded sky when they saw the plane, motionless. Cautiously, swords ready, they approached it. There were no signs of life on board the plane. They recognized it as the one they had been fighting in the early part of the night. They entered it and found Izanne, crying a little in her weary sleep.

She was very beautiful to the two men who loved her, beautiful in spite of her torn and blood-stained garments. Each of the men stepped forward instinctively to lift her in his arms, and their eyes met coolly. Meriden and Lee

Chilton knew that they were rivals, and, according to the Venus-code, rivals fought to the death. Yet they were comrades. . . .

Four fast planes landed skilfully near the motionless large one . . . the planes sent from Cor with extra fuel. The commander of one of them had orders to bring the girl to Cor. The twelve Corians from the planes were suspicious. The warplane had suddenly ceased to communicate with Cor, and they had had a difficult search before sighting it here on the plateau. They approached it cautiously, swords drawn. Then Meriden and Lee Chilton, attracted by the noise of the Corian planes, appeared in the fuselage door of the large plane, and three of the Corians recognized the Swordsman of Sarvon.

Then began the greatest fight of Meriden the Sarvonian. Before that battle was over, each of his three jaguar-hilted swords had drunk deep of blood, and his own blood stained the rocks. One of the Corians had reentered his own plane and radioed to Cor; the other eleven had attacked the two in the doorway of the larger skyship. And Meriden had leaped to the combat. Always at his side was the earthman Lee Chilton, hardly a less formidable opponent than the giant, for Lee fought with the fencing-technique of earth, unfamiliar to the Corians, who, except when throwing them, were accustomed to using the edges of their swords rather than the points . . . unfamiliar and deadly.

The Corians did not force the combat. They had plenty of time, and they were numerically superior. Working systematically in shifts of four, they undertook to exhaust their two enemies. Twelve of them there were, and when four were tired, four fresh and rested swordsmen took their places, but the two who were protecting Izanne had not a minute's respite. Nevertheless, the Corians made one fatal mistake. They jeered at Meriden and boastfully told him of the fate of his city. It drove the giant mad. In a minute and a half he killed three of his opponents. The others retreated toward their planes.

As they did so, they seized the opportunity to throw swords, which they had not dared to do previously for fear of hitting their own comrades. Meriden could hurl swords too. In this way he wounded another Corian enough to keep him out of the battle, and he acquired his third wound of this particular battle. Lee Chilton had five, but only one of them was at all serious.

But the Corians were succeeding. It was easy to see that Meriden needed a rest desperately. The eight Corians determined not to give him a second to recover, and crowded around the two to finish them. Lee and Meriden backed toward the warplane. A scratch on the giant's forehead was bleeding freely, and the blood was getting into his eyes. His breath came in enormous choking gasps. The eight enemies were confident now that they had won. Meriden took a second to wipe the blood from his eyes with the back of his hand, and in that second Lee, with a sword in each hand after the Venerion fashion, stepped in front of the giant and protected him until he could see again; then for a while they were fighting back to back, for protection against the surrounding circle of warriors. One more of their opponents was disabled now, but the unequal battle was going to the Corians. Meriden was practically blind, and bleeding from a dozen wounds; Lee was weak from loss of blood, suffering more physical pain than he had previously believed possible for a man to endure, but he could

yet see. Blood from his wounds had not blinded him.

Suddenly he saw Izanne in the doorway, motioning the two men to retreat toward the warplane. Lee took Meriden's arm and drew him swiftly back. The move was unexpected by the Corians, and for a second they were alone in a group of seven.

In that second Laura Ives exposed them to the steel-fatigue ray, and every one of their swords disintegrated into impalpable dust. Meanwhile Meriden had again wiped the blood from his eyes. The seven men stood motionless a moment and leaped toward their planes. Meriden leaped to forestall them. Lee shouted to Izanne to turn the ray-projector on the planes. She shook her head and snapped off the ray. Wondering, Lee rushed to Meriden's aid. Two of the Corians managed to take off in one of the planes. The other five were held at bay by Lee and Meriden. The Corians knew that it would take little provocation indeed to cause Meriden to run them through.

The girl had snapped on the ray again, and had turned the projector, mounted on top of the fuselage of the warplane, so that it caught the escaping Corian plane. It disintegrated, and the two men in it were wearing no parachutes.

Then, after a short conversation with the girl, Meriden and Lee forced their prisoners, at sword-points, to refill the tanks of the warplane with the fuel which the smaller planes had brought. In a few moments Lee had disabled the Corian planes, and then the warplane rose with Meriden at the controls. Lee stood by, intending to relieve the giant when he tired, and Izanne watched the two men furtively, sensing the coolness between them. None of the three said anything. The giant and the earthman needed medical attention badly. It soon became evident that Meriden intended to land on the broad ledge in front of the cave. He did it well, considering that he had lost several pints of blood, was suffering from upwards of ten open wounds, and was blinded by the blood that persisted in flowing into his eyes.

The staff of the *Interplanetary* treated their wounds and attended to the wound of Izanne. Her real identity was revealed to the group from the earth. Benny Jacobs was beside himself with grief. Here was startling news-material, and his beloved news-unit was out of touch with the earth. Benny burst into genuine tears, and the technical staff of the news unit redoubled their efforts at improvising a usable cosmic radio from the material at hand, which wasn't much. It was evident that to reopen communication with the earth, new motors and generators and instruments would be necessary.

Meriden took the first opportunity he could to speak to Izanne. "Is it true that . . . that they were successful in destroying Sarvon with that ray?" he asked haltingly.

The girl did not reply, but he read the answer in her eyes. It seemed to crush the giant. His city-nation destroyed. It had existed for centuries, that proud city, that one great structural unit with its foundations deep in the jungle mire and its upper levels among the clouds. Destroyed. Meriden was not quite able to comprehend completely that idea. Izanne held out her hand to him and he took it gratefully, tried to tell her a little of his grief, but choked on it, and turned away. The Swordsman of Sarvon was ashamed of tears. There was something else he wanted to tell her, too, but somehow he could not speak freely to this earthgirl.

He left her and sat by himself in the cave opening,

brooding, wondering if he were the last of the Sarvonians alive. Thousands of them must have been killed when the structure collapsed, ran his thoughts, but certainly thousands must have survived. But, with no tools of steel, with nothing to protect them from the beasts of the jungle, they could not exist long. He decided to go to Sarvon in the plane. At least, he had some swords left, good swords, wrought of tempered steel and burnished gold. Perhaps he could help.

It was not until he ceased to brood and started to think that he thought of the perfectly good projector of the steel-fatigue ray, mounted in that little fenced-in enclosure on top of the fuselage of the Corian plane. In a few seconds it could be lowered into the fuselage itself, and projected downward through an opening in the floor. It was a two-edged weapon. Cor was built of steel, too. There was plenty of fuel in the plane, both for the motors and for the generators that supplied the power for the ray. He had a means of revenge, but two men would be necessary, one to pilot the plane and one to operate the projector. Meriden went in search of Lee Chilton.

Upon learning of her identity, Burton Boyd had obtained from Laura Ives the key to the intricate code her brother had used. She carefully detailed to him the mathematical processes by which the complex cipher could be made to yield its secret.

Burton Boyd was more than anxious to send this knowledge to the earth. There was no longer any danger of war on the earth, and the secret of the liberation and control of intra-atomic energy would be of tremendous value to the earth. But it did not seem possible to accomplish communication across the void. Burton Boyd was irritated by his inability to get into communication with Robert Huston and Brad-Henson Ecclestone, but he did not realize how vital to the world that communication would shortly become.

After his wounds had been dressed, Lee Chilton sought out Izanne, finding her just after she was through speaking with Boyd, who had wandered back toward the interior of the cave.

Very gently, because of her injured arm, Lee Chilton took her in his arms and kissed her upturned lips. He was startled a little at the fervor with which she returned the kiss. Her slender body was suddenly very limp against his, and she started to cry softly, burying her face in his shoulder.

And so it was that Meriden found them.

Meriden was very calm now. His face betrayed no emotion. In a low voice he asked Lee to go with him in the plane, to avenge Sarvon, to destroy the city and the immense rockets with which the Corians intended to invade the earth.

Lee went with Meriden in the warplane of Cor, and left behind him a starry-eyed girl. . . .

Neither of the two men spoke as the plane hurtled toward Cor. It was very hot in the plane, in spite of the speed they were making and the wind which it produced in the well-ventilated skyship. Meriden handled the controls, always climbing. Lee adjusted the projector to point downward and waited, thinking of Izanne. He was sure she loved him, though she had not said so, nor had he himself confessed his love, in words. Words weren't necessary. They understood each other. But Meriden . . . How would the giant take it? Lee knew that the Swordsman loved the girl sincerely, and that

Meriden considered Lee to have a right to her love only if a duel proved Lee to be the better man. He was not a coward, Lee Chilton, but he hated the thought of fighting the giant swordsman with whom he had shared so many adventures.

The sudden appearance of half a dozen Corian planes, (sent to investigate the mysterious silence of the first four) snapped Lee out of his meditations. He had discovered what were evidently sights for the accurate aiming of the ray, and he had disintegrated the six planes almost before they were aware of the large plane above them. The skyship roared on toward Cor.

A series of tremendous explosions, at intervals of three seconds, rocked the plane. Far ahead, Lee saw through the observation windows of the fuselage a tremendous object shaped like a dirigible without motors or cabins. It was rising vertically at tremendous and accelerating speed. Brilliant flame emerged from its lower end. In the few seconds it took for the object to disappear completely in the clouds, Lee realized that it was the first of the rockets leaving for the earth, but he did not know that aboard it was Eenedar, meteorologist of Cor, with fuel equipped for destroying the vital ozone of the earth's atmosphere.

He and Meriden were some five minutes too late; if they could have prevented the going of that rocket they would have rendered an incalculable service to the earth, but by the time they reached Cor, the rocket was already out of the atmosphere of Venus.

So unexpected was their attack on Cor, that it was entirely successful. The ray flashed down invisibly, and through the sights Lee saw the immense city crumple into dust as it was exposed to the ray developed by its own scientists. It was slaughter, the earthmen realized, but only in that way could the power of the earth's greatest enemy be broken. They had shown no mercy to Sarvon; they had calmly laid plans to decimate the earth, which they did not need, because they coveted its wealth and power; they were reaping precisely what they had sown. It was like magic to see the structure crumple and collapse and dissolve into powder, and it was horrible, yet the City of Cor would never again threaten the earth. There was no chance to organize resistance. The ray brought down the few planes that managed to take off. The survivors, thought Lee grimly, could take up again the age-old fight with the jungle. If the race survived, perhaps the hardship would make it cleaner and better.

It seems to be true that a great nation falls when it seeks wealth and power and luxury, which it does not need.

Cor was destroyed, yet that one rocket that escaped was speeding toward an unwarned, defenseless earth. . . .

CHAPTER XXIX

The Battle of the Sky-Hordes

YET Cor was not dead yet. Near the city was an enormous cleared space in the jungle. The two incomplete rockets of the Corians were being built there, and the third had just left its berth between the other two.

Perhaps half of the Corians had gone to this enclosure to see the rocket leave. Myriads of little planes were parked near the rockets. Besides the citizens who had come to watch the rocket's departure, there were also

thousands of workers in the great and busy enclosure.

Lee had not attacked the rockets with his ray. He remembered the group of marooned earthmen in the cave who could not endure the sunlight of Venus because of its actinic rays, and he decided that the rockets should not be destroyed. At least one of them must be saved for di Bargi.

And so, while the warplane passed and repassed over the crumbling city of Cor, a swarm of little planes took off from the enclosure. Most of them were armed, though few possessed the recently developed steel-fatigue ray. They were armed with the Corian heat-ray and an electrical ray that paralyzed the engines of planes it touched. Venerian planes had always fought with rays, the use of projectiles had never been developed on the Hot Planet.

And so the big warskyship was surrounded by innumerable little planes, every one of them bent on revenge. For a moment it seemed that the big plane could cut its way out of the swarm. Plane after plane suddenly fell to pieces in the air as Lee manipulated the big projector, but there were too many of them. Heat rays were striking the armored walls and making the interior temperature intolerable.

Then the motors missed and stopped dead. One of the Corian rays had short-circuited every electrical connection on the big plane, including the generator that provided the power for the steel-fatigue ray projector. Lee threw the battery switch desperately. Perhaps the projector could be operated for a while on the batteries. No results. It was evident that the Corian ray was short-circuiting the storage batteries too.

The plane was falling erratically. Meriden was trying to volplane down, but the skyship was too heavy, and the wing, that had been disabled by Meriden's bullets the previous night, rendered a smooth descent impossible.

Suddenly the motors caught on again. The unknown Corian had not been skilful enough to follow the erratic fall of the plane with his short-circuiting ray. It was almost a perfect conductor of electricity, that ray, and no electrical device exposed to it could operate. But once out of its field of influence, the plane was not permanently damaged.

Instantly Lee reversed the switch and disintegrated the nearest little plane. Then the conducting ray stopped the engines again, and the warplane dropped. The temperature was intolerable. Lee looked at one of the windows in the fuselage and saw that the glass was fusing under the influence of one or more of the heat rays. He stepped aside, just as a beam of unendurable heat struck the projector which was pointing downward through the opening in the fuselage floor. In a vain attempt to save the projector from the effects of the heat ray, Lee threw the switch that lifted the projector up through the top of the fuselage to that fenced-in enclosure from whence the projector could be pointed upward. In his frenzy he forgot that the power was off again. The hoists did not work, and the projector itself was fusing from the heat.

Meriden, in the pilot's compartment, strove to keep the plane under control. Both he and Lee realized that he was not doing so, but the earthman was powerless to help. In a terrestrial plane, Lee Chilton could have maintained control, but he had never learned anything of the controls of a Venerian airplane.

The plane landed, smashing its undercarriage, in the

space between the two nearly-completed rockets. Meriden and Lee leaped out, each with a sword in each hand. Hundreds of Corians ran toward the plane, all armed with heavy swords of good steel. The enclosure where the rockets were being built had not been exposed to the ray that had destroyed the city of Cor.

Once more Lee Chilton found himself at the side of the Swordsman of Sarvon, fighting for life itself against odds. It looked rather hopeless to Lee. Their wounds of a few hours ago were still painful, in spite of the care they had been given by the surgeon from di Bargi's crew of earthmen. Never before had the odds against them been so great. Well, all had to die sometime. . . .

"No," said Chilton suddenly, a second before the nearest of his enemies reached him, "No! I'm going to live. She'd be sorry if I died."

For one second Meriden looked at him with steel-gray eyes. Then they gave their attention to the fighters that were crowding around. Both their backs were against the fuselage of the wrecked plane and they were side by side. Lee fought with desperation, but the giant swordsman was very cool. An enigmatic smile flickered on the Sarvonian's lips. With the efficiency of a scientific machine, he dispatched the first unfortunate individual who opposed him, seized the man's swords, and hurled them at three Corians who were near. The range was short, and the giant's aim was perfect. Each of the three Corians died a clean painless death, before realizing that he had been struck. This seemed to give the Corians an idea; at a shouted signal, they all drew back and devoted their time to throwing swords. With such overpowering numbers, perhaps it would be better to fight the two hated Sarvonians at long range. They had plenty of swords; the two by the plane had only six to begin with, and would have to pick up any others that they used.

There are two ways of dealing with an accurately thrown sword. It can be dodged, or it can be fended off by clever, very clever, manipulation of the defender's sword or swords. Meriden stood planted, turning aside the swords of his enemies with those jaguar-hilted swords of his own. Lee dodged; he had had no practice in turning aside swords, and he wished devoutly for armor, the heavier the better, to say nothing of a shield. A peculiar, anachronistic civilization indeed; it had aircraft, heat-rays, and many other modern achievements, but the scientists of Venus had apparently never thought of inventing a shield. Lee side-stepped another sword, which clanged against the plane's armor plate. Planes were armored against heat-rays, yet no Venerian warrior ever wore any armor. There was some reason in that, at least, ran the earthman's thoughts. The damned planet was hot enough for a man in a tunic, let alone trying to run around in a suit of tin. Lee dodged another sword. The Corians seemed to be stalling now, playing for time. Three more swords came close, yet Lee escaped unscathed. They would have to get busier, he thought, if they intended to kill him within a month or so.

Before they could run for their lives, a flaming plane crashed into the group of Corians. Its fuel tank exploded. Lee had one second's glimpse of Meriden falling under a flaming piece of the wreckage, and then something knocked him cleanly into the blackness of unconsciousness.

The swarm of planes that had brought down the warskyship had not been able to follow up their advantage. Before they could land, a second swarm approached

rapidly through the clouds, and the startled Corians recognized them as Sarvonian planes.

The two swarms met and fought. It was not one large battle, but rather tended to break up into thousands of duels. And the Corians soon realized that the Sarvonian planes were faster and more flexibly maneuverable, and that they had weapons which were new to Venus. The steady tot-tot-tot-tot of the Sarvonian machine guns spelled out the final doom of Cor.

For every plane brought down by the heat ray or the short-circuiting ray of Cor, a dozen fell to the bullets of Sarvon . . . steel-jacketed, incendiary, explosive bullets. Every few minutes one of them would penetrate a Corian fuel-tank. . . .

Lee Chilton was not unconscious more than three minutes. He regained his senses to see Meriden leaning over him with that same unfathomable smile. And close to Meriden's side was another, whom Lee recognized as Xavian, supreme ruler of Sarvon.

CHAPTER XXX

The Rare Earth Metals

IT had been short and decisive, that battle. The Corian planes had fallen by scores, and those that were left soon showed the green signal of surrender. Some of the Sarvonian planes had caught sight of the two standing by the wrecked skyship and had recognized the giant Meriden. At radio orders from Xavian, who was personally commanding the expedition, the nearest Sarvonian pilots had looped low to let their gunners strafe the Corians by the two immense rockets. They were aided by the accident of the flaming Corian plane's fall in the group threatening the two comrades. Landing immediately, the Sarvonians in Xavian's plane had thrown aside the fragments of flaming wood and twisted steel that had almost buried Meriden, who was stunned and burned, but not seriously hurt; and in a minute more they had brought Lee Chilton back to consciousness.

Then Meriden addressed his ruler. "I am glad you escaped the destruction of the city."

Xavian looked dumbfounded. "The only city that has been destroyed is the city of Cor, and you destroyed that," he stated. "I do not understand you."

"Sarvon was not destroyed?" The giant's voice was incredulous and trembling. Xavian hastened to reassure him.

"Certainly not. But we had given you up as lost. When you did not return, we decided to strike at once. These new weapons were made by Grantolon and his staff under the direction of the three brothers Dornn, of the earth, whom you saved from death at Corian hands. They are with us now, in one of the planes. Their weapons have saved your life in turn. You are well repaid."

"I do not understand," said the bewildered giant. And he proceeded to inform Xavian of the Corian plane that had passed over Sarvon in the darkness with the steel-fatigue ray. He told of the effectiveness of that ray in all the other instances they had seen it operated, and indeed Xavian himself could see by the most casual glance at what had once been the proud city-nation of Cor that there was no doubting the destructive effect of that ray upon steel. Nor could Lee Chilton offer any explanation of the ray's failure to destroy Sarvon. They discussed it as Xavian's plane flew homeward, surrounded by the air-fleet of Sarvon, deciding that either

the Corians had made a mistake as to the location of Sarvon, or else had been amiss in some way about the projection of the ray.

Neither of these suppositions was true.

At the suggestion of Meriden and Lee Chilton, Xavian ordered his pilot and about a dozen others to stop with him at the cave containing the party from earth. The broad ledge of the cliff gave ample room for the skilful landing of planes. The rest of the fleet returned to Sarvon, except those who had been stationed in the enclosure near Cor to supervise the prisoners.

It was again late in the day when Xavian's plane approached the immense mountain barrier that rose out of the jungle between Sarvon and Cor. Through the plane's telescope Lee saw the cave opening on the ledge. All the earth party were out of sight in the interior, for the sun was still in the clouded sky, but Laura Ives had nothing to fear in her Venerian body, and she was outside watching the heavens anxiously. Lee saw her jump up and wave at the plane. He leaned out of the circular window of the cabin and waved back. As the plane landed, he noticed again the cool smile of Meriden.

Xavian was surprised to see Izanne, but said little. Meriden, Xavian, Izanne and Lee entered the cave. Meriden introduced his ruler, and Lee Chilton presented the earth party.

Upon learning of the disaster to the earth-rocket, Xavian promised to have the Sarvonian scientists and builders complete the Corian rockets, one of which he presented to the earth. Professor di Bargi accepted joyously. Then the old Sarvonian, expressing the hope that soon interplanetary commerce and friendship, such as had existed in the pre-Hellene days of Atlantis, would soon be reestablished to the benefit of both worlds, asked the earth-party to be his guests in Sarvon. At di Bargi's request, the chemist of the party explained that the earthmen could not endure the Venerian sunlight, and it was decided to wait in the cave the few hours before nightfall, and to embark then for Sarvon, which would be reached before morning.

The conversation had been in English, which Xavian spoke fluently. Suddenly the girl gave a startled exclamation in the Sarvonian tongue. "Sarvon was not destroyed after all," she said. And then, to Meriden, by way of explanation, "I was almost sure that it hadn't been, but I didn't dare tell you until I knew. I was almost sure. . . ."

Xavian and Meriden and Lee Chilton listened intently to her explanation. Later she gave it in English for the benefit of the terrestrials.

"My brother, Harrison Ives, was the world's greatest authority on the rare earth metals, such as dysprosium, yttrium, lutecium, samarium, and so on; he spent years investigating their physical and chemical properties; and among the things he discovered was this: Certain of the rare metals, if alloyed with steel in sufficient quantities, make it immune to what is called steel-fatigue.

"For centuries steel-fatigue had been known. It was first investigated seriously back in the first part of the twentieth century. It occurs at rare intervals. Sometimes a steel bridge or building would suddenly collapse while under no unusual strain, for no assignable reason; it seemed as if the steel had become tired, and the phenomenon was called steel-fatigue.

"My brother's fatigue-proof alloy was steel with a high vanadium content, *plus* almost three percent of

ruthenium and small quantities of samarium and other elements of the "rare earth" group. The alloy was not at all practicable commercially. Sixty pounds or more of rare-earth metals to each ton of steel was far too costly; most of the metals of that group are more difficult to obtain and cost far more than gold or platinum. Steel fatigue was such a rare and negligible occurrence that it was not worth the immense amount of money necessary to guard against it. Seldom would it manifest itself over an entire structure, anyway. Such cases were rare, though they were known to have occurred. But once in a while some vital part of a machine will break when there seems no logical reason for it to do so. My brother patented this process, for he was working on the problem of transmutation. Had he succeeded, the rare metals might have become cheap and the process would automatically have become commercially feasible.

"When I was working in the metal laboratories with Grantolon, I learned a lot about the steel of Sarvon. The entire structure is built of steel made from ore mined at one place, the mines of Crokan-Venn, I believe they are called. Upon analyzing this ore, I found it to contain a very high percentage of ruthenium compounds, with vanadium and traces of samarium and palladium. Rare on earth perhaps, and very costly, but these metals seem to be common in the ores of Venus.

And I also learned that the Sarvonians seldom took the trouble to get rid of these impurities.

For most purposes, they did not in the least impair the quality of the steel.

"The Corians' ray produced an artificial steel-fatigue thousands of times more complete than that which sometimes occurs naturally on the earth, and I did not know whether Sarvonian steel would withstand its effects, but it did.

"I was almost sure that it would. . . ."

"Corian steel, on the other hand, is all produced from ore mined in another place, some locality where the rare earth elements do not occur associated with ferrous ores. In every case where their ray proved effective, the steel that was disintegrated was Corian steel, or else steel from the earth."

She was a scientist in her own right, Laura Ives. Lee checked back in his memories of that ray and saw that she was right. No Sarvonian steel had ever been affected by the ray.

Quite obviously, Sarvonian steel must be immune.

There was a momentary lull in the conversation. Once Benjamin Jacobs seized eagerly his chance to ask a question.

"Say, Mr. Xavian, er . . . Your Majesty . . . would I be able to obtain electrical equipment in your city? Enough to repair a cosmic radio and television outfit?"

"Certainly. We have finely equipped radio laboratories, and all types of metal-working and electrical shops.

"Our engineers will be glad to help you."

Benny tried to express his gratitude, but his heart was too full. After all his troubles in trying to keep the news-hungry earth informed, he realized that at last there was little probability of further interruptions. The greatest scoop in the history of newsgathering was to be afforded on his unprecedented, if successful, interplanetary voyage.

Benny already visualized himself, with a mike before him, talking to all the world.

CHAPTER XXXI

A Confession and a Challenge

IT was not until the embarkment, after nightfall, that Lee Chilton got a chance to see Laura Ives alone. Two bloody, disheveled figures they were, but if anyone cared, it wasn't Lee Chilton or Laura Ives. The wounds of that battle-filled day, carefully bandaged though they were, ached continually, but Lee paid no attention to them. The girl's wound, more serious than any single one of Lee's, was badly in need of attention and clean bandages, but Izanne didn't seem to notice it. While the possessions of the earthmen were being loaded in the Corian planes, Laura and Lee walked a short distance along the ledge in order to be alone. Sheer vertical cliffs rose above their heads and fell away beneath their feet.

"I don't like this darn planet," said Lee Chilton in a manner intended to be abstract.

"Why not?"

"It hasn't got a moon. We're entitled to a moon. Lovers have had moons since the earth began, and all we get is a fog."

Their conversation suffered a slight interruption, very sweet, and Laura Ives replied:

"That's not the biggest difference between Earth and Venus."

"What is?"

"Just this, Lee. No one on this planet ever heard of a kiss. If Meriden had kissed me once, I guess it would have been he and not you. . . ."

She was silent for a minute.

"You see, Lee, on earth I was always a wall-flower. No fellow ever paid any attention to me. I just wasn't attractive, no matter how hard I tried to be charming. The only one that ever cared for me was my brother, Harrison, and I was devoted to him. I just had to have something to love, even if it was only my brother and his science.

"And then this cosmic transfer took place, and I woke up to find I had a beautiful body. It was too wonderful to believe. The Corian girl Izanne, who took my body on earth and killed Harry, had intended to be transferred back to her own body after she had done her bit for the Corian plans, and I was kept imprisoned in Cor so that the body would be ready when she radioed. But Meriden was spying in Cor and he helped me to escape and took me to Sarvon. I was a guest of Xavian and I helped Grantolon in the laboratories. I helped a lot in the scientific work, because lots of things I had learned from Harry weren't known on Venus. In many lines their science is way behind that of the earth.

"I used the name Izanne. Even Meriden didn't know I was really an earth-identity in a Venus-body until that day in the Corian council room when I betrayed our presence and you and Meriden had to fight your way out.

"While I was helping Grantolon in the laboratories, some of the Sarvonian gallants started to court me. Sarvonians are awfully strict and formal in their love-affairs. Then they started to kill each other over me. They fight to the death for their mates here. There are so few girls compared to the number of men. I didn't want them to kill each other on account of me, but I couldn't do anything about it. By a sort of unwritten law or custom, it was almost compulsory for me to marry the survivor, and he was Meriden.

"I liked him better than any other, too, and for a while I thought I was in love with him. He was awfully nice, but sometimes I wished he wouldn't be so formal. I wanted him to kiss me, but it seems that no one on Venus had any idea of what a kiss is. Sometimes I wonder how they do show their affection.

"Meriden gave me that beautiful belt. It's in the cave now. I wore it for him; I'll have to give it back now; it's the Venerian equivalent of an engagement ring.

"But I've been realizing that I could never be happy with a Venerian, Lee. I want an earth-man, with his virtues and his faults. They're far more human than Venerian swordsmen. And you might give me a genuine osculation, such as are dispensed on the earth, moon or no moon."

"What? More? ejaculated Lee Chilton softly. "What a greedy girl!"

They were startled a little by Meriden's cough. The Sarvonian was standing near them in the darkness. They could see that he was holding a broad belt of beautifully tanned leather, with a buckle beautifully wrought in steel and gold to represent the head of a jaguar. It was the device of the line of Meriden, that steel and golden jaguar.

Izanne took a step toward him. "I'm sorry to return it," she said, "but I could never be happy with a Venerian mate, nor could you with an earthgirl, Meriden . . ."

She hesitated, not knowing what to say, and held out her hand toward the giant. He did not seem to notice it. The belt fell out of his hand, and he did not notice that either.

"I will not give up my claim to you," said Meriden of Sarvon, "nor will I ask my comrade to relinquish his." He spoke to Lee.

"About a month from now, Earthman, when your wounds have completely healed, I will meet you in a duel to the death."

There was a shout from the direction of the loaded planes. The entire party was ready to leave for the flight to Sarvon, and the absence of the three had been discovered.

Izanne stood motionless. Lee Chilton shrugged his shoulders. "Old Timer," he remarked, "I'll take you up on that proposition." He felt the girl's body tremble as, without a word, the three of them turned and walked toward the planes.

The same inscrutable smile played about Meriden's lips, but in his eyes was pain . . . and it was not physical pain.

CHAPTER XXXII

A Matter of Ozone

THE next few days were joyful ones for Benny Jacobs. With the equipment available at Sarvon, he had reestablished communication with the earth. Six hours or more each day News-Unit Thirteen broadcast from Venus. The entire world listened in on the re-broadcast from the stations of Universal News and the Eurasian News-Syndicate. The entire story of Cor's plan to conquer the earth was told over the interplanetary circuit. The earth was eager to see Venus, and each day the television showed interesting scenes in the city of Sarvon or in the Venerian jungles. Through the co-operation of the news companies, treaties of friendship and commerce were drawn up between the planets, and signed, di Bargi being given the right to act for the

newly-formed Federation of Earth-Nations. Scientific news and discoveries and data were exchanged to the benefit of both worlds, and supervising it all was Benny Jacobs, in the eighth heaven of joy.

The earth was told of the Corian rocket that was on the way, but that caused little concern to humanity. As there could be no reinforcements from Cor, the earth was quite sure that it could handle the situation when the rocket landed. They did not know that Eenedar did not intend to land when he reached the earth, but planned to allow the rocket to be caught by the earth's gravitation in such a way that it would revolve around the earth as a small satellite, expending none of its limited fuel. They did not know that Eenedar had any plan to destroy the ozone of the earth. Nor did they realize that every word of the interplanetary broadcast was received aboard the rocket.

Eenedar knew of the fate of Cor, and the knowledge only made him more eager to wipe out the earth, utterly and completely. No one on either planet knew about Eenedar's plan except a few of the Corian prisoners, who were careful to keep their knowledge to themselves, hoping that after all the earth might be conquered by Cor, or at least that the population of the earth might be wiped out to avenge the destruction of the city-nation of Cor.

Eenedar was insane now in his lust to kill. He drove the rocket through space at an always-increasing speed, though with a constant rate of acceleration that was close to the limit of his men's endurance. It is not great speed that produces dangerous pressure on the human body, it is the great acceleration, the rapid change of speed, necessary finally to obtain great speed.

As soon as Benny had established communication, Burton Boyd got in touch with Robert Huston of United Utilities. They spoke across the void. There were gaps of more than four minutes in their conversation because of the distance between the planets and the fact that radio waves only travel some 186,000 miles per second.

"Well, Bob," said Burton Boyd, "the war-clouds have rolled by. We're starting for home in about three weeks. Tell Ecclestone that the Ives cipher is a double-substitution roulette, using the English system, with the key-word 'praseodymium.' The joker is that the original message is in German instead of English. No wonder Brad couldn't crack it.

"Laura Ives tells me that her brother destroyed most of his notes, and the cipher gives only the bare essentials of the process of converting atomic energy into usable electricity. Your engineers will have to work out the details."

A four minute pause.

"Fine. Ecclestone was listening in with me. He's just rushed off to get the notebook. Tell Miss Ives that United Utilities is buying all rights to the process for the price agreed upon in a verbal agreement with her brother, the day before he was killed. She's rich. It amounts to two hundred million a year for thirty years, plus a block of sixty thousand shares of preferred stock in United Utilities.

"If you think you can break the news gently, you might also tell Lee Chilton that the courts have finally decided about that freak will of Eugene Chilton. It's thrown out. Lee is the sole heir. He now possesses outright fifty-one percent of the stock in the corporation. The cash value of his holding is just under one trillion dollars. I wish I were that man. He enjoys himself

on Venus, while I'm back here running his business for him at a measly fifty thousand dollars a month.

"Incidentally, Burt, you're discharged with thanks. You've accomplished what I hired you for, besides being instrumental in preventing a hellish war. When you get back to Earth I'll be quite glad to hand you a certified check for one billion dollars, plus \$6,403.19 for expenses."

A four minute pause.

"Thanks. Lee Chilton was listening in with me, and he told me to notify you, that starting next month, your salary was tripled. And now let's get down to something important.

"You undoubtedly remember that Eugene Chilton financed di Bargi's rocket in return for the exclusive rights to all mineral wealth imported from Venus, in case contracts could be negotiated with the inhabitants. Lee and I and di Bargi have just made some contracts quite favorable to both the City of Sarvon and United Utilities. It seems that such rare and costly metals as praseodymium, ruthenium, rubidium, and others of the rare-earth group are common here. Considering the prices some of these metals are bringing on earth, the corporation should make quite a neat profit. There are also some uranium, radium, and thorium ores here obtainable at about half the current price on earth, and furthermore, Venus will provide a steady market for copper and silver. You might take steps to corner a portion of the market there. You can buy a lot here with a pound of pure copper."

After the conversation was over, Lee Chilton turned to Burton Boyd. "I may be the richest individual on earth," he said, "but it amounts to precisely zero on this planet. I can't marry the girl I love unless I kill Meriden in a duel to the death. In the first place, I'm no match for him, and in the second place, I like the man. It's not his fault; he's just living up to his code of honor, and I suppose it did hurt him when Laura refused him.

"I've made a will, Burt. If Meriden finishes me, Laura gets everything, even if she marries him."

"How is she getting along?"

"As well as might be expected. That shoulder wound of hers is uglier than we realized. They've cleaned out the infection. It ought to heal now. She's worrying terribly about this fight, and it's not helping the healing process any."

"Do you really intend to go through with this duel?"

"I can't back out without being branded a coward, and I'd hate to give the Sarvonians such an idea of the terrestrial race."

"But you haven't a chance, man! That giant was born to the sword, and you never handled one until you woke up on this planet."

"I fenced a little at Yale, Burt. And Meriden has no idea of the thrust and parry. He slashes exclusively at close quarters. All Venerians do. These heavy swords they use are nowhere near as easy to handle as foils, but the one thing that gives me a chance is my knowledge of fencing technique. It's new to Venus. By the way, they follow the same customs as the earth about having seconds and a judge, except that they use three judges. You'll be my second?"

"Certainly. When is the duel?"

"Twenty-seven days from today."

"A lot can happen in twenty-seven days."

ENEDER and the Corian mathematician carefully checked their calculations. At the speed the rocket

was making, they calculated that it would, if not further accelerated and if its course were not changed, plunge by the earth at a distance of slightly more than twenty miles. But it did not have enough speed to pass the earth that closely. Instead of continuing off into space, it would be captured by the earth's gravitational field and drawn into an orbit, the plane of which would be almost perpendicular to that of the earth's equator. On each of this artificially-produced satellite's revolutions about the earth, it would pass near the poles, and, because of its proximity to the earth and its comparatively small mass, its revolutions would be very swift, more than thirty in each twenty-four hours. Each time it shot around the world, at an altitude of approximately one hundred and twenty-five miles, it would pass over a different section of the rotating earth. Its speed would be slightly better than ten miles a second, they figured, and they would be high enough above the atmosphere, so they would not be slowed down by friction, and yet close enough so that their ray would destroy the ozone in the earth's upper atmosphere.

It was an intricate calculation, taking into consideration the masses and orbits and velocities of the earth and the rocket, the resistance of the atmosphere when the rocket first plunged through it, and dozens of minor factors, but at last Eenedar was satisfied. The great speed of the rocket would make it practically impossible for earth artillery to score a direct hit with a projectile large enough to harm the rocket, and Eenedar knew that one hundred and twenty-five miles was an extreme range, even for the most powerful guns of the earth, though it was practicable for the projector of his dissociating ray. One of the most beautiful features of his plan was the lack of visible evidence of the splitting up of the ozone molecules. The ray was invisible, the dissociated oxygen atoms reassociated into ordinary oxygen molecules with no violent show of energy or any other visible evidence of the occurrence. The inhabitants of the earth could not see what was going on; but as soon as the already extremely small percentage of ozone in the air became smaller, no terrestrial could endure the light of the sun. Those who were not killed by exposure to the sunlight would have to remain in shelter, and could not prevent the landing of the rocket. Once on earth, the steel-fatigue ray, employing almost the same principles as the other, would make easy the conquest of those who escaped the sunlight.

But Eenedar did not intend to let any of them escape the sunlight. If his plan was successful, the ozone of the atmosphere would be removed before anyone on earth realized what was happening.

When the earth was reached, it was seen that the calculations had been so near correct that the expenditure of a little hydrogen perfected the rocket's course. It had become very hot in its plunge through the earth's air-blanket, but no harm was done. It started its rapid circling of the earth, and its invisible ray was thinning out the ozone of the earth's atmosphere, removing the protective filter of the extreme ultra-violet rays, destroying the balance of conditions under which life had grown up on the earth.

There is a tremendous difference between a molecule composed of three oxygen atoms and a molecule of only two oxygen atoms! Astronomers of the earth followed the rocket's swift course. They could detect no signs of life or activity aboard it. Apparently it was a freely revolving body, a new satellite of the earth. Perhaps

the heat of the first plunge through the atmosphere had killed the Corians. Statements were published, claiming that when the rocket had passed within twenty miles of the earth, the heat generated by its friction with the atmosphere had killed its occupants, and that when it had passed the earth and had been drawn back to its present orbit, it no longer constituted a menace.

But there were others who doubted that mere chance was responsible for the fact that it passed over practically all of the earth in less than one day. Its orbit seemed to indicate brains, not chance. It was neatly calculated, the more wide-awake astronomers maintained, and it did not seem to be chance, either, that was responsible for the fact that the orbit was just outside the most extreme limits of the atmosphere.

No one on the earth could see how the rocket could do any damage from its present position. The earth sat back to await some move on the part of the Corians, if they were alive.

On the last day of October, 2180, after a round of golf in spite of a chilly wind, Robert Huston, Acting President of United Utilities, was astounded, as were his three companions, to see that every one of them had a severe case of sunburn.

The same day nearly every child under three years of age that was exposed to the sunlight was blinded with terrible suffering. Everyone who had been exposed to the sun was burnt to a greater or less degree, and the burns were not confined to outdoor people, for ever since 1950, health-glass, permitting the passage of ultra-violet rays, had been in almost universal use, and the powerful actinic rays at the extreme ultra-violet end of the radiations was not filtered out by the health-glass. Ordinary glass, opaque to ultra-violet light, had gone completely out of use, except for such things as drinking glasses and electric bulbs.

But if conditions were bad in New York, they were infinitely worse in the equatorial regions and in the southern hemisphere, where it was spring instead of autumn. It was blindness and death, in the tropics, to stay in the sunlight for ten minutes, and many died before they were well aware of trouble.

Always blindness came first, accompanied by horrible burns. Then came death.

On that last day of October nearly a million people died, all of them in torturing pain. Eenedar's thinning of the ozone in the atmosphere had reached the crucial stage.

CHAPTER XXXIII

Intra-Atomic Power

"**L**EE, dear, please don't fight Meriden. He's determined not to give me up, and he'll kill you. Di Bargi is leaving for the earth tonight. We can go with him. Meriden won't know until tomorrow. I'm getting well, now. Let's go back to Earth, together."

"We can't, Izanne. You know very well that you're in no shape to withstand the acceleration of an inter-planetary voyage. Even if you could, I couldn't let Meriden think I was a coward. Could you respect a coward?"

"I could love him."

"But that's not what I ask you, Izanne. We'll play the game out to the end. By the way, your nurse told me that Meriden was visiting you today."

"Yes. I sent for him. No Sarvonian of the warrior class will ever attack one of the aristocrats. It's considered dishonorable. And I told him that you were an aristocrat of the earth. You're the earth's richest man, and—"

"What did he say to that?"

"He told me that Xavian had raised him to the rank of an aristocrat because of his part in the destruction of Cor. He was awfully relieved to find that you were an aristocrat too. That made it quite proper for him to fight you. Lee, I'm afraid . . . afraid . . ."

"Don't worry, Cosmic Sweetheart. You must hurry up and get well so that the next time di Bargi comes, we can go home with him . . . together."

"**P**ROFESSOR di BARGI, you're wanted on the earth-phone."

"What seems to be the trouble, Benny?"

"I don't understand exactly. Something about ultra-violet light that is killing people on the world."

"All right, Benny, I'm coming."

When he reached the radioroom of the completed rocket that had been taken from Cor, the professor paused a moment to give his right-hand man some instructions concerning the launching of the rocket. Then he got in touch with Robert Huston on the earth. He listened to what the executive told him about the menace that was threatening the earth, and he worked out a plan. It was four hours later that he left the radioroom, and the rocket was already on its way back to earth, without Lee or Laura or Burton Boyd.

Since the year 2009, United Utilities had been the largest and most powerful corporation on the earth, and only that immense organization could have carried out the plan that di Bargi had outlined. The next twenty-four hours were the busiest of Robert Huston's life.

Astronomers were put to work calculating the exact orbit of the rocket for hours and days in advance. When these calculations were finished, Huston could tell by a glance at a chart just what locality the rocket would pass over at any given second up to a week in the future. While these calculations were being made, the great factories of United Utilities were producing, as if by magic, the various apparatus being designed by United Utilities' engineering staff. Ten minutes after a blueprint of any part was finished in the drafting-rooms and telephotoed to a factory, that part was being produced by suitable manufacturing machines.

Working in the night in order to avoid the deadly sunlight, skilled engineers and willing workmen erected two immense projectors of the Venerian conducting ray, details of which had been radioed from Sarvon. The projectors were half a mile apart, in a spot in southern Illinois over which the rocket would pass next morning. The rays were tested: they were perfect conductors of electricity, like two immense wires running up into the heavens.

The Bureau of Weather Control was ordered, through the coöperation of the government of United America, to furnish a clear, cloudless day.

Atomic disintegrators were manufactured and hooked up in series so that they could furnish electric power in quantities never before employed, using an electrical pressure of trillions of volts.

Supervising all of the work was Robert Huston. A speedy plane took him to Illinois before dawn. Astronomers checked the rocket's orbit and verified their former

conclusions. Dawn came, with its searing, burning light. Six seconds before the rocket, traveling ten miles a second, was due to pass over the two stations in Illinois, Robert Huston pressed the buttons that operated remote-control switches which hooked up the two conducting rays to the long series of atomic disintegrators. The disintegrators, converting atomic power into electrical power, built up a difference of potential in the two vertical rays of trillions upon trillions of volts.

Then the Corian rocket closed the circuit.

The terrific discharge of electricity through the immense rocket all but liquified it. Eenedar and his colleagues never realized what had hit them. The enormous momentum of the rocket carried it past the electrical trap that had been set, but it was a lifeless, twisted piece of metal now, and it was slowed down to a speed not sufficient to keep it from falling. In a few minutes the astronomers, from observations of its new motion, had calculated, with their efficient mechanical and electrical mathematics machines, that it would fall in the Pacific Ocean, five hundred miles north of Hawaii, in about three days' time. Ships were warned to keep away from the danger zone.

Huston got in touch with di Bargi over the cosmic radio, and told him of the success of the plan.

Di Bargi grinned, wondering idly what Huston would say when it was discovered that the tremendous discharge of electricity, even though it had taken place just outside the atmosphere, had produced an enormous amount of ozone, which would gradually distribute itself throughout the upper atmosphere.

CHAPTER XXXIV

A Duel to the Death

"WELL, Lee, said Burton Boyd, seriously, "this is the day. How do you feel?"

"I'm in perfect condition. I'm sorry your offering to be my second prevented you from going home with di Bargi."

"That's all right. He'll be back in six months. Besides, I like this planet, even though I can't go out in the sunlight. Did you see the pretty nurse Izanne has?"

"Watch your step, Burt. There are about sixteen aspiring young Sarvonians on the trail of that nurse. You had better start taking lessons in swordsmanship right away if you intend to last until the semi-finals."

There was a knock on the door of their chamber. Lee opened it and took Laura in his arms.

"When did they let you get up, sweetheart?"

"They didn't, Lee. I . . . Well I slugged the nurse and got dressed and came to see you. I wanted one last kiss . . . in case you didn't . . . didn't win. The nurse told me that I couldn't have any visitors, because I was too weak, and I wanted to be sure of seeing you again. And you're terribly brutal, Lee. I want it so much. Won't you give it to me before I faint?"

Lee gave it to her, and she fainted away from weakness. Tenderly he carried her back to the section of Sarvon that was used as a hospital. A frantic young Sarvonian nurse was nursing a lump on her head that had been caused when Laura had skilfully caressed her with a heavy glass carafe, but the nurse grinned when her truant patient was brought back, apparently not much the worse for her escapade.

Because of the fact that Burton Boyd could not with-

stand direct exposure to the Venerian sunlight, the duel was scheduled in a large artificially-lighted chamber on a lower level of the immense structure that was the City of Sarvon.

It was by no means a public affair, but rather a private matter of honor. Xavian, supreme ruler of Sarvon, was in the chamber with one trusted bodyguard when Lee and Burton entered, Boyd carrying the three gleaming swords that Lee had borrowed three weeks previously for the purpose of practicing.

Meriden entered, with three men behind him. Lee recognized them as Aloysius, Albert, and William Dornn, earth-identities in Venerian bodies. They surprised Lee. Just where did they fit in the picture? When, back on earth, his uncle, Eugene Chilton, had disinherited him, the three Dornn brothers had been made legatees of the immense corporation. Now that will had been set aside, and Lee was the recipient of United Utilities. Were the three brothers hoping that he would be killed, so that once back to earth, they could claim the controlling interest of the company?

At Meriden's waist hung his triplicate scabbard, with the three jaguar-hilted swords. The giant was smiling. Xavian called them together as two other Sarvonians, who with Xavian were to be the judges, entered the spacious room. The doors were locked.

Lee and Meriden shook hands, after the earth-fashion. There seemed to be no corresponding Venerian custom.

"The duel," said Xavian, "will be fought with pistols." Lee started. Meriden smiled.

"It was I who challenged," said the giant. "I did not think it fair to you to choose swords. I have handled swords from infancy."

"I am perfectly willing to use swords."

"I refuse, Earthman. It is knowledge, not pride, that makes me say I could slaughter you with a sword in fifteen seconds, and I would be a coward if I killed you with swords, particularly since I challenged you to this fight. These men," continued the giant calmly, indicating the Dornn brothers, "have introduced firearms on this planet. I have been practicing with a pistol. I like the weapon, and I know how to use it. If we use pistols, we are equally matched. My superior size and consequent strength do not then give me an advantage. You told me once that you were accustomed to handling a pistol. If that statement is true, I call upon you to prove it."

There was a hint of coldness in the giant's voice, as if he thought that Lee had lied about his ability to use a pistol. Lee shrugged his shoulders. "Very well, if you wish. I shall have to be furnished with a pistol."

One of the Dornns produced two pistols, not at all unlike the automatics of the earth. They were identical in appearance. He gave one to Meriden and one to Lee.

"You will stand at opposite sides of the room," said Xavian. "Each pistol contains three bullets. No more should be necessary. We, the judges and witnesses, will be in the adjoining room, watching you through a window of unbreakable glassite, which enables us to observe you in safety. I shall fire one blank shot which will be audible through the glassite. After that you may fire at will, observing this condition: The walls are forty *zots* apart, or in earth-measure about seventy feet. Neither of you is permitted to go more than four *zots*, or about seven feet, from his respective wall, unless the pistol is dropped to the floor, signifying that no attempt to shoot will be made.

"The walls are of steel. The bullets, of lead, will flatten against them. There is little danger of a bullet rebounding or ricocheting. If either of you should happen to be wounded as a result of such an accident, the other is obliged to cease firing. May you conduct yourselves with honor!"

Lee walked to his wall, taking a position about six feet from it. Meriden established himself at the other end of the room, directly opposite. The judges left the room, soon becoming visible through the large glassite panel in one side-wall. Xavian was seen speaking a minute with Burton Boyd and the three brothers who seemed to be Meriden's seconds. Then he raised his pistol and fired the blank cartridge. The report was plainly audible through the glassite.

Immediately Meriden raised his automatic and fired one shot.

Never in Lee Chilton's life had anything come so close to him without actually touching him as did that first bullet of Meriden. It passed within one inch of his head, just above his left ear, to flatten on the wall behind him. Lee heard it strike and drop to the floor.

Lee admired the giant's fine sportsmanship. In spite of the fact that he had never seen a pistol a month before, the giant was trying to inflict a clean, painless death by a shot through the brain, rather than take the easier aim of a body shot, that, unless it were actually through the heart, would bring death only after suffering. The head is a small target at seventy feet, compared to the body.

Lee did not return the shot. There was no hurry. The giant was aiming again, more carefully. Instinctively Lee sensed the second that Meriden was to pull the trigger, and stepped aside. The bullet missed him by three feet, this time. Meriden had one shot left. Lee could see that same half-smile on the giant's lips. One shot left. Very slowly, without the least emotion or nervousness, Meriden was lifting his pistol again. Lee had not lifted his.

Suddenly the vision of Laura Ives rose in Lee's mind. For the first time in his life Lee Chilton understood what

real fear was. He struggled to prevent his fear from manifesting itself to the giant and the watchers. Meriden had one shot left, and the giant was so devilishly cool about it!

Behind the transparent panel, Burton Boyd gasped. Chilton was calmly taking three chances with death. If he won, the giant would be at his mercy. If he lost. . .

Meriden fired again, and missed, by a very small fraction of a *zot*. Lee Chilton dropped his loaded pistol and walked toward the giant. The watchers did not move. Meriden's expression did not change. Lee came close to him.

"I have my code of honor, too," said Lee Chilton of the Earth. "I cannot shoot you. If you would like to continue with swords. . ."

The others were entering. Meriden's half-smile grew deeper. "You are worthy of her, Lee Chilton. Never before have I seen a man take three such chances with death for the sake of friendship, however great. I wish you happiness."

The giant held out his hand. Lee took it without a word.

Burton Boyd had picked up the gun that Lee had dropped, had brought it with him as he approached the two. The giant spoke again, to Lee.

"I told you once, Earthman, that I was sincere in my love for her. The realization that she could not be happy with me came slowly. It hurt me. But it was her happiness I wished, above all. I trust you to make her happy. For the sake of friendship, do not fail me."

The same inscrutable smile played around the giant's lips. He took Lee's unused pistol from the hand of Burton Boyd. At the opposite end of the room, seventy feet away, were three tiny marks in the steel wall, where Meriden's three bullets had hit. Three marks, each the size of a thumbnail, at seventy feet.

Without apparent aim, the Swordsman of Sarvon lifted the pistol in his hand and fired three shots in as many seconds. Each of those three bullets struck the exact center of one of the three marks.

THE END

What Do You Know?

READERS of AMAZING STORIES have frequently commented upon the fact that there is more actual knowledge to be gained through reading its pages than from many a text-book. Moreover, most of the stories are written in a popular vein, making it possible for anyone to grasp important facts.

The questions which we give below are all answered on the pages as listed at the end of the questions. Please see if you can answer the questions without looking for the answer, and see how well you check up on your general knowledge of science.

1. What is the formula for the wave-length of ether waves of any stated frequency? (See page 627.)
2. What is the length of ether waves used for wireless communication across the ocean? (See page 627.)
3. What is the length of a relatively short wave used in radio broadcasting? (See page 627.)
4. What is the range approximately of Hertzian ether waves? (See page 627.)
5. What is the distinguishing feature of ether waves .067 millimeters in length? (See page 627.)
6. What is the characteristic of ether waves .00068 millimeters and .00043 millimeters long? (See page 628.)
7. What are secondary vibrations of a fundamental note? (See page 628.)
8. What is calorescence? (See page 628.)
9. What is the relation of carbon dioxide to plant life? (See page 635.)
10. What is the difference between oxygen and ozone? (See page 639.)
11. Describe steel-fatigue and give examples of its action. (See page 644.)
12. What planet has no satellite? (See page 645.)
13. What element in the speed of a plane would be dangerous to the inmates? (See page 646.)

The First Martian

By Eando Binder

OUR continued experiments in radio and television may play a much more important part in the eventual realization of successful interplanetary travel than we can possibly conceive of right now. But if we stop a moment to think about it, the possibilities of such closely allied work between radio, television and rocket travel take on vast proportions—one phase of which is vividly portrayed in this short science fiction gem.

Illustrated by MOREY

Synthetic Platinum

THE American people have never clamored for a true, detailed account of the arrival of the First Martian. Yet the event, unheralded and unprecedented though it was, was one of the most important occurrences in human history. His coming was a distinct shock to the whole world, despite the marvelous advances of science from its birth in 1896 to that date. The inconceivable distance to be traversed, the enormous energy required to transport a heavy machine from planet to planet, and the all-powerful force of gravity, seemed insurmountable objects to even the most broadminded and optimistic thinkers. Feeble attempts were made even in 1931 to leave this speck of the universe and soar to other worlds, but constant failures dulled the ardor of those who wished to connect our world with the others which acknowledge the same central sun. Hope flourished after the almost successful (perhaps indeed successful) attempt of four German scientists to soar from the hide-bound earth, who departed in their famous rocket in 1938, bound for the moon. The world is certain that they never returned, unless they landed in some very remote spot, unseen by human eyes; and it cannot be said where they are, whether lost in boundless space, alive or dead on the moon, or perhaps scattered in minute particles in the infinite. Again, five years later, the globular ship of two intrepid Americans vanished from the earth, never to be seen or heard from; and during the period just following the Martian signaling, several others were lost and many more crashed. Although the fatalities far exceeded these probable successes, the hope of interplanetary travel was still uppermost in our minds. We know now, that our failure can be attributed to the unfortunate lack of radioactive elements, and not to the lack of ingenuity or inventiveness. It was only too true,

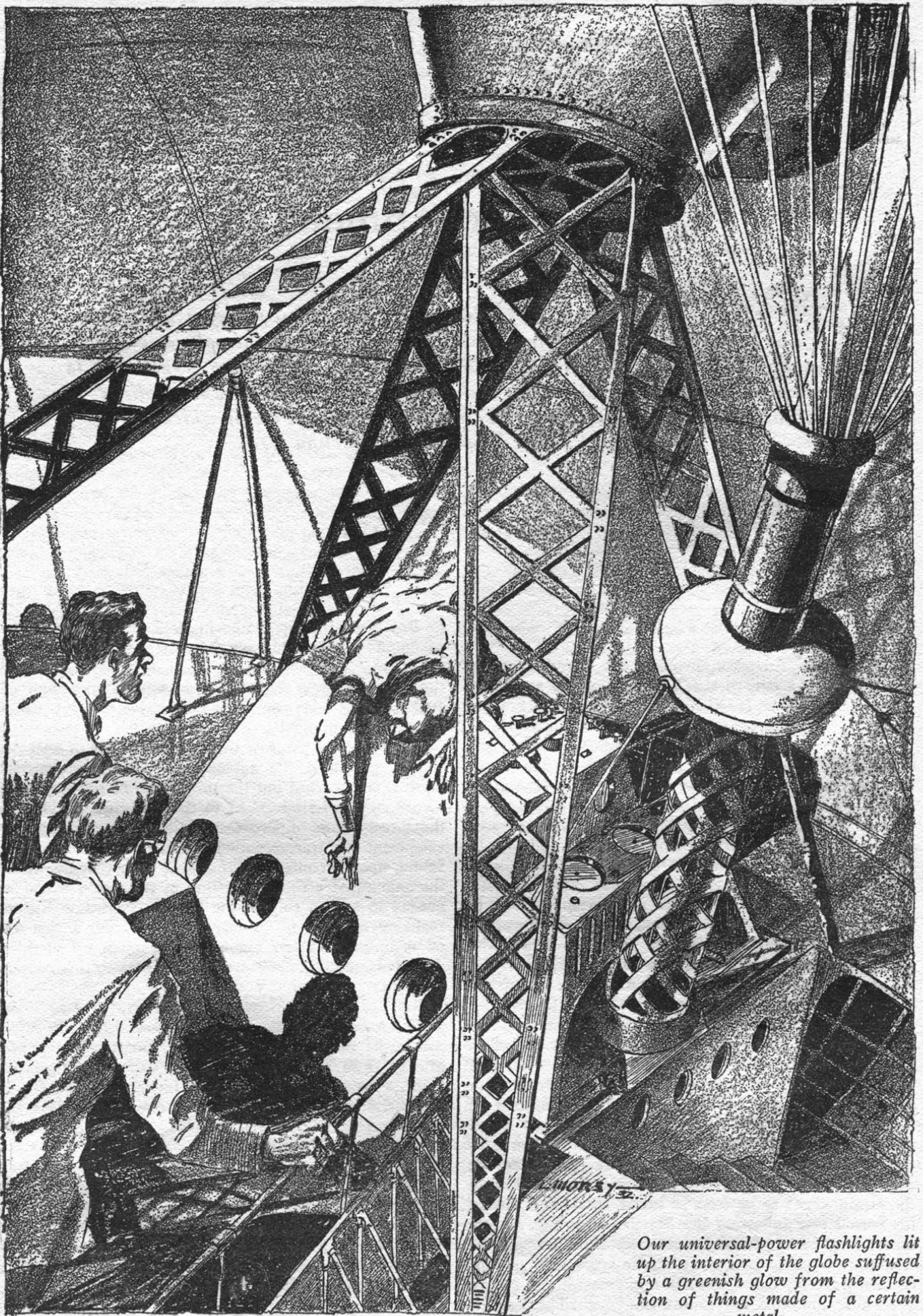
as Professor Billings stated in 1945, that the only type of engine which could possibly transport a heavy machine from our earth to some planet, would have to be the atomic-energy engine, which, with a minimum of fuel and the very necessary radioactive element, could develop an unlimited amount of energy.

He even drew plans of the basic principles of such an engine, estimated the amount of radioactive material needed, and worked out the propulsion of the ship. The theory, which he advanced to the scientific world, was the direct cause of Professor Riehm's remarkable development of transmutation of elements, for it was found, upon investigation, that at least twenty-five times the amount of actinium existing in the world would be needed to send a ship to the moon. Professor Riehm, realizing that the probability of discovering a rich ore of actinium was too remote to be relied on, decided that transmutation alone was the keynote to this baffling problem.

His first great work was to break down the ordinary platinum of commerce to iso-platinum 192! In other words, he made a variety of platinum with a specific gravity of 21.021! It consequently had a lower melting point, a lower specific heat, and higher atomic volume! For a full understanding of this, one must review the past of science, a wonderful stairway of facts and truths, leading to Truth enthroned.

Prout, back in the days of the dawn of science, formulated the theory that elements were aggregates of the hydrogen atom, and hence every atomic weight should come out exactly and without fractions, or very nearly even. His contemporaries, all able men, examined carefully the then existing list of elements, and although a surprising number came out very close to whole numbers, a good many were halfway between.

Stas, a German, then proceeded to redetermine the atomic weights and came to the conclusion that Prout



Our universal-power flashlights lit up the interior of the globe suffused by a greenish glow from the reflection of things made of a certain metal. . . .

was wrong, for no matter how carefully done, chlorine always came out 35.5, and several others, too, showed an uneven atomic weight, with full allowance for experimental error. This marked the doom of Prout's hypothesis, and he died in the belief that he had failed to reveal to the world a great truth, because of the bigoted beliefs, and inaccurate work of Stas. As it chanced, both were right. Stas had done his work admirably well, and yet Prout's Theory was not a mere dream. For early in this century, a series of brilliant spectroscopic experiments proved that many, in fact most, of the elements, were mixtures of bodies, chemically alike, but *EACH HAVING A WHOLE NUMBER ATOMIC WEIGHT!*

For instance, Aston, the investigator, found that tin was composed of no less than eight isotopes, whose atomic weights are as follow: 116, 117, 118, 119, 120, 121, 122, 124. Each of these iso-elements is chemically identical with all the others; but possessed each of varying specific gravities. It will be noticed that two of the isotopes are actually greater in atomic weight than antimony (121.77), the element following tin. No doubt one or two of the isotopes of antimony (they have not yet been investigated thoroughly) are identical in atomic weight with one or two of tin!

The average of all the isotopic weights of any one element, with due regard to their relative proportions, gives the present value for the atomic weight. For as yet (beyond a very limited number) we have not been able to separate the isotopes of many elements.

We shall now, after this short digression, be able better to understand Professor Riehm's remarkable experiment whereby he made iso-platinum 192. Let us read from his account of the transmutation:

"—it was found that platinum was composed of the following isotopes: 192, 194, 195, and 198. Isotope 192 has a 48He (helium) proton; 194, a 48He—2H (hydrogen) proton; 195, a 48He—3H proton; and 198, a 49He—2H proton. The problem now resolved itself into this: to remove by a sufficiently powerful agency the excess hydrogen protons of isos 194, 195, and 198, leaving isos 192 and 196.

Ordinary chemical reactions have no effect on the proton, of course, so some more powerful agency was needed. We tried radium with no effect, nor even radon, radium emanation, which is hard to isolate, and hard to handle, but extremely more radioactive. Finally we used actinium, no. 89, with success.—

Our apparatus was merely a thick-walled cylinder of lead, ½ meter long, whose ends tapered to points, with openings at each point—a large one at one end, and a small one at the other. In the large end was placed, in a built-in receptacle, the specimen of platinum to be altered. In the other end we suspended a milligram of actinium, quite a powerful agency. In making the preparations, my assistants and myself wore lead-lined suits, and helmets with goggles of lead glass. Actinium is much more powerful than radium, and a milligram is decidedly deadly to a man if he works with it for any length of time while unprotected from its penetrating gamma rays.

Using a cube of platinum at first, we had no success. We bathed it in different ether rays while the gamma rays from the actinium acted upon it. No results—powdered platinum was the solution, known as platinum black. After the hour was up, we removed the platinum

black, no physical change being apparent; but, to our great joy, upon weighing it, a loss of weight showed that we had increased the proportion of isotope 192 by about 25%. Subsequent trials with refined apparatus and more exact methods of procedure yielded specimens of almost pure iso-platinum 192 and 196, which are easily separated by the difference of their melting points.*

The announcement to the scientific world of this astounding feat aroused long controversy and numerous conjectures. The International Science Group of Paris asked for a specimen of Professor Riehm's iso-platinum 192 and upon examining it carefully, announced to the world that the great German had indeed produced the isotope of platinum of atomic weight 192 exactly! It was the spring of 1971. Already, at this time, several scientists suggested that the Law of Definite Proportions be declared null and void, but the actual act did not go into force till 1975, when Delande made five different chlorides of tin of the same formula!

Transmutation

WE will skip the intervening years from 1971 to 1974, during which time several isotopes of different elements were isolated in small quantities by various investigators, and return to Professor Riehm in his Boston laboratory. A big American firm had induced him to work solely for them for an enormous compensation. He moved from Berlin to Boston and continued his experiments in one of the best-equipped laboratories ever built. Here it was that he and his assistants broke down a series of elements and iso-elements, including zinc, which was broken down into the non-metal sulphur! The process was kept a secret and all we know even today is that some powerful radioactive body other than actinium was used with, however, practically the same apparatus as that for the making of iso-Pt 192.

The decomposing (or, more modernly, the isoprotizing) of zinc into sulphur was of more interest to the scientific world than to the industrial world for which he labored, but the big men behind knew that sooner or later would come their chance. Sometime Professor Riehm would discover a process that would enrich them immensely. That was why they lured him away from Berlin, where he had been working in the interests of pure science, and business men seldom make a mistake. It came in a mild way, when out of barium, Professor Riehm made silver! The raw products were barium chloride, a very cheap salt, and certain radio-elements, and the final product was silver in the form of ingots, with hydrogen chloride gas as a valuable by-product. The big firm immediately began turning out electrical instruments with silver replacing the copper for a conducting medium, and inside of five years, copper as an electrical conductor was unheard of, silver being far superior to it in more ways than one.

Had this been done back in the early part of the century, when some countries were on a silver standard and all countries used it for currency, there would have been a world panic. But in 1974, when money was all paper based on real estate, no ill effects resulted.

Professor Riehm spent the rest of his active days in perfecting various processes for the giant concern

* Actinium itself produces no radiation of any kind, but it suffers continual inter-protonic rearrangement, constantly forming actinium A (isotope of polonium) which immediately breaks down into actinium B (isotope of lead) which gives off very powerful gamma rays.

which owned him. It is indeed sad that such a brilliant mind became enmeshed in the tentacles of big business. No one knows what he might have done, what great advancement the world might have known, if he had followed the guiding-star of pure science in his Berlin laboratory. However, there were others of brilliant mind to carry on the great work.

Four years later, in 1978, Dr. Svens sprang into prominence by building up platinum or *synthesizing it*, from lower elements!

Professor Riehm had done two outstanding things: he had made possible the isolation of isotopes (which is a partial transmutation) and three years later he made transmutation a reality rather than a hypothetical word by isoprotizing zinc. Transmutation, as Professor Riehm had left it, could be done only in the *breaking-down* way, and then only if the atom split exactly in two. (As iso-zinc 64 into two of iso-sulphur 32). But Dr. Svens introduced to science the process of synthesizing elements. This produced a stir in scientific circles equal to that produced when Perkins synthesized mauve, the first aniline dye, back in the early days of science.

Dr. Svens' notes are written in too technical a style for clarity to the average reader. Suffice it to say that three atoms of iso-iron 56 plus one atom of iso-aluminum 27 in protonic union gives one atom of iso-platinum 195. There are exactly enough hydrogen and helium protons and free electrons to make normal platinum of atomic weight 195 but thirteen free electrons had to be transferred from the outer shells or orbits to the nucleus! This was the task which Dr. Svens had taken upon himself. Working upon this principle that three parts by atomic-measure of iso-iron 56 (purified by Professor Riehm's process) *plus* one part of iso-aluminum 27 would give one part of iso-platinum 195, he subjected the correct proportions of the lower metals to various radioactive radiations, with no success whatsoever. The metals were finely ground and carefully mixed; every radioactive material procurable was tried, and still constant failure resulted. It was not until a small amount of iso-Pt 195 was mixed with the raw products that success came. The yield was, however, poor; after dissolving out of the fused mass the unchanged iron and aluminum by boiling hydrochloric acid, a small amount of iso-Pt 195 was found, running to .01% of the total weight!

Small as the yield was, the materials were cheap and several great chemical concerns took over Dr. Svens' process and put synthetic platinum on the market at one-third the price of natural platinum. This was a great boon to the chemists, who found it thus easier to procure the much-needed platinum.

Dr. Svens, in his laboratory up in northern Sweden, next attempted the production of artificial actinium! He had heard about Professor Billings and his famous atomic-engine theory and his estimation of the amount of actinium needed to run it. Imbued with the grand purpose of conquering space and establishing communication with Mars, which he knew was inhabited by reason of the Period of Signaling a decade before, and perhaps other planets, he began that series of famous experiments which culminated in the production of Svenium, the Wonder-Metal of today, a radioactive body at least 1000 times more powerful than any natural material. He reached the grand goal which Professor Riehm had set before himself, but never attained

But, as it chanced, before Dr. Svens perfected his process, the First Martian landed on earth, up in northern Michigan, near the shores of Lake Superior. This landing occurred three months after the making of iso-Pt 195 in 1978, and just about the time that Svens began his work on synthetic actinium. Undismayed by the crashing of his hopes of first conquering space, he labored on and in 1981 he announced success—success beyond his dreams. He not only made actinium but also element 87, an alkali metal, and so radioactive that its period (i.e. half its life) is three minutes! He was not able to isolate it, but found that when alloyed with actinium, it became much longer lived and still capable of producing enormous energy-products. He made by dint of much labor a large supply of the alloy, which subsequently became known as Svenium, or more popularly, the Wonder Metal, and offered it to the Mars Klan, of which he was a member.

In a short time the ship built by the Mars Klan and propelled by the Wonder Metal rose into the air, and, leaving behind the shouts and mad acclaim of admiring thousands, sped to Mars, equipped with powerful engines and staunchly built to withstand space conditions.

It was somewhat surprising that after the landing of the *Pioneer*, or the First Martian, no Martian ships immediately followed. The next one to arrive here came a week after Dr. Svens' ship had left Earth. In fact, as it later proved, the Martian ship had left Mars on the same day our ship, the *Tellurian*, had left Earth; but the *Tellurian* made the journey in less time than did the Martian ship! Hence the first official spaceship from Earth arrived on Mars before her first official (the *Pioneer* was a lone flyer, whose departure from Mars was witnessed by only one person) ship reached earth. And then, the handicaps we had to overcome! The Martians had abundant supplies of radioactive bodies and needed but to invent the atomic-energy engine, while we had to make our actinium after long years of intense research, the fruit of perhaps 85 years of scientific advance.

The principle of the atomic engine was discovered on earth before the fuel to run it was found. On Mars the fuel was there for the taking.

Martian Superiority

IF this account reaches the eyes of Martians and may seem to them rather boastful and impertinent, I give them this reason: I have written spaceship, this in answer to Markin Lavlo's book, "Martian Superiority." It is merely a gentle reminder that beyond the remarkable flight of the First Martian, we Tellurians can claim to be the pioneers of space.

It must not be thought that we of earth in any way minimize the great and historical space flight of the *Pioneer*. Far from it. We are as quick in our homage to his dead body and everlasting spirit in the museum at the spot of landing as his fellow-Martians themselves.

The foregoing has prepared the reader for the story of the arrival of Kastory Impan, the First Martian, or the *Pioneer*, whose name is held today in reverence by the peoples of two great worlds.

There are numerous other accounts of the arrival, but none have gone back into the past to show the connection between scientific research in transmutation and interplanetary flight; a point, I think, directly connected

to the first space flight and subsequent establishment of commercial relationship. It is true, that without the flight of Dr. Sven's ship, the Earth would still be as far ahead; the Martians would still have come, but that does not detract from the honor and glory forever associated with the names of Professor Wilhelm Riehm, the founder of the science of transmutation, and Dr. Jarl Svens, who developed it. I challenge Martia, the super-race of Mars, to bring up a scientist to compare with either of these two:

And I may add that quite by accident I came across the little sub-plot which goes with story of the arrival of the First Martian. I'm certain no one ever heard of Gregory Stewart before.

The Arrival

UPON the gently-sloping greensward in the shadow of the forested First Bluff, one of the myriads of peaks of the Porcupine Mountain Range, just a few miles outside of the small town of Bessemer in the year of 1978, a group of holiday picnickers were startled from their merrymakings to see descending near them, with sickening speed, a dull, green-hued sphere. Appearing high in the air as a balloon, it rapidly increased in size, and when about a hundred feet above the ground, stopped, wobbled uncertainly, and then crashed to the ground with a metallic, crackling sound. After swaying back and forth slightly, it finally came to a dead rest. So startling was this incident that it deprived the merry-makers of all action. In attitudes of astonishment, they gazed speechless at the strange object, hardly knowing what to expect next. With excited exclamations, the impetuous youths of the group ran towards it.

"I'll bet it's another of those crazy planetary ships," yelled one excitedly. "They try 'em by the dozens nowadays."

"Or else it's a new perpetual-motion air glider."

"Or maybe it's a new raiding plane from the Chinese," chimed in a third, breathless from running.

"Well, whatever it is," came from a fourth, "the inventor, or whoever runs it, is sure gone!"

Upon the heels of the racing youths, each eager to be first, followed the elders and the children, all thoughts of their tasty lunch, lying on the sward, forgotten. Surrounding the globe upon their approach, they did not know what to make of it, for it was such a strange-looking object. One of the boys, in his curiosity, advanced close and touched its metallic side, but quickly withdrew his hand with a cry of pain and sucked his scorched fingers. Being in diameter about ten feet, it looked like nothing more than a huge glass ball, tinted with a light green; of smooth, unseamed surface. No opening of any kind could be discerned in the area of the sphere's surface, except that the bottom side, on which it had landed, seemed to have been crushed and the jagged edge buried in the earth. No sound could be heard from the interior of the globe, and the excited picknickers chattered volubly, conjecturing and gesticulating, trying to make something out of the puzzle.

One of the older men voiced the opinion that it seemed to have been cast as a whole; and that seemed an impossibility to him.

"Why, look?" he cried, "if it's some sort of an airship, how could the driver get into it? I've just walked all around it and I can't see a door!"

"It must be on the underside," his companion, a younger man, replied. "Just our luck, too, or we could have entered and seen what's what. If there's anybody in there, and there surely must be, unless it's radio controlled, he'll die—if he isn't already dead."

"Here, Louie," he called to a boy, "run to the highway and see if you can find a motorcopper." He turned to the other man. "I guess that's all we can do till he comes, Mr. Boldt."

"It occurs to me," said Mr. Boldt to the other, whose name was Ramson, "that that metal doesn't look like metal! It looks more like glass! Of course, it can't be that, or it would be smashed to bits!"

"It landed with enough force to snap steel," said Ramson, "but this stuff seems to be intact, except where it struck the earth." He bent down and looked closely at the smashed portion of the huge globe. "In fact, the only place it did smash is where it landed on a large rock, which you can just see there," he pointed. "Over on the other side, it merely depressed the ground."

A third man joined them. "There is a door to the thing," he cried. "Come on; I'll show you." He led the way to the other side. "There, right above our heads, you can see the crack which separates it from the wall. It's flush with the surface and looks like a perfect fitting."

It was, indeed, the door, about four feet long and two feet wide, and indistinguishable, except for the fine cracks separating it from the main wall of the globe. It was evident that the sole means of opening it was from the inside—inside, where perhaps someone lay hurt or dead. It was the usual thing for unsuccessful rockets and spaceships to either smash to pieces on returning, or to land so lightly that the occupant, or occupants, escaped unscathed, and stepped smiling out of their temporarily-disabled ship.

At that moment a man came hurrying up, easily recognized as a farmer by the spotless white suit and wide-brimmed straw hat. He arrived, breathless.

"What in Heaven's name has happened here? What—whose?—why, hello, Mr. Ramson, I thought you'd be here," the farmer said as he spied his friend, "Did you bring this along?"

"Lord, no, Mr. Chaws, I had enough to do carrying lunch! It landed just as we were eating, too. I can't make it out. I figure it's some fellow's invention on its maiden voyage, and it was evidently built for space flight. My friends here—" he proceeded to introduce them.

Mr. Chaws was introduced as manager of Section D of the well-known Brinkley Farm, whose products always sold well in big-city markets. In extent about 500,000 acres, its various sections were scattered on both sides of the Porcupine Range. Section D bordered the other side of the woods near which the picnickers had started to eat lunch, and specialized in dairying more than grains. Mr. Chaws himself was one of the regular college-bred, scientific farmers, who are trained in our large agricultural institutes.

"I was just stepping out of the milking-room of Barn 3," began Mr. Chaws, all introductions over, "when, raising my eyes for some reason, I saw this—ship—as a rather large ball high in the air. Its peculiar color and apparent speed of descent made me watch it curiously as it drew nearer. It rapidly increased in size and at first I thought it was going to land near me, but instead,

it disappeared from my sight as it fell behind First Bluff. Determined to find out what it was, I jumped into my Cremson and motored over here as fast as I could, through the woods. I parked the car over on the road. I fully expected to see a mass of broken metal here, instead of this—"

"Well, you see," broke in Mr. Boldt, "whoever runs the machine, succeeded in halting it about a hundred feet above ground, and then lost control again."

"It's all heated up," ejaculated Mr. Ramson, "at least on the outside. Even if the fall didn't kill the pilot of this—ship—then the heat will—or has."

"Isn't there some way of opening it and getting the fellow out!" asked Mr. Chaws.

"Doesn't seem to be," exclaimed Mr. Ramson, "Look, here's the door," and he pointed with meaning at the only evident means of egress and entrance.

"Hm—no chance there," spoke Mr. Chaws. "About all we can do is send for a motorcopper and let him worry."

"I've done that already," cried Mr. Ramson. "If there was one on the highway when the boy got there, he ought to be here now. But they're never where they're needed most." All the men smiled, for at that time the motorcoppers had very indefinite schedules, as compared with the present strict system.

"Of all the places to land, this is the worst," commented Mr. Chaws. "Three miles from a town, ten miles from the nearest airport, and confound it all—I think it's going to take a hydrotorch to open that thing!"

"When it cools enough to work near it," added Mr. Boldt significantly. In fact, all the people kept at a comfortable distance from the huge globe, which radiated quite an amount of heat.

"I pity the poor fellow in there if he's still alive. It's as bad as a miner, twenty feet from safety, pinned down by a rock across his leg," spoke Mr. Chaws quietly. "If we could only get a hose connected up and sprinkle it with water."

"To get his machine so heated up by atmospheric friction, he must have been speeding at a good fast clip, or perhaps he's been falling from away up," exclaimed Mr. Boldt.

"When that rocket-ship those three engineers navigated last year to 97 miles up came back as a freely-falling body, the remains of the ship were hardly as hot as this is. This fellow must have come from a good deal higher—and faster," said Mr. Ramson. "Only it would not get hot in empty space."

From the roadway that led through the woods appeared the figure of a motorcopper, resplendent in his blue uniform and leather leggings. He strode up, looking curiously at the globular, green-hued ship, unaware of the connection his name would have in the future with one of the most important events in earthly and Martian history.

Stopping a few yards away, he looked sharply at the object and whistled softly.

"Looks like the real thing," he said in a loud voice, "but why didn't it get there?" and he pointed to the moon. Every space-adventurer or group of them announced their destination as the moon to the admiring crowds before the take-off, and "reaching the moon" was a standing joke and likewise a proverb in those days.

"My name's Steelstrong," he exclaimed as he turned to Mr. Chaws and the others. "What's it all about?"

All the former picknickers had clustered together and one and all looked at Mr. Chaws as if appointing him speaker. In terse sentences Mr. Chaws told his part of the story. Mr. Ramson continued and emphasized the fact that it would take a hydrotorch to open the mysterious object and get in to rescue the pilot of the ship.

"Where's the door?" asked Mr. Steelstrong. It was pointed out to him and surveying it carefully, he turned to Mr. Ramson. "You're right. It's a space-built ship and the door is an air-tight affair. I wonder what kind of engine he could possibly have to lift a spherical ship off the ground—it doesn't look like a rocket-ship—"

"Hardly that. Maybe this fellow has perfected some sort of gravity-screen or nullifier," exclaimed Mr. Boldt.

"If so, he's done something that scientists have striven to do for a long time," said Mr. Chaws.

Mr. Ramson had been all the while examining the juncture of the ship and the ground. He straightened up. "I think it is a rocket-ship after all. Look—see that flange almost buried in the earth? I believe that's part of the circumference of his rocket-discharge tube."

"Quite possible," answered the motorcop. "But the shape of the craft is hardly that of a rocket-ship. They are usually elongated, with the discharge tube at one end. Of course, the shape of a rocket-ship does not matter in the least out in mid-space, as long as it has a weighted side."

Possessed of all details, the motorcop pulled out of his pocket the tiny, but efficient radio-transmitter, such as is in common use today, at that time used mainly by officials, policemen, motorcops and the like. In a few moments the little instrument, powered by universal-energy, made connections and the attendant at headquarters answered.

Mr. Steelstrong reported in a casual voice, little realizing how his words would be read by millions of eager people later—"There is a strange, metallic, glassy-like spherical ship or machine, piloted by some unknown person, which landed three miles northeast of Bessemer, some ways off the Bristow Highway, near First Bluff. It landed 16:10 (on the date so well remembered by the peoples of two worlds) according to some twenty eyewitnesses. No means are at hand to enter the ship to rescue the pilot, for not only is it too hot to approach, but the only door is locked from the inside, to all appearances. I advise sending a public-utilities crew over immediately with a hydrotorch to cut an entrance."

The motorcop snapped off the handy little transmitter and engaged in a calm talk with Mr. Chaws, Mr. Ramson, and Mr. Boldt, although all knew there might be a badly-bruised, possibly suffocating, perhaps dead person in the green, glass-like sphere, strangely out-of-place where it rested on the brown earth. And while the public-utilities crew is speeding with all possible haste in a universal power car to the scene of the landing of the *Pioneer*, all unconscious of their part in the making of history, let us turn our attention to a person intimately connected with all this and yet about whom very little is known.

Signaling from Mars

AS early as 1960, people had reported strange, intelligent-sounding signals coming through on the carrier-waves of distant stations, especially on wave-lengths of around 10,000 meters. The signaling gradually be-

came more persistent and the public began complaining of the increasing disturbance, comparable to the one-time dreaded static. The government, slow to act as usual, did nothing about it until there was nothing left to do. It was voiced about gradually that some fanatic, with a grudge against the whole world, was bent on spoiling radio entertainment, the greatest means of uniting and educating people there was, and still is. Television remained undisturbed, but it was provoking, when listening to some foreign station on a high wave, to have an intermittent dot-dashing break in as a background to the singing and talking.

Considerable excitement was created when a world-renowned amateur, in experimenting with new hook-ups, devised one capable of receiving waves of as long as 20,000 meters, double the longest in common use. He reported the bothersome signals as very strong at 20,000 meters and said he planned to trace the waves to their source and possibly lead to the capture of the fiend who was creating them. As an outcome of this, a number of radio-experts got together for "the common good of all and for the sake of radio-science," and adopting the principle of the great amateur's circuit, built an efficient receiver capable of close to 30,000 meters' reception!

At first trial the set proved a success for the purpose for which it had been built. The signaling came in loud and distinct, and was found to be simply: dash—double dash—triple dash—etc. up to ten; then combinations such as: dot dash—dot dash dot—dot dash dash dot—etc.; and again: dot dash—double dot double dash—triple dot triple dash—etc. After a long series of such signaling, there would be a short pause and then the whole thing over again:

Really puzzled, the group of amateurs prepared a direction-finder attachment in the attempt to locate the diabolical fiend who tampered with the ether-rights of citizens of the world. The results of this showed the signals to be moving! actually moving! curiously, at a rate of speed equal to the earth's rotation! At times, the waves came from China, straight through the earth (the group had headquarters near New York City) and at other times, from straight above, as if reflected from the Heaviside Layer!

No progress was made till an enterprising young astronomer, of the group of experimenters, conceived the idea of listening to the signals and observing Mars in a telescope at the same time. He, his name lies shamefully in obscurity today, discovered the explanation of the periodic flashes on Mars: for the signals and the flashes corresponded down to the smallest detailed dot!

It was announced to the world that the Martians (for who or what else could it be?) were attempting to communicate with the earth by means of a powerful directional radio-wave and large, visible flashes. Today we know these flashing lights (which must have been enormous in area) to have been produced by a complicated apparatus whose vitals were radioactive substances, which Mars is singularly blessed with in immense quantities. The period of Signaling lasted, with several breaks, till 1967, or seven long years—a strong indication of the well-known Martian persistency!

Various theories sprang up back in 1960, regarding the purpose of the signaling. Some claimed the Martians merely wanted to let us know they were living, having found out somehow (or had they?) that the Earth was inhabited by rational beings. There was no doubt that

the Earth was the object of their signaling, for assuming that the wave was a directional one, and it is the only possible conception, considering the enormous distance we know the waves to have followed the Earth in its movements.

The theory gradually gained ground that the signaling was a warning from the Martians that they were about to launch ships to the earth. In fact, said some, it might be taken as declaration of war! When the *Pioneer* landed in 1978, eleven years after the signaling so suddenly stopped, many people said its coming was the message conveyed by the Martian Signals, but we know today, the two events had no connection. The Martians, having means at hand, were imbued with the idea of making a simple gesture at interspace communication, one-sided though it be. One thing is certain; it had a most important effect on the affairs of this world.

Space Flying Period

THE one great result of the Martian Signaling was to start an era of planetary ship-building, which gradually died away to normal in 1975. The people of the world seemed to become electrified by the startling news that rational beings, who understood radio and optics, lived on another and similar world some few million miles away! Minds, before dormant, were dragged out of the rut of the commonplace, and geniuses were born and died in the space of a week. Mars, Martians, interspace communication, light minutes, light seconds, acceleration, initial speed, super-steel, such expressions were on every one's tongue. Young inventors, old, hair-brained fanatics, unproved Lindberghs, self-appointed areonauts, and pseudo-engineers began designing and trying out spaceships, space-flyers, rocket ships, speed bullets, ether planes, anti-gravity screens, and what not else, in the attempt to be first to tell the Martians how glad we were to acknowledge them our neighbors! Almost daily, martyrs left the earth in imposing ships, having promised to send greetings from wife and child, neighbors and friends to the first Martians he saw. On an average of once a week, some inventor or pioneer came to a sudden death in his self-built ship, or soared into space never to return, never to arrive anywhere, victims of misbegotten ideas. The more rational people had no check on the enthusiastic ones who left all and everything to carry earthly tidings to distant Mars. Professor Billings' theory, that space-travel was only possible in an atomic-energy engine with more actinium than the world had, was totally disregarded by these fanatics and opinionated ones.

This country held its breath when a former-famed engineer embarked in a truly imposing rocket ship and soared grandly into space one summer's day. It took him a minute and a half to go 500 miles up and a minute and a half, or perhaps longer, to go back, and they couldn't even find his body down in the bottom of the big pit which marked the landing of the ship, loaded with several tons of "markite," a new and powerful explosive.

But youth is impetuous and his spectacular flight served rather to stimulate than check the mad tide of would-be space flyers, ambassadors to Mars.

In the meantime, Dr. Svens and others worked quietly ahead to the goal in sight, the synthetic production of actinium, so greatly needed for the atomic engine—and so rare. Their success in transmuting lower ele-

ments into a higher one, platinum, came about three years after the sudden decline in activity in space-flying attempts. Calmly assured that the production of synthetic actinium was but a matter of development, he forged ahead, determined to do in a scientific way what so many foolish people had attempted in other ways. The coming of the First Martian was a blow, but he accepted it philosophically, and perhaps realized that the success of the *Pioneer* was due more to chance than to Martian science.

An era of "wildcat speculation," far transcending that of the Civil War Period, set in and the gullible public bought worthless stock from convincing and voluble professional sharks, for Martian-Earthian Freight Lines, Inter-Space Express Co.'s, and Planetary Service Lines, etc.

To enhance their sales, certain combines of the sharks put up signs and billboards:

"This marks the spot where the great Martian Space Port will be built. Reliable backing. Buy stock now and realize millions before a year's time," and accompanying it, would be a vivid, florid picture of a gigantic space-ship, or perhaps a grotesque Martian, beckoning and urging.

But even as in former times, reliable companies sprang up to really promote the project. The common populace had a fling, and when they had spent themselves, science stepped in.

A scientific convention met at Moscow in 1976 and formed a body, which was pledged:

"To establish inter-space travel and communication between our inhabited neighbor, Mars, and the Earth, for the betterment of science and the good of the public."

The body became a strictly scientific organization, and the charter members, after drawing up a series of regulations, which included very strenuous requirements for membership, opened their doors to all who were interested, who could satisfactorily prove their worth. In time, the organization became known as the Mars Klan and absorbed a number of efficient engineers and mechanicians, astronomers, and, in fact, recruits from every branch of science. But it is doubtful if the Klan would have made good, if it hadn't gathered into its folds Dr. Svens, the one person responsible for the success of their plans.

Work was begun in earnest the following year. Dr. Svens promised to produce actinium within a decade; the engineers worked together on the construction of the *Tellurian*, which, after making six flights to Mars and back, was placed in the Moscow Museum, where it rests today, viewed daily by thousands. It embodied, of course, the original plans as made by Professor Billings back in 1945, altered as modern discoveries made necessary, and was fully constructed almost a year before Dr. Svens perfected his synthetic actinium process in 1981. The laboratory constructed by the Mars Klan was rated as the best in the world at the time. The astronomers also had their part to do: to dig up and record some 350 years of painstaking data on Mars and all features of Mars, and also to study with renewed intensity the planet through telescopes. All in all, much valuable experimental work was done before the actual accomplishment of their aims, and a great deal of by-product results was filed away for future use. And in the midst of all this, like a prophesy, came the arrival of Kastory Impan, The First Martian:

Gregory Stewart

WHEN the motorcop spoke into his little short wave transmitter to report to headquarters of the landing of a strange, green-hued sphere, he did not know the furore he caused in the mind of a certain man seated at the dials of his short-wave set. It had been more or less of a puzzle to the motorcop and the crew who came at his call, why, almost immediately after their arrival, the heads of the Ironwood Laboratory, branch 28 of the Federal Laboratory, also came up in a universal-power car. The scientists spoke of a mysterious call from someone who in a voice of anguish told them a Martian, the First Martian, had arrived on earth at First Bluff near Bessemer, begging them to hurry, because he was probably badly hurt. The writer of this article succeeded in piecing together the scattered facts after considerable trouble and revealing the little drama behind the arrival of the *Pioneer*.

A middle-aged, quiet, and quite well-to-do eccentric had bought a small brick house just on the northern edge of Bessemer and therein had established a small experimental radio laboratory. Small, insignificant, and unobtrusive, people had, after the usual run of gossip, almost completely forgotten him. In fact, that made it doubly hard to secure the necessary information about his activities, as no one knew of them. He simply had no friends.

He had listened steadily and eagerly to the Martian Signals at the time of their occurrence and had, for the purpose, built himself a long-wave set copied from the invention of the famous amateur who made possible radio reception from Mars. After the Martians had so suddenly ceased broadcasting in 1967, this experimenter, Gregory Stewart, put the useless set aside and turned back to his old field, short-wave experimenting. In 1970 he left for Europe, apparently to satisfy a "wanderlust." From then he traveled to different regions of the globe, erratically skipping from city to city and place to place. His "wanderlust" satisfied, he returned to the laboratory in Bessemer and began work on an incomplete report, which the writer has procured, on the effects of the Heaviside Layer on radio waves. It is possible, almost certain, that completion of this work would have made broadcasting to Mars an accomplished thing, before the adoption of Martian long-wave methods. It is safe to identify the reception of strange signals on Mars from time to time after 1972 with the efforts of this obscure man, whose apparatus, however, was found completely demolished. It is surmised the Martian signaling had imbued him with the desire to retaliate.

But night after night, as he glanced now and then at the old high wave set, an irresistible impulse grew within him, a hunch, more or less, that the Martians would some time recommence signaling, perhaps in answer to his efforts to reach them. At last, almost driven to distraction by haunting thoughts of missing it when it came (this is gleaned from his incomplete and erratic diary) he devised a scheme whereby, should the Martians re-establish broadcasting to earth on the old wave length, about 30,000 meters, he would be notified by the flashing of a small light in an open circuit. He had revised a crystal set and along with the high-wave design, had inserted a very sensitive heat-indicator, and connected it to the break in the light circuit. If, at any time, the signals from Mars came again, the crystal, sensitized to it by

the high-wave design, would send a minutely weak, and absolutely unheard impulse through a coil surrounding the heat indicator. This heat indicator was the heart of the whole scheme. Several years back, an investigator had perfected a thermo-electric globe, made of a secret metal, which in response to the slightest amount of radio-heat (i. e. the border line waves between heat and radio) waves would close an electric circuit. The coil surrounding it produced this necessary radio-heat impulse when the signals came and as a result, the circuit would be closed, lighting the small lamp, and the observer would be apprised of the signaling. He would then simply have to connect up his big set and tune in. Several times the light had momentarily flashed, but at no time had there been a permanent and lasting broadcast; probably some accidental effect of earthly experimenters.

But one night it happened. In a trice the man, awaiting just this occurrence, had hooked up the big set, although his hands trembled so, he dropped the earphones twice. His astonishment may be imagined when he heard, instead of signals, a *voice*! True, a strange and muffled voice, but nevertheless they were articulations of a rational being. It is possible that the man ecstatically drank in the triumph of first hearing of all living and of all dead peoples the voice of a Martian. In breathless suspense, we may imagine him, listening spellbound to a language he could not in the least understand, momentarily disconnected with things material, and experiencing a sublime emotion, that of being *first* to do something!

His diary is especially illuminating at this point: "voice that soothes and lulls, at least to me. Curiously rapid, and unhesitatingly, as if it took little effort to formulate. Few harsh sounds and many graduated vowel combinations came. I am the first human to hear the voice of a being not of the earth! Glorious triumph! I am now amply rewarded for my recluse life. And it took no physical prowess. God, how I hate the thought — Despised and scorned, health undermined — But this is ample reward. I could ask no more. Am I to become famous? Nothing I desire more—or less. I'll meet him face to face—"

I may add that he struck the right expression when he said: "Rapid and unhesitating as if it took little effort to formulate." That is the outstanding characteristic of the spoken Martian language.

In the days following, he listened to what were evidently long talks or reports, to which he could not hear the answers, for which the speaker stopped at times. As he listened, night after night, and the voice grew louder and louder, it gradually dawned upon him that the Martian was somehow in motion and gradually nearing the earth!

In a daze, the man sat almost continuously by the receiver till a report would be ended, then most likely he worked on his great work; in the pauses between the messages. As soon as the light flashed, however, he was back at the set and indulging again in the "soothing and lulling" modulations of the Pioneer. It never occurred to him or perhaps he didn't want to do that, to notify the scientists at the Ironwood Public-Service Laboratory, but it did occur to him to speak to the Martian. He hooked up the set of his invention and switched on the current. No one knows what he said but probably they were impassioned words of cheer and

welcome, and the effect on the Martian, again from the diary, is given here:

"His voice became eager, his words more rapid; and although we had no way of understanding each other, I verily believe something in common in our thoughts gave him hope and comfort and me——! Later, when he spoke again, to whomever on Mars was in contact with him, I could almost follow his eager explanations about me——"

This, the writer thinks, explains the comparatively slight excitement, when the Martians asked, who had attempted to communicate with the Martian, Kastory Impan, during his flight to earth. No one had accomplished such an inconceivable thing as far as anyone knew, the Martians were assured, but they maintained, with their usual persistency, that someone on our earth had spoken to him while he was yet in mid-space and from then till his fatal landing.

Affairs came to a climax. Some fate, some working of destiny, pointed the ship of the First Martian in his epochal-making flight to the town of Bessemer near the shores of Lake Superior and very near to the home of the eccentric radio-enthusiast.

The signals had become extraordinarily loud and the man basked in delightful thoughts of meeting him. He sat by his set that memorable afternoon of August, 1978, and heard the voice of the Martian becoming excited! Suddenly his words ceased! There was a long and deathly silence, in which the only man cognizant of the Martian's arrivau "was gripped in a mighty and terrible dread. My very heart stopped beating as I hoped and prayed for the Martian." Then came a grinding sound, a fearful scream, a dull crash, and then—dead silence!

We have no record of Gregory Stewart's immediate reactions to what he knew probably meant death to the First Martian. Perhaps he fainted. Anyway, the call, his call, to the Ironwood Laboratory came a full hour after the landing. The words of the unknown man who apprized the scientists of the arrival are indelibly printed in the mind of the operator at the set in the laboratory, who heard in a tense, almost unearthly, strained voiced the following:

"In God's name, hurry over to First Bluff near Bessemer where a Martian has just landed and is probably—badly—hurt!"

It is easily seen that Gregory Stewart had heard the report of the motorcop in his low-wave set and so knew that fate had landed the Martian very near to the only human who knew of his coming!

Thus it was that when the scientists and utilities crew arrived and carried out the body of Kastory Impan, The Pioneer, The First Martian, there was a small dark man, a glazed look in his weary eyes, who hovered in the background and looked intently at the distorted face of the Martian.

Kastory Impan

THE door was cut out, as was the only possible way, with a hydrotorch, and the piece was lifted away. The head of the utilities crew stepped into the globe. He came out with an expression of bewilderment, and turning to the group of five scientists who had sped over to investigate the truth of the mysterious call, said he believed they were the ones to enter and bring out the person inside.

Let us read the abridged report of this group of men who were first to look upon the face of the First Martian:

"Our universal-power flashlights lit up the interior of the globe suffused by a greenish glow from the reflection of things made of a certain metal (an alloy known later as Martinium). The first object to engage our attention was the body of the First Martian to arrive on this earth. Perhaps four feet long, with massive chest and spindly legs, the Pioneer lay stretched out, on his thin and wasted face a most frantic look of despair and fear. His fingers were clutched together and his legs terribly twisted. A general angular look about the body suggested that all his bones were broken. Carefully we laid aside the yielding broken body and proceeded to examine the interior of the ship. The interior walls were covered by a netting of fine wire, whose purpose was to provide heat, obtained from electrical energy from a radioactive battery. Among the articles in the ship was a heavy, metal box, securely attached to the floor-wall, which housed the atomic-energy engine; another, similar-appearing box nearby was ajar and inside were jars of a peculiar, practically unbreakable glass, some of them containing crust-like substances and others water, an oily liquid and miscellaneous articles. Fastened securely to the walls all around were various instruments of delicate and fine make easily recognized as thermometer, clock, telescope, sextant-like affair, an acceleration and speed recorder, altimeter, and several seemingly purposeless instruments. All seemed to have survived the shock of the impact quite well.

"Near the body was an apparent radio-set, mangled beyond readjustment and about the only object in the ship in that condition. It was connected by a thin wire to a metallic rod supported on a wooden base, which evidently was the aerial. We also observed a television attachment and the reflecting mirror fastened to the wall. In the space between the outer and inner wall was the compressed air tank which supplied the pilot with pure air, and an outlet with an ingenious valve for eliminating used air. In six different places, equidistant from each other, were shutter-like arrangements. Raising one of them we looked right through the outer wall into the woods around First Bluff! Truly, a marvelous metal of which the ship was built!

"The body lay half across the radio-set as we found it. Our inspection done, the body was reverently carried outside to the eager people and the ship was closed up and guarded till taken away the next day."

The body of Kastory Impan lies in state, in contrast to the look of anguish on his face, in the Bessemer Museum, and is a shrine at which thousands daily worship—and pray.

The Martians, we learned later, knew absolutely nothing about the flight of the *Pioneer*. He and his friend had built the ship, devised the engine (the crude forerunner of the atomic-engine) and fitted it for space-flight. Constant communication was kept up between the two during all the flight, and the full story of particulars was published by the Martian who stayed behind. It is therein stated that the reason for his failure to land successfully was due to the crudeness and incompleteness of the engine. For fuel, the Martian had used gold, a fairly common metal on Mars, which yields a high percentage of hydrogen volume when broken up by actinium. The ship had landed squarely on its rocket-tube

discharge (which they had built almost flush with the outer shell). Around the discharge tube had been placed the weighting material, gold, to keep the tube always pointing to the planet above which the ship hovered. It is suggested that the Martian and his companion had not made enough allowance for the earth's superior gravity and hence had not enough discharge-force to land the ship gently.

Two Worlds

"SECOND Martian Ship Arrived!" read the startling headlines of newspapers. September 21, 1981. What had happened to Dr. Svens', to our ship? the *Tellurian*? Had they passed each other on the way? Had the *Tellurian* been disabled or lost or smashed into infinity? The turmoil reached proportions almost transcending the Space-Ship Period, when everyone had become inspired with the desire to reach Mars.

The ten Martians who came as official pioneers to earth, knew nothing of our ship. They started, in fact, on exactly the same day the *Tellurian* left earth! If the dead body of the Pioneer, Kastory Impan, had been ogle-eyed and stared at by millions, imagine the center of attraction ten live, moving, and talking Martians must have been! Their ship had arrived in Europia, in the former country of Belgium, near Antwerp. The International Science Group of Paris immediately traveled thither *en masse* and accorded the Martians welcome. I will not detail the activities of the Martians and our scientists but suffice it that the visit lasted a full six months, in which time, by using joint telepathy and simple teaching methods, the Martians were taught English, which was the universal language on Earth.

In the meantime, the *Tellurian* came back from Mars, and the success of their voyage caused every world citizen to expand his chest and look mightily pleased. The two ships were a strange contrast side by side: the large, green-hued globular ship from Mars, made of Martinium, and the smaller, elongated, bright silver earth-ship. Both had the identical type of engine, but each was run by different fuels. The Martians were run by large amounts of actinium and gold, while ours was run by small amounts of the Wonder Metal and lead.

After the two successful flights in 1981, space travel became but a matter of development and enterprise. The Martians soon brought us their science, in many ways superior to ours, their television, which was superior to ours, their persistence, and lastly, Martinium, able to resist heat and cold to all extremes. The Earth returned with her imbeciles and invalids, headed for the mountains of Mars, the best sanitariums of the two worlds. As trade became established, vast stores of radioactive minerals, gold, lead and tin, were exported to earth, the last two vying on the market with synthetic lead and tin, successfully developed by Professor Riehm, famous for all times as the originator of transmutation. In turn, the Martians imported sodium salts, of which they suffered an extreme rarity, sulphur, and iron. At first, considerable numbers of the space freight-ships were lost, some with valuable consignments, due to insufficient fuel or lack of practical data on space travel, but today, losses are down to a bare minimum. And the brains of the two worlds have worked in unison to solve baffling problems. Only once has trouble loomed on the horizon of our friendly relationship.

In closing, let us read a clipping from a newspaper dated August 3, 1978.

"Today, a small, dark man, Gregory Stewart, known to the people of Bessemer as a radio-amateur, and having a laboratory there, startled the people in Setter's Park by rushing straight to the waters of the lagoon. He shouted as he ran: 'Ah! God! I hear it again!'

He screams, oh!—he screams! He's lost!" and holding his hands to his ears, he plunged to his death in the pond. Although he was pulled out quickly, he could not be revived.

This little article was hidden in the middle of the newspaper. Yet almost all the rest of it dealt with the arrival of the *FIRST MARTIAN*.

THE END

Space Rocket Murders

By Edmond Hamilton

(Continued from page 601)

they took. For let us suppose that when the Venerians first visited earth two hundred years ago, they had made themselves known to the people of earth and had helped them build space-ships like their own. Suppose they had done that fifty years ago—five years ago. What would have been the result?

Would there not have been space-ships sailing from earth to Venus soon, crowded with the curious, the self-seeking, the restless? And when they reached Venus, if they found there anything considered of value by men, gold, precious stones, valuable minerals, who can doubt but that soon more and more ships would have been sailing Venus-ward, that the Venerians' natural resources would have been ruthlessly exploited, and that when the Venerians resisted, they would have been fought and in time wiped out just as here in our own world the Tasmanians and the Red Indians and a score of other lower races were annihilated?

No, much as we may dislike to admit it, we must confess that the Venerians acted for their own best interests when they deliberately planted spies on earth to retard and prevent entirely, if possible, the development of space-travel by men. And, from their point of view, the few deaths their course occasioned here on earth would be well justified by the prevention of the disastrous consequences if man ever did reach Venus.

But this lies in the past. We know now that the Venerians exist and that they have developed a method of space-sailing. We are aware even of the fact that their numbers are less than ours, though their science is farther advanced. Their two hundred years of watch on us, through their spies on earth, has been disclosed to us.

Parenthetically, there is small chance, to my mind, that the Venerians will attempt to resume this watch on us. I doubt if they will ever again seek to maintain spies on earth, not only because, since they have been once discovered, their work would be almost impossible, but also because the object of their watch is gone, now that we know all these things and are fully aware that Venus is a habitable and inhabited world.

No, this first secret phase in the relations of Venus and Earth, the one planet's race being entirely unaware of the other's existence, is gone forever. The great question now is, what are the two worlds' relations to be in the future?

It is evident, that if the Venerians have developed

space-ships, we also can do so, though perhaps much time must elapse first. But as the scientific knowledge and power of man marches steadily onward, the day must surely come when man, too, will take to space and sail to other worlds. When he sails to Venus, will it be as an invader or a friend?

The Venerians, no doubt, believe that he will come combatively, and probably from now on will be busily preparing weapons with which to resist the hordes of earth that will someday drop out of the sky. Many there will be on earth, too, who will want to see man go as a conqueror, who will vision an empire of humans extending from end to end of the solar system, from Mercury to Pluto.

It may be that their visions will be fulfilled and that the Venerians will go down under a human invasion after long resistance, and their little islands will be peopled by human colonists. It may be that less-developed races on other planets will be exterminated also to the greater glory of humanity. Certainly there will be many in that future day who would thrill to the trumpet-call challenge to bring every planet in our system under the domination of man.

But there is a chance, also, that when man does visit Venus and the other worlds, it will not be as a conqueror but as a friend. There is a chance that by that time man will have outgrown his barbaric war-fever that still racks earth and will have seen it for the childish thing it is, unworthy of a mature race. And that chance increases each day, for each day sees us a little farther, a tiny little, away from the glory in war for war's sake, that formerly was ours.

So the fears of the Venerians may prove vain after all. So the future may bring, not a cruel autocracy of man in the solar system, but a friendly, peaceful association of the solar system's living worlds, with humans, Venerians and whatever other races the system may prove to hold, engaged in trade and travel from world to world.

May this prove indeed to be what the future holds! Our solar system, that seems now so vast to us, is in reality but a little, heated, lighted shelter in the cold black immensities of space.

May we different ones who inhabit it refrain always from fighting each other, and dwell in it in enduring peace.

THE END

The Great Invasion of 1955

By J. David Reid

HERE is a short, short story of provocative interest, not only to those who are especially interested in chemistry—and there is much of interest to those who are—but also to those who like to speculate on the chances of our next universal war, which seems almost inevitably to be on its way.

OF course it's all old history now, but after seeing the brief three minutes devoted to it in my grandson's picture-phono history, I feel that one, so intimately connected with these events as I was, should tell something about the manner in which the United States was saved from foreign invasion by Harvey Wilkins back in those hectic days in 1955. I feel that he should receive a little more credit than has been given him.

It was in 1940 that Harvey Wilkins and I were students and roommates in college. He was a sort of fragile chap with light hair and blue eyes. He was a bit near-sighted and he gave the impression of a rather small ruffled owl, when he peered at you through his horn-rimmed glasses. For all his queer appearance he was a very friendly sort of fellow, as I soon found out when I became his roommate.

We both majored in chemistry and in all the time we were together we never quarreled. We struggled through all the various courses together with varying degrees of success. I could handle routine chemical analyses a trifle better than he could, but when it came to theoretical chemistry, he left me far behind.

It was a warm spring morning in 1943 and I was half asleep in physical chemistry—chem. 142 they called it—when I noticed Harvey next to me was sitting on the edge of his chair with a rapt expression on his face, watching the figures and circles the professor was putting on the blackboard. Usually we had illustrated pictures and diagrams, but this morning the professor had elected to draw his own.

"And very little more is known about this subject than was known some ten years ago," the professor was saying. "It has baffled the efforts of all the great scientists, but someday it will be solved. Undoubtedly, with the solution of this problem will come the emancipation of the world from much of its labor."

When I came home that night, I found Harvey tremendously excited.

"Say," he began, "did you listen to the lecture this morning?"

"I was asleep," I confessed. "What was the old duck raving about?"

"Raving?" repeated Harvey, staring at me incredulously—he took his professors very seriously—"Why, he was talking about the most interesting subject in chemistry—that is to say, in the world. He lectured on atomic disintegration."

"Pure bunkum," I responded rather contemptuously, my interest evaporating at once. "That is one problem that will never be solved." I left him before he could start arguing because I knew from past experience that I would lose any argument on theory with him. I would have to agree, whether I believed him or not, in order to get some peace. Harvey Wilkins had a peculiar bulldog tenacity that made him never give up an idea that he was once convinced was practicable.

Well, things ran on in their usual course and we graduated with our Bachelor's degree in chemistry. It was just at this time that fate stepped in with a little incident that probably changed the history of the world. The incident was only a carelessly handled rifle up in the Canadian woods, but it resulted in the death of Harvey's multimillionaire uncle. When the will was read, it was found that Harvey was the sole heir to his uncle's millions. Harvey was thus enabled to go out west to Arizona—his lungs were weak—and to build himself a wonderful research laboratory, with a corps of assistants and all the apparatus that he wanted. Of course, he offered me a job but I had already agreed to go into the government service and he did not urge me.

I worked up from a junior chemist in the government service until I became a senior chemist. Then I was transferred over to work on some cases for the diplo-

matic service and I became a permanent fixture there. My chemical training enabled me to take a scientific view of many things, and to give advice that proved helpful to those who controlled the destinies of the nation.

In all this time, I had not lost track of Harvey. Although I had not seen him since college days, I knew that he was unobtrusively making a name for himself in radiochemistry. I corresponded with him quite frequently, so it happened that I knew about his new process for extracting radium salts from the ores. That was his first great step toward his goal, for it gave him material to work on. Incidentally it brought him fame and considerably more money.

It was several years after this initial discovery of his, that the events occurred leading up to the Great Invasion. My first intimation of anything unusual was when I was called into the office of the Secretary of War. When I entered, he was sitting at his desk frowning and petulantly hitting the corner of his desk with an extremely thin piece of metal about six inches by four. When I came into the room he jumped up and stuck the piece of metal out at me accusingly.

"What's that?" he demanded.

"Looks like a piece of metal," I answered flippantly. "Feel it," he said.

Then it was my turn to gasp. The sample was very light and it had a peculiar greyish sheen to it. When I started to bend it, I found to my surprise, that, although the little sheet of metal was almost incredibly thin, it resisted my utmost efforts to bend it. In some ways it reminded me of spring steel.

"A new alloy," I breathed, and turned to the Secretary eagerly. "What is it?" I asked.

He threw up his hand impatiently and sat down rather wearily.

"That's for you to find out," he said. "That's the most important job we've ever turned over to you."

"Where did you get it? Is there some more?"

He leaned over his desk and pointed his finger at me impressively.

"Young man, that little piece of metal has already cost us the life of two of the best men we ever had. It's more dangerous than if it were high explosive and more valuable to us than if it were made of diamonds."

"But, why?" I interrupted. "Is it—"

He waved my interruption aside impatiently.

"One of the best spies we ever had got wind of the fact that something was strange about a little island off Japan. He posed as a tourist but was politely but firmly steered away. Naturally that only increased his determination to find out what was going on. He and two other men got there in a motor boat and holed up in a little cove on one end of the island. Here is the typewritten report of the operator who survived and came out with the sample of alloy."

I took the typewritten manuscript rather gingerly. I was used to danger of various sorts, but somehow this seemed to be a sort of cold-blooded affair. The manuscript ran as follows:

Report of Operator BXV3

This is a résumé of recent happenings on Island — (The name had been eliminated) off the coast of Japan. Operator BXV8 was the first to discover the fact that there was unusual activity on this island and myself and

Operator BXV5 were ordered to report to him with a large motor boat on the night of June 16th. This we did as ordered, and picked him up. After several hours' run, we docked in a little rocky cove at the end of the island. The place was deserted and we managed to conceal our boat. Leaving BXV5 on guard, BXV8 and I went to look over the ground. We found that in the center of the island there was a large plant of some sort. Owing to guards, we were unable to get very close but BXV8 tried it alone. When he came back to me in the early morning, he told of a large plant which, he said, was engaged in the manufacture of parts made out of a sort of grey metal. He said that the substance must be incredibly light, because he had observed a small Japanese pick up an enormous bar of metal. He also said that the metal was made in a small building that seemed to require an enormous amount of electric current, judging from the dynamos. He said that he would risk getting a piece of it the next night. We spent the day safely hidden and that evening BXV8 went after a sample of the queer metal. I accompanied him part of the way and waited for him most of the night. It was early in the morning when he returned with several soldiers after him. He received a bullet through his lungs but he managed to get to me. He died there but he gave me the piece of metal. I shot two of the soldiers, and succeeded in getting back to the boat. BXV5 had the motor going immediately. Unfortunately BXV5 was shot by a soldier as we were leaving, but I managed to get picked up by a steamer. I then managed to get here without mishap. I believe that I was traced by the Japanese, because there was an attempt at assassination as I left the steamer.

Respectfully submitted—BXV3.

I looked up from the report and handed it back to the Secretary with a puzzled frown.

"Then I suppose you want me to analyze this sample, and duplicate the alloy if possible?" I asked.

"I suppose you realize what a metal as light and strong as this one means to aviation." Without waiting for my answer, he continued. "It means that Japan will be able to take the leadership in aviation. Not only that, but if she builds airplanes with body, wings and engine made out of this material, she will be able to launch a fleet against us that we will be unable to defend ourselves against. With naval carriers and planes that can carry an enormous weight of fuel, Japan can sweep far inland to our great cities and wipe them off the map. With the United States unprepared, Japan can establish a base in Canada or in one of the Northwestern states. Before we can get ready to defend ourselves, their new planes will sweep us off the face of the earth, or at least bring us to terms."

"But our own planes," I protested.

He waved his hand wearily.

"Planes built of this stuff can outmaneuver us. Their planes will stand greater strain than ours. Our own heavily built planes will be swept aside like tissue paper. What we must do is duplicate this alloy and build a defensive fleet. That or find a new means of defense. The first named is your job."

He waved a hand in dismissal and I left the building with my precious sample. Outside, four guards fell in behind me. I realized that I had become an import-

ant personage since I had charge of the alloy. Incidentally, it might have been an accident, but my car was run into by a large car driven by a Japanese chauffeur. I luckily escaped injury, and my guard, following in another car, quickly rushed me to the laboratory.

Perhaps you can imagine my surprise when I learned that the new alloy was composed principally of lead. True, there were a few other components, but they were of relatively little importance. All my attempts during the next week to duplicate the alloy failed. I concluded that it was a new crystalline allotropic form of lead. In some way, the Japanese had discovered how to crystallize the lead in such a form as to give it this extremely strong feature, even though it were very thin and light. I concluded that the atomic structure must be very unusual to give it such properties.

My conclusions were verified when a small piece of the alloy was put under a pressure of many thousands atmospheres. The result was a drop of ordinary lead of many times less volume than the original piece. This proved my crystalline theory, because pressure always tends to put a substance in the denser form. An example of this is the fact that pressure lowers the freezing point of water, thus tending to keep the water in the denser, or liquid, state.

In this dilemma, my thoughts naturally turned to my old friend Harvey Wilkins.

While I was puzzling over the matter, an assistant came in with a report that decided me. He had been working on the atomic weight of the lead and he reported to me that it had an atomic weight of 206. That night I took the night air-express to Arizona.

I may explain here that 206 is the atomic weight of a substance which is identical in every way with lead except for the atomic weight and a very little difference in the density. Ordinary lead is 207.2 while the two other "kinds of lead" identical in every way, except for atomic weight and density, have atomic weights of 206 and 208. These are called isotopes and they result from the disintegration of radium and thorium respectively.

I confess that the thing was entirely beyond me. I couldn't figure out where they could have got such enormous quantities of lead with an atomic weight of 206. I knew that way back in 1915, lead from all over the world had been collected with results that all checked at 207.2.

It was midnight before we made out first stop and I got hold of a newspaper. I was shocked to see the headlines shrieking that "WAR CLOUDS THREATEN." The account said that there had been some trifling misunderstanding over some Japanese in California, and that Japan was demanding an explanation in very beligerent tones.

I also noted, down in one corner, that an enormous fleet of Japanese "tramp steamers" was now more than half way across the Pacific, "destination unknown" but "believed to be headed for South America."

AS we walked, I took in the beautiful scene which lay before my eyes. Harvey had picked an ideal location. In the background, lofty mountains reared themselves against the rising sun. The flying field was long and narrow and had several hangars at one end. At the edge of the field, as I have said, stood the laboratories and living quarters. These I now had opportunity to observe more closely. All the buildings

were built of grey concrete with very little attempt at ornamentation. None were over two stories in height, except one which had a small observatory tower on one end of it. It was to this structure that Harvey led me. He took me to what I guessed to be his own private "den."

"Sit down and make yourself at home," Harvey said. Then excitedly, "Do you know, I think I've got my problem nearly solved?"

I confess that I was a little brusque.

"Small good it will ever do you," I said. "In a couple of weeks we'll all be working for the Japs—those of us who aren't dead."

Harvey looked a little hurt but he politely asked me to "spill my tale of woe."

Harvey sat silently, thinking for a while, and then asked me questions about the alloy. I showed him my sample and he became quite excited over it, firing question after question at me.

"What we want," I said, "is something that can be used for defense. The alloy is of little use now. Why Japan may have declared war already."

"Give me the list of properties," he said, quietly. "It may be of some use. I'm not a magician, you know."

I gave him the list of properties of the alloy and watched him run down the list from specific gravity, melting point, tensile strength, and so on to the last one that I had jotted down—the atomic weight of 206.

I heard him gasp and he looked up suddenly.

"Is this atomic weight of 206 well established?" he asked eagerly.

I nodded.

"I think your problem is solved," he said.

"How—when—why?" I gasped.

He held up his hand soothingly.

"Let us go out and see how "Bird" is coming along."

I knew then that he would say no more. In some ways Harvey Wilkins was a very obstinate man.

As we walked out on the field we noticed that everybody was excited. They all seemed to be watching a small black spot that hung motionless up in the sky.

"It works, Dr. Wilkins, it works!" a man exclaimed.

"I knew it would," Harvey said.

It was not until a little later that I realized that I was present at the first flight of "Bird" Howard's helicopter. Of course there were many helicopters before his time, but they were only the forerunners. The machine that I saw that morning was the first of the new type. When he landed, I took the opportunity to examine it and its maker closely.

"Bird" was just a slender, fair-haired boy, who was only two years graduated from an aviation college. He had won a special two-year scholarship and had come here to continue his work on research in aviation.

His ship was not as stable nor as large as later ships, but it was a fairly good machine. It had an octagonal platform about twelve feet wide. Underneath this platform there were eight rods, which supported the machine as it landed. Each rod slid in its setting and allowed the machine to settle down gently on four wheels. The rods could then be drawn up to allow the machine to be wheeled close to the ground. The platform had a sort of observation cockpit with the controls which was built in the middle of it. At the front and on each side were propellers to propel it forward through the air.

At the back was a fourth propeller to pull the ma-

chine backwards in case the pilot happened to overshoot his mark. A large fin, sticking out at the back, below the fourth propeller, was the only provision that I could see for directing the machine, although I later learned that it could turn around much more quickly than any ordinary airplane, by the simple process of cutting out one of the side propellers.

The most novel innovation, however, was the lifting device. Extending above and to each side of the platform were two rather small wings and above these were at least a dozen propellers of various sizes and shapes. Most of the motors controlling all these were located in the steel framework above the platform and even with the stubby wings. I also learned that there was a gyroscope in the center of the platform that acted as a stabilizer.

"—Just a rickety old boat," Bird was saying exultantly, as we came up. "She'll probably shake herself to pieces pretty soon, but she's proved practical and that's all I care about. She can't stay up over some five hours at a time and she can't do more than about a hundred and sixty kilometers* an hour, but you just ought to see her go up and down. I can drop her a couple of hundred meters and jerk her out of it, though it almost takes the bottom out of her."

"Bird," called Dr. Wilkins, "come over here and let me congratulate you."

Bird came eagerly to get his word of praise.

"I knew you could do it, Boy," was all that he got, but it apparently was enough.

"Bird," he said, "I want you to tighten up every bolt on that thing and be ready to leave for Seattle in three hours or sooner. I'll put every mechanic on the place on her."

"All right, Doc," was all Bird said, but his eyes were shining.

Harvey gave numerous orders and then designated several men to come with him. He turned to me just before he left.

"You better get a few hours sleep," he advised. "If I judge that contraption rightly, we are going to need nerves of steel."

With that he left me and I went slowly back to his den, and, strangely enough, I slept.

"Let's go," was all Harvey said six hours later.

I went out with him and together we got into a large cabin monoplane which was warmed up and waiting. As soon as its pilot had it headed for Seattle, Harvey lay down and calmly went to sleep.

I hung over the radio, eager to learn the latest developments in the controversy with Japan. As I tuned in on one of the national news-broadcasting stations, I heard the announcer say, "Matters are rapidly approaching a crisis. War with Japan is inevitable. Their demands lead to the belief that they wish to force war upon the United States. Great Britain, as a whole, wishes to keep neutral but Canada is bringing every pressure to bear to throw her forces in with us. Seattle, Tacoma, and other coast cities are being evacuated. Planes are being mobilized on Felt's Field, the great airport at Spokane. No attack is expected immediately, but the fleet is coming north. Hawaii and the Philippines are making frantic preparations for war. The Japanese fleet is reported to be sailing eastward. The most immediate fears result from a large fleet of Japanese ships, supposedly merchant tramps, which were

reported to be sailing for South America. It now appears that they are further northward than that destination would indicate. If they are hostile, it will be known within twenty-four hours, for by tomorrow afternoon they will be within striking distance."

That was the most important news that the radio had to offer.

And that one man lying there, peacefully asleep, was intending to check the supreme power of a great nation!

We arrived at a small flying field near Seattle sometime during the night. Harvey and I were busy from that time until morning, arranging everything and getting things ready for Bird. He and his companion arrived with the dawn and they showed no bad effects from their strenuous trip.

"Well, we got here," he greeted us, brightly. "Had to stop to get the tanks filled twice, and once for engine trouble, but that was all right."

Then it was that I got my first view of the weapon that was to save the United States.

It wasn't very much to look at. It was a tube about three feet long with a large bulb on the lower end. The whole thing was mounted on a swivel base which permitted it to be pointed in any direction. Apparently it was made of fused sand—silica—and it was perfectly clear. The lower part of the tube was sheathed with what appeared to be layers of several metals, the outermost material being lead. I could not see, because of the sheathing what was in the lower bulb. Two wires connected the bulb with a generator. This whole apparatus was soon fastened securely on the platform of the helicopter.

"Now there is nothing to do but wait," said Harvey. "We will be notified by radio of the approach of the enemy."

I think the nervous strain told on all of us except Harvey. While Bird and his companion fussed with bolts and engines; while I paced up and down; while the pilot of the plane that brought us, Buck Walters, hung over the radio, Harvey lay on his blanket, chewing on a straw and gazing up into the blue of the sky.

Suddenly Walters stood up.

"The first fleet is coming," he said quietly. "They are still out about a hundred miles and our own air-fleet will meet them near the shore of Puget Sound, where they can have the help of the shore batteries. That leaves us the space between. Good luck to you. I'll do my part if they don't get me. Goodbye."

He silently walked over to his plane. Though he never came back, the name of Buck Walters will always be remembered as the only American aviator to die in the Invasion of 1955. His body was never recovered, but if you visit Seattle, you will find there a bronze monument with the words on it "He did his duty."

As Walters' plane left the field, our own motors roared and Harvey and I fastened a sort of harness on ourselves. Up, up we went, with hardly a jar.

How long it took, I don't know, but it seemed like hours before we could distinguish that first grey line of planes. Before we could see them, we could see Buck coming back in his plane.

Rapidly we dropped to a height a couple of hundred meters above the enemy.

In the meantime, Buck was off to one side of us a mile or so and almost as high as we were. Then it was that I saw that his mission was to lay a wide smoke

(*About 100 miles.)

screen in front of the oncoming fleet of planes.

Suddenly, the grim grey line appeared.

Steadily, without a tremor, Harvey aimed his tube at one end of the grim, grey line and swept the whole length of it. As though an invisible knife had shorn through them, the line melted away. Parts of some planes disappeared, some vanished completely, but not one escaped. Falling toward the Sound was a silvery sheet of liquid with the pilots kicking as they fell. Five times Harvey swept that line and five rows of ships went down into the Sound. Then Walters, who had been circling above, looped the loop and we knew that our work was done for the moment.

Twenty minutes later the second fleet followed the first into oblivion.

It was during the annihilation of the third fleet that we came near disaster. Two planes apparently decided to rise to higher altitudes and they saw what happened to their first line of ships.

Without hesitation, one of the ships dived at us. It was only Bird's sudden drop that saved us. We had already finished the second line of planes when we felt the bottom drop out from under us. When our drop was checked, the third line of ships was out of the cloud and the ship that had tried to get us was swinging around to try again. Although Harvey was badly shaken, he managed to pick it off in mid-air and then to get the rest of the ships before they could come within firing-distance. We had been rising and managed to dispose of the fourth row of planes before it got very far.

Suddenly we began to drop again and I looked up to see the second of the two planes that had been above us, coming straight down at us in a power dive. It was at this moment that Buck Walters showed his heroism. How he got off to one side, I never knew, but he came in like a flash of light to collide with the Japanese pilot a scant twenty meters above our heads. The two planes hurtled by us carrying two brave men to their deaths.

That was the high point of the whole episode. We wiped out the remaining planes with little difficulty, and then went homewards to receive the plaudits of the nation.

It was nearly a week before Harvey and I could escape from a too-grateful public. Then it was that I sat down and said, "Now, out with it, Harvey! How does that tube of yours work?"

"Well," he said making himself comfortable. "It all goes back to a day at college when you laughed at me. First, though, what is your idea of atomic weight?"

"Why," I replied slowly, knowing that Harvey would tell things his own way. "An atom of oxygen is arbitrarily set at 16 and every other element is judged by it. For example, an atom of helium is just one-fourth as heavy as oxygen so it is called 4.00. Every other one of the ninety-two elements is compared to oxygen from the lightest element, hydrogen, which is 1.008, up to Uranium, the heaviest, at a little more than 238."

"Very good," commented Harvey, with a smile. "You've learned a little since we left college."

I threw a cushion at him and he carefully tucked it under him.

"Now, I suppose you know that there is a theory that all atomic weights except that of hydrogen are whole numbers. For example, chlorine, usually called thirty-five and a half is really a mixture of atomic weights of

isotopes one of 35 and another of 37.

"Now, Prout, as far back as 1834, thought that all elements were built up from hydrogen atoms. Later, as it was found that helium and hydrogen nuclei were very stable, it was decided that all elements were made up of combinations of nuclei of these two elements. An atom is made up of a positive nucleus and a number of negative electrons revolving around it. The electron only weighs one eleven-hundred and fortieth of a single positive nucleus or proton. The loss of the extra weight of the hydrogen atom above one is accounted for by the theory that it is converted into energy, since according to the theory of relativity, mass may be changed into energy. Do you follow me?"

"I'm even ahead of you," I grinned back at him.

"Now to go back a bit, what do you know about the decomposition products of uranium?"

"Not much," I confessed. "Go on."

Well, uranium decomposes rather slowly. Half of it decomposes in five million years, giving off a helium nucleus. Half of the product, uranium X_1 , decomposes in about three weeks, giving off one of the four extra electrons left on it by the helium nucleus, and this product, uranium X_2 , again gives off an electron, half of it decomposing in about one and a quarter minutes. This third new element, uranium 2, has the same atomic weight as uranums X_1 and X_2 , and is therefore an isotope of these. Then a helium nucleus comes off giving ionium. Ionium gives off still another helium nucleus and the product is radium. Is my monologue getting too dry for you?"

"Not too dry," I answered, "but I think it's getting over my head."

He smiled and went on, "Radium, as I suppose you know, has a half-time decomposition of two thousand years. Well, it and its products, by emission of alpha particles (charged helium nuclei) and by Beta particles (unit charges of negative electricity) manage to result finally in a product which cannot be distinguished from ordinary lead except that its atomic weight is 206 instead of 207. Now, I reasoned that the lead could be moved over two places in the periodic table by the loss of a helium nucleus. It should be easier to break down than ordinary lead, which is a mixture of the two isotopes 206 and 208. A shift like that would result in changing lead to—"

"Mercury!" I burst in eagerly.

"Exactly," he smiled. "I built myself a cathode tube using a uranium target a cathode of my own composition of radioactive material. Well, it worked on radioactive lead but on no other kind. Its effect was to cause one helium nucleus to leave the lead. I haven't got the process perfected yet."

"The Japanese evidently found some way to separate lead into its two isotopes and then a way to crystallize the lighter form into this strong and extremely light form. I think that the other things in your sample were just impurities, probably remaining from the separation."

He spread out his hands and shrugged his shoulders. "That's about all. You know the rest. It was simple from then on. The silvery sheets that you saw falling were mercury. And that's about all."

"Well," I said, "Fate certainly works things out just the way she wants them, doesn't she?" Which, under the circumstances, was about all that anyone could say.

A TRIBUTE TO AMAZING STORIES FROM CHINA

Editor, AMAZING STORIES:

This is my first letter to you, so I will start in the conventional manner by congratulating you on the standard of the mag. especially the Discussions Column, the Editorials and the stories by Dr. E. E. Smith, I like his stories best because they seem to me to contain more authentic science in them than most others. Here is my solitary complaint; in your May issue you published a story, "The Doubt"; though quite a good story, there was not one iota of scientificity in it. How would we feel when on going into a shop for a pair of gloves we were offered socks, maybe good socks but unsuitable for hands?

I was interested in R. W. Haysen's theory of the conservation of heat energy by getting in the shadow of an astral body. This happens to be in my line of study so I will endeavor to explain as best as I can where he is wrong. His main fault lies in the conception of heat as being something material, "heat particles or electrons" as he calls the transmission of heat, being radiated or reflected from the body.

It has been definitely established that heat is another form of that omnipresent phenomenon "Wave Motion" without which we would lack heat, light, or sound. The nature of heat, briefly, is this: heat or infra red rays lie in that part of the spectrum between radio and visible light rays; these waves are the result of the compression and rarefaction of the ether at such a frequency that they accelerate the movement of atoms, thus causing increased frictional energy or atomic vibrations which reflect the waves, or part of them, the rest being absorbed.

Now let us see what would probably happen to our hypothetical "sky-pilot"; firstly, he is in the shadow of a planet so that he cannot receive any benefit from the sun's rays; secondly, the temperature of space is assumed to be absolute zero, (-450 degrees centigrade I think) and thirdly, the body has got to be kept above a certain minimum temperature for its proper functioning, such as blood circulation, etc.

The only way our pilot could live would be to bottle himself up with the vacuum flask principle, for Nature abhors inequalities and to think of this fellow trying to keep off freezing by creating or preserving a body temperature of say 60 degrees F. with surroundings at about "800 degrees below" is like thinking of trying to drive the Leviathan at full speed with a domestic coal fire. In fact, his body may dissolve for 'tis said that at absolute zero all atomic movement ceases so that our enterprising friend would find his body resolving into chemical formulae. Not that I am trying to ridicule R. W. H.'s theory or himself, for it has often proved to be the tyro who has shaken the authorities out of a recognized rut of thought into the right direction. Anyway, it has provided me with some thoughtful exercise to marshal concrete evidence of where he goes off the trail. And now, Haysen, is your chance to get back at me, for the bee has flown from my bonnet on that knotty problem, Gravity, in itself a grave subject.

As most of us know there are two forces acting on us from Mother Earth, centrifugal and centripetal force or gravity. Centrifugal force is accounted for by the mechanical inertia theory but not so gravity, this mysterious force not only counteracts the enormous centrifugal force that must exist but also retains a tremendous surplus of energy (sighs from the world's budget balancers).

There seems to me to be only one possible solution to this, and that is: it is nothing more nor less than an extreme form of wave motion. For an analogy we can compare its frequency with respect to the known waves to ether's density with respect to ordinary matter. I do not mean to infer that ether has an infinite density for that would be a futile argument. To delineate, it must be some form of wave motion, for all bodies no matter how small have a certain amount of inherent attraction for other bodies, as witness two small pieces of cork in a bowl of water. Also other planets and stars exert an attraction upon this earth with ether as the only conducting medium. So far as is known, ether can only transmit energy by wave motion, therefore there can only be one answer to this problem. I believe magnetism also is kin to gravity but at a lower

frequency; we can shield bodies from magnetic attraction, so why cannot we do the same as regards gravity, once we get a better idea of its nature, or when we find its frequency we could possibly generate another frequency that would break up the sequence. Comparatively simple???? (once we have an exact knowledge of its nature).

People investigating in that line, however, had better be very careful about discovering it for if they happened on it whilst standing on the piece under treatment they would need an army of scrapers to remove the effects of centrifugal force off the ceiling. The possibility of conquering gravity certainly opens up wonderful dreams. I think the fellow that did that would be able to live on his royalties (patents) quite well if he survived the discovery.

Just one more piece before finishing: ether does not possess infinite density, otherwise the compression and rarefaction theory would be washed out. If anyone would care to correspond on above and associated subjects I will be only too pleased to do so.

Sigmund F. Collins,
Royal Signals,
Whitefield Bks.,
Hong Kong.

(We seldom pass a letter from a distant country without expressing our gratification of having readers so many degrees of longitude away from us. We carry out the idea expressed in your last sentence and we leave any comments on your letter to correspondents. You certainly have given a great deal of thought to the subject of heat waves. We feel, however, that speculating on what happens at the absolute zero is decidedly unsafe as the ether, after all, is still, we think, to be considered a hypothetical body, if it is a body at all. The temperature of absolute zero is -273.1° centigrade.—EDITOR.)

SOME QUERIES TO BE ANSWERED ABOUT SPACE, RADIATED HEAT AND AIR AND THE GASEOUS STATE

Editor, AMAZING STORIES:

I am writing this letter, not to tell you whether I like your magazine or not (the fact that I read it shows that I enjoy it) but to ask some questions which have been puzzling me.

1. The temperature of space is absolute zero. Space is a perfect vacuum. Why and how can anything freeze in space if there is nothing to radiate heat to? It would seem to me that an animal body, or any object generating heat, would freeze itself.

2. It is a law of earth that "Nature abhors a vacuum." It seems to me that it is a law of gravitation rather than a law of the universe.

May I illustrate?

In many stories about interplanetary disasters, the air rushes from the machine into the vacuum of space. But it is also stated that every celestial body, regardless of size, has a gravitational field depending on mass or weight. Why is it that a man who quits the interplanetary vessel may be drawn to the vessel by its gravity but the air and gas leave it entirely?

3. May I state my theory?

Gas holds the same relation to space as oil holds to water. The gas does not mix with space but emulsifies. It will collect in globules around any body which exerts a gravitational field. The ratio of density of the gas varies directly with the ratio of gravitational attraction.

The heat of the sun on any celestial body is generated by the bombardment of the molecules of gas by the ions of radiant energy. Therefore it is a physical impossibility for gas to freeze.

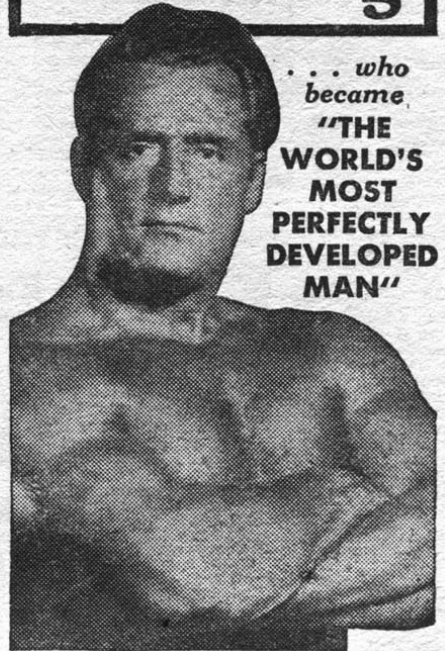
The amount of heat generated varies directly with the density of the gas and the distance from the source of energy.

Please set me right on these facts.

Joseph M. Thone,
71 Weld Street,
Rochester, N. Y.

(Does it seem when a heated body, such as a filament of a lamp, radiates heat that it troubles itself to know where the heat is going? Is it not the sun that radiates an enormous proportion of its heat into empty space? The planets, few in number and comparatively in-

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By CHARLES ATLAS

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—Mrs. P. L. R., Okla.

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significant in size get an extremely small proportion of the heat. We certainly think that any living body out in space would freeze to death in short order. The assertion that "nature abhors a vacuum" is little more than a proverbial way of expressing the fact that air presses everywhere due to gravitation, with a pressure approximately 15 lbs. to the square inch; it is perfectly just to say that the above expression is a colloquial or picturesque way of stating one of the phases of the action of gravitation. The air in an interplanetary vessel is supposed to be at a pressure enormously greater than the gravitation of the vessel would imply. If the vessel is open, the air would rush out as the gravitation of the vessel is far too slight to have any perceptible effect upon the elastic, compressed air. You say that it is a physical impossibility for gas to freeze. Did it ever occur to you that steam is a gas and that by reduction of temperature it becomes water and by further reduction freezes into a solid? The last clause of your question is far from clear. Gas does not emulsify.—EDITOR.)

AN APPRECIATION OF OUR STORIES FROM SWITZERLAND

Editor, AMAZING STORIES:

A short time ago I sent my two years' subscription of \$8.00 for two years' AMAZING STORIES Monthly and Quarterly, and hope you received it all right. I take this opportunity of conveying my best wishes to both magazines, and long may they flourish to delight us all! I have been a subscriber to AMAZING STORIES now since September 1926. It is really one of my greatest pleasures in life, and I cannot at all imagine what I should do if I were deprived of it. For me, it would be a very great loss. As I know you like to hear about your readers' preferences I mention a few of the stories which occur to me as being especially good, during the past year or so: "The Amazing Enemy," "The Troglodytes," "The Valley of the Titans," "The Earth's Cancer," "Elaine's Tomb," "The Ship that went Aside," "The Gostok Distorts the Doshes," "Tumitak of the Corridors," and of the longer ones, "Paradise and Iron," "Tani of Ekkis." Also was it called "A Modern Prometheus," by Cecil Wates? (Yes) I think the most versatile of your writers is Dr. Breuer. Who else could have written three such dissimilar stories as "Paradise and Iron," "The Talking Head," and "The Gostok," etc.? By the way, ever since I read the latter I have been making the most violent efforts to get into the Fourth Dimension, but as you will surmise, I have not yet succeeded! If I could change places with one of your authors, it would be with Mr. Hyatt Verrill, who is in my opinion greatly to be envied. To be at once explorer, antiquarian, and a writer of most delightful stories; who could ask for more?

Ina Birmingham,
Beckenried, Lake Lucerne,
Switzerland.

(This appreciative letter from the Lake of the Four Forest Cantons, which is the rendering of the German language name of what we call Lake Lucerne, makes pleasant reading to the Editors. We get many letters, as you will see from our Discussions Columns, finding fault with some of our stories. We are glad to learn that you like so many of them. Anyhow, it is fun trying to get into the fourth dimension, even if we never get there.—EDITOR.)

AN ENCOURAGING LETTER FROM A VETERAN READER

Editor, AMAZING STORIES:

Although I am a veteran reader of "our" mag., I have never written you a letter. I think that "The Metal Doom" is wonderful, and I look forward to reading the last part. In fact, I enjoyed every story in the June issue. Keep up the good work. Jack Mackay,

140 E. 35th Street,
Portland, Oregon.

("The Metal Doom" certainly had a very good basis and we consider its author one of our best. We are sure you will always find Dr. Keller's stories most interesting. In spite of all our efforts, we do not find that our readers always admire all stories in an issue.—EDITOR.)

A LOT OF SUGGESTIONS—BUT THE WRITER SEES ONLY HIS OWN SIDE OF THE CASE

Editor, AMAZING STORIES:

In your last issue, "Cities of Ardathia," and "The Amir's Magic" could have been left out for all the enjoyment I got out of them. The theme of the former is just about worn out—the second story does not belong in your book. In the Winter 1932 Quarterly, I was very much pleased with "Naval Control," "Starvation in Space," and "Blue Waters." The last was fine, with excellent science.

I notice that Mr. Lemkin (or should it be Dr.?) always has good science, and his ability as an author is increasing by leaps and bounds. What a pity the long story of the Quarterly, ("Voice Across the Years") was so poor. Some suggestions for improvement:

1. A border one-half inch wide around the cover.
2. Print the Scientifiction emblem on the cover.

3. Allot one-half page each month to an explanation or a description of some new or up-to-date scientific invention, idea or achievement, e.g. Quantum Theory, Cosmic Rays, Wave Mechanics, non-Euclidean Geometries, the evidence for element No. 118, explanation of the hypothetical "Coronium," "Nebulium," "Asterium," etc., Progress of Rocket Planes in Germany, transmission of power by radio, etc.?

4. Have an ANNUAL and a special large book-form re-print number containing: "Skylark of Space," "Skylark Three," "Spacebonds of I. P. C.," "A Modern Atlantis," "Hick's Inventions with a Kick," and "Ralph 124C41."

I hope to see more stories from Smith, Meek, J. W. Campbell, Jr. Let us have stories by Smith, stories by Ray Cummings, stories about Hicks, and stories by the author of "Electro-Episodes in 2030 A.D.!!!"

I would like to enter into correspondence with some of your readers.

John Wm. Straede,
7 Adeline Street,
Bell Preston, N. W.,
Victoria, Australia.

(When you say that certain stories might have been left out for all the enjoyment you get out of them, you must remember that it is not only you that we are striving to please; there are many others. To follow all your suggestions, the magazine would be materially changed and this, you must agree, would be a poor time to change, since the magazine as it is holds its own so well. We have received so many letters from readers who desire correspondence with our authors that it seems very probable that you will hear from some of them.—EDITOR.)

NOTES ON VARIOUS STORIES. THE MEANING OF "OMEGA"

Editor, AMAZING STORIES:

I have just finished the July issue of our magazine, including the Discussions Columns, which, by the way, was very long. Good.

I shall start at the cover, which was fairly good, except for the resemblance of the Martian city to an American one.

"This of the Drylands": good, but why wasn't hypnotism used the first time Barron met the secret service operative?

"North of Matto Grosso": better. But, so soon after the war, it seemed peculiar that so many clever inventions were available. Also the ability of the disintegrating ray to destroy only living matter was "almost too good to be true."

"The Metal Doom": better yet.

"The Lemurian Documents": good.

"The Resistant Ray": fair. The story was too convenient in places; the rays did not reach the ceiling, although they had been adjusted for the width of the room; the handiness of the bar; the remarkable power of the ray. Much too convenient.

"Sheridan Becomes Ambassador": good.

Very good.

"Omega": very good. What is the sense of the title?

I hope you don't mind these mild brickbats. Please weed out stories with "(something) happened to be handy."

Albert Field,
364 Beech Spring Road,
South Orange, N. J.

(We feel that the "Discussions" letters in our magazine are a most important part and are very glad when they are long. Your criticisms of the different stories are interesting and require no comment as they express clearly your idea. The word "Omega" literally means the "long O." It is the last letter of the Greek alphabet and it is used figuratively to mean the end of anything, as the word "Alpha," the first letter of the Greek alphabet, is used to indicate the first of anything, thus the expression "Alpha and Omega" means the first and last. It so frequently happens in life that something comes in handy, that we fail to see why it should not happen in a story.—EDITOR.)

PROOF THAT THE EARTH IS ROUND

Editor, AMAZING STORIES:

Would you mind sending me proof that the world is round? This may sound queer to you, but I have recently heard an intelligent argument in which various proofs were propounded, as to the flatness of the earth. I, not agreeing, but lacking the scientific knowledge to produce facts to the contrary, am asking you for information. I have been a constant reader of AMAZING STORIES for the past three years, and because I know of no other source to secure the information I desire, I am asking you to send me detailed facts to prove that the earth is round.

Donald R. Scott,
1420 Lexington Avenue,
Indianapolis, Indiana.

(If you do not believe that the world is a sphere, how can you account for day and night unless you believe that the sun goes around it and if you try to carry out that old time Ptolemaic theory in the light of the discoveries of modern astronomy, you will find yourself getting into endless trouble. If the world is not a sphere, how can one travel all around it without tumbling over the edge into space? The parallels of longitude (really not parallels at all) represent the divisions of time, fifteen degrees corresponding to an hour of time, but these approach each other and practically intersect at the North and South Poles. If you could get close enough to the Poles, you would find that an hour might be represented by a variation in latitude of a mile or less, whereas at the Equator something like a thousand miles represents the variations required for an hour's variation of time. If you are in a boat on the sea or on the sea-shore and a ship is approaching, you will see the top of the mast long before you see the hull because, as far as you are concerned the ship is climbing a hill, as it were, to meet you. This you can see readily on any clear stretch of water running east and west for a few miles.—EDITOR.)

A LETTER ABOUT ENTROPY WITH ALLUSIONS TO A PRECEDING LETTER FROM P. SCHUYLER MILLER

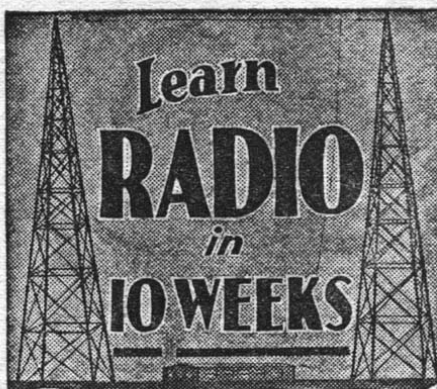
Editor, AMAZING STORIES:

In the April 1932 issue, you published a letter about entropy by P. Schuyler Miller. Mr. Miller states that the increase of entropy is time. I wish to elaborate this.

Entropy is defined as the total quantity of heat in the thermodynamic system divided by the average temperature. By this is meant the unavailable heat energy. Let us take a body which has a temperature of 20° C. and which is constantly receiving heat by radiation. The absolute temperature of space is -273° C. The entire temperature between -273° and 20° is unavailable for any use. It is this heat which is called entropy.

I assume that in any system, whose temperature increases at a regular rate, the entropy will also increase regularly. This regular increase of entropy is time. Now, if the temperature is increased suddenly, or at variable rates, the entropy is also increased, but at variable rates, and the flow of time is not regular. Therefore, it may be possible to bridge a large amount of time in a short while, if a way is found to increase the entropy of the system.

In the same issue, Mrs. Tuckerman writes that an absolute Zero is impossible in interstellar space. This is false, and I will attempt to show why. Heat is the kinetic energy of moving molecules. In interstellar space, matter is very rare, so rare that nearly a perfect vacuum exists. Since heat is produced by molecular motion, the greater amount of molecules in motion, the greater the heat content. The few molecules present in the average cubic



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foot in space, produce so infinitesimal an amount of heat, that instruments are not affected and no heat is registered. I think we are justified in calling the temperature of interstellar space absolute Zero.

I have read AMAZING STORIES since late in 1927 and can say that very few stories disappointed me. In the April issue, "Troyana" was the best story. I think it surpassed Meek's other stories, except "Drums of Tapajos" which is its peer. I do not like detective stories and I believe that Bob Olsen does much better work in fourth dimensional stories.

I am 15 years old, a junior in scientific high school and intend to study mathematical physics. I would be pleased to correspond with anyone interested in mathematics, physics and chemistry.

Lester Blum,
1744 Clay Ave.,
Bronx, N. Y.

(One of the troubles about entropy is that the meaning of it was changed some years ago. There was something quite romantic in Captain Meek's stories of South America. The description of the drums droning through the wilderness and constituting a menace were quite impressive. If you will look over our Discussions columns you will find numerous writers who wish to have correspondence, and we are sure some of them will be delighted to write you and to receive your letters. It seems to the writer that it would be a very great element in education to have such correspondence with a competent person and we certainly think that it would be an enjoyment on both sides.—EDITOR.)

AN ANSWER TO MR. JULIAN GRAY'S RECENT CRITICISM IN OUR DISCUSSIONS COLUMNS

Editor, AMAZING STORIES:
I should like to point out a few considerations which, apparently, have been overlooked by Mr. Julian Gray in his thoughtful and well-written criticism of science fiction in the letter columns of the June AMAZING STORIES.

To begin with, it seems to me that his definition of literature as being exclusively a study of human reactions and character-development is rather narrow and limited. Literature can be, and does, many things; and one of its most glorious prerogatives is the exercise of imagination on things that lie beyond human experience—the adventuring of fantasy into the awful, sublime and infinite cosmos outside the human aquarium. In this genre, of which science fiction is one branch, the main interest lies in other elements than mere character-reaction and development, such as would properly be emphasized in a tale of ordinary events and conditions.

Of course, science-fiction can, has been, and will be written with a close attention to verisimilitude in such matters. But for the initiate in this type of fiction, and highly imaginative and fantastic fiction in general, the real thrill comes from the description of *ultrahuman* events, forces and scenes, which properly dwarf the terrene actors to comparative insignificance. For many people—probably more than Mr. Gray realizes—imaginative stories offer a welcome and salutary release from the somewhat oppressive tyranny of the homocentric, and help to correct the deeply introverted, ingrowing values that are fostered by present-day "humanism" and realistic literature with its unhealthy materialism and earth-bound trend. Science fiction, at its best, is akin to sublime and exalted poetry, in its evocation of tremendous, non-anthropomorphic imageries. To demand in such tales the intensive earthly observation of a Hardy is idle and beside the point; and one who approaches them from this angle will miss the true value and beauty.

It seems to me, too, that Mr. Gray makes a pretty sweeping statement in his remarks about science fiction authors. Doubtless there are hacks in this branch of writing, as in all others; but, on the other hand, there are sincere imaginative artists. One has only to name A. Merritt (at least in his earlier work, such as the original novelette version of "The Moon Pool"), Stanton Coblenz, who has written some gorgeous fantastic satires, John Taine, a master of authentic science, and H. P. Lovecraft, whose "The Color Out of Space" goes infinitely beyond anything of H. G. Wells in its sheer imaginative scope and creation of atmosphere. To say that science fiction writers are "men of doubtful education and still more doubtful intelligence" because they prefer

imaginative happenings, cosmic forces, atmosphere, etc., to psychological analysis, is an utterly pointless and senseless statement. But, since there is a fixed gulf, wider and deeper than Erebus, between imaginative people and those who lack imagination, it is no doubt equally senseless to argue this question.

Certainly, however, one must admit that there is vast room for improvement in the general body of science-fiction. This improvement, it seems to me, could lie in the direction of more skilful and finished writing, the exclusion of the trite and overworked, and the elimination of many stories which, on close analysis, are revealed as mere gangster tales or ordinary adventure stories with a futuristic or ultra-planetary setting. A few editorial measures of this sort would go far to remove the reproach which can justly be brought against science-fiction magazines. As a well-wisher, a reader—and also a writer, of this genre—I sincerely hope that such an improvement will in time be brought about.

There is one other matter that I should like to touch upon: Mr. Gray's preliminary remarks about the general development of literature. To judge from these, one would think that the world's literature is marked off in perfectly distinct, geological strata and that all the former, more primitive layers are now hermetically sealed beneath a deep and solid stratum of realism. This, however, is not the case. Romanticism, both in novels and short magazine stories, is still the most popular and widely read genre; and as for the supernatural, which Mr. Gray puts at the archaic bottom—well, even that despised branch of literary endeavor is having its innings, both with writers and readers. Apart from folk-lore, the literature of the supernatural is almost a modern invention anyway; and some of the best work in that genre is being done at the present time. Realism, even though it is the only form favored by the alleged "quality magazines" and the self-appointed critical pontiffs, certainly doesn't have the field all to itself. And I think one can safely predict that it never will. The intolerable conditions of modern life and mechanistic civilization, will, one thinks, be more and more conducive to the development of a literature of imaginative "escape."

There is still another angle which occurs to me, *apropos* of Mr. Gray's letter. After all, why shouldn't literature, or at least one literary genre, emphasize what he calls the "inhuman," which, more properly, is the non-human or extra-human? Isn't it only the damnable, preposterous and pernicious egomania of the race, which refuses to admit anything but man's own feelings, desires, aims and actions as worthy of consideration?

This egomania, alas! is manifested in other ways than through literature, and lies at the bottom of that ruthless aggrandizement, that maltreatment of weaker life-forms, that presumptuous meddling with the delicate balance of planetary forces, which may sweep our present-day civilization into the limbo of the dinosaurs. I fear that many super-scientific tales, which depict a world-wide catastrophe as the result of human meddling with nature, may prove to be all too prophetic. Any type of writing that would serve even in the smallest degree as a brake on the madly careering wheels of this racial egomania, is, it seems to me, more than praiseworthy from a moral standpoint if from none other.

Clark Ashton Smith,
Auburn, Calif.

P.S. On re-reading Mr. Gray's letter, I find that I have forgotten to mention the matter of H. G. Wells, which he brings up. Doubtless it is the particular trend of Wells' mental development that has led him, in latter years, to abandon the writing of science fiction for that of sociological novels. Wells, when he wrote the marvelous "Time Machine," "The War of the Worlds," and other fine fantasies, had in him much of the artist, perhaps even a little of the poet. These, however, have been progressively smothered and drowned out by the growth of the pedagogue, the utilitarian "humanist."

As to Aldous Huxley, I have not read his "Brave New World," which, I should judge from reviews, is marked by the same congenital pornography as Huxley's ordinary novels. Satire, of course, is a well-recognized function of much science fiction, and perhaps some of it has been a little too subtle for Mr. Gray's apprehension. He seems to have missed Stanton Coblenz, of whom I have already spoken.

If I cared to, I could name others in whom the satire is even more subtle and implicit.

If Mr. Gray should find my language somewhat violently polemical in places, he must realize that I have merely availed myself of that parliamentary privilege which he, in his own letter, has already avowedly pre-empted.

In conclusion, let me recommend to Mr. Gray, and to others who are similarly minded, the perusal of imaginative fiction for what it really is rather than for what it isn't. Also, he should realize that there are intelligent (and not necessarily immature) people who have the courage to dissent from the limited and grossly materialistic definition of literature which he has laid down, and who, moreover, are not overawed by the burden of present-day authority.

C. A. S.
Auburn, Calif.

(The subject of science-fiction is more or less abstract and cannot be treated like a problem of mathematics, but in science-fiction the description of personality of the characters is all important. Nothing can make a story so vivid, of whatever type it may be, as a true picture of human nature. However, we may complain about its imperfections, we have to consider human nature extremely interesting. We have a very good gauge in our work for our stories from the standpoint of this science-fiction. We publish, as you have noticed, a questionnaire. Answers to the questions contained are to be found in the stories, and page numbers are always given. Sometimes we fear that we shall not get enough questions and should like to have from twelve to twenty of them, but somehow there always are a reasonable number. We certainly agree with you in your criticism of the special type of modern fictional literature. Science-fiction does its part to lift up stories and romances out of the rut of realism, which, as you practically say, are to be judged by ingrowing values. You will be surprised if you knew how many books of science-fiction have come out year by year. One would suppose that no one would take it up except such writers as H. G. Wells and we know that there is no living Jules Verne and even Mr. Wells is flying off more or less on a tangent in what he considers important subjects. Then we had the Sherlock Holmes stories, which of course have a touch of science in them, but the author, Conan Doyle, was carried away by psychic research as the subject of his more recent years work has been called. It does us good to read over your notes on authors and comments. We have always felt that our American writers, if anything, surpassed the English authors decidedly in this line of fiction. Literature of the super-natural goes back a good many years and it is called folk-lore. We were certainly amused at your comments on Mr. Wells' recent courses in writing. We certainly agree with you.—EDITOR.)

A LONG LETTER ABOUT DR. SMITH

Editor, AMAZING STORIES:

Poor old "Doc." Again he has been unhorsed, and his faithful charger has fled. Only he remains upon the field, alone and almost borne down by the sheer weight of his armor. His foe, like the bold De La Mark, is riding mercilessly over and around him, waiting for an opportune moment to deal the last crushing blow. Earlier in the day "Doc." met another very formidable foe, and that encounter has apparently weakened him. That enemy, however, is lying deliriously off to one side, nursing a broken skull and waving his weapon around in a mad frenzy. Suddenly a black knight appears upon the field. His black charger gallops at full speed toward the nearly doomed comrade. Instantly the almost victorious knight counters and rushes upon the new enemy. What will be the result? But that matters little. If "Doc." has a chance to get up and find his horse, the black knight's efforts will be fully rewarded.

Now Mr. Dunark, you admit that Seaton saved your life several times. You also admit that he presented you and your race with many almost unrepayable gifts. Now, these things being true, it is only natural that you should regard this man not as one of the common herd, but as one to whom honor is due. Even if you were able to confer with Seaton in his own "customary mode of speech" you would be a little loath to use the lower form of English in his presence, and only at times when you were utterly unable, because of your very



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nature, to understand how Seaton could be so soft and sentimental, would you tell him in his own words what you thought of him.

This other little point, although almost immaterial, might help matters slightly. You admit, Mr. Dunark, that you were able to speak precisely as Seaton did. At one time in your adventures you actually spoke as Seaton would have spoken under similar circumstances; therefore, you *did* speak precisely as Seaton did, but you never allowed this manner of address to become a habit. Thank you, Mr. Dunark. I am sure that your evidence completely absolves your creator of any erroneous complications in your anatomy. Personally, I wouldn't have said goodbye, either.

Hoping that old "Doc" has found his gallant steed, the black knight will now proceed to the sidelines in order to add further to the misery of the defeated champion of the first fray.

As to the matter of slang, much can be argued *pro* and *con*. I must say, however, that Dr. Smith's characters are more true to life than Mr. Campbell's. Whether or not this is due to slang I cannot say, because I am sure that Dr. Smith could develop his characters without the use of any slang whatsoever. His descriptions are far superior to Mr. Campbell's, and I believe that I am right when I say the same thing about his characters. Mr. Campbell, however, has a better scientific base for his stories. At least it is better in the eyes of modern science. But I believe that Dr. Smith has taken it into consideration that over a period of years scientific views change considerably, because he uses very few of the modern scientific concepts in his stories.

Since an argument about scientific fiction must necessarily employ quite a bit of beating around the bush, I think that it would be a good idea to use a few known facts—not figures. I believe that I, too, could set up a very great probability against the molecular motion drive, but why argue about how many angels can stand on the head of a pin? The main thing is that two of the assumptions on which Dr. Smith's story is based are now actual scientific facts. In the Cavendish laboratory at Cambridge University, Dr. Cockcroft and E. T. S. Walton have shattered the atom with only 100,000 volts, and they obtained energy equivalent to 16,000,000 volts. Whether or not there was a corresponding decrease in amperage I do not know, because the details of the experiment are secret; nevertheless, the fact remains that atomic disintegration of the lighter elements is an actual fact. It is also reported from Ft. Worth, Texas, that an inventor has succeeded in imprinting upon fine steel wires both sound and television impulses. A mechanical educator is not so highly improbable either.

Well, Sir Campbell, have any of your basic assumptions come to pass? What? Well then, I am sure that Miss Robb's laurels belong upon the lofty brow of Dr. Smith.

Albert S. Trube,
2409 Whitis,
Austin, Texas

(This writer from the Lone Star state most amusingly depicts the correspondence which Dr. Smith's excellent story has brought about. If the story had not been so good, it would not have excited the comment which it has, and this comment, whatever its bearing, we regard as a great compliment to the story indicating that it makes an impression which is of course what every author wants his work to do. We do not think that Dr. Smith was ever unhorsed. He certainly has been well able to take care of himself, and it is rather amusing that the unfavorable comments on the slang which Dr. Smith used very properly in his story started in England and English slang we consider far less picturesque and interesting than American. The ending of a remark with the interrogative pronoun, "What?" which is a typical English habit, always seems quite disagreeable. You will find this in many English novels. As regards your angels standing on the head of a pin, if our memory serves us right, there was a question as to how many could support themselves on the point of this adjunct of the female toilet as of a needle. Volts, which you treat as energy are really units of potential. The impressing of the voice on a steel wire is an old story, which was done by Poulson who is called the Swedish Edison, and it is only going a step farther to put television on a wire.—EDITOR.)

THE BEST AUTHORS IN AMAZING STORIES ACCORDING TO THE JUDGMENT OF A READER OF MANY YEARS STANDING

Editor, AMAZING STORIES:

I have read practically every issue of AMAZING STORIES except the first. Campbell and Smith are undoubtedly your best authors. Dr. Keller and some others run close to them.

In your reply to Mr. J. W. Buck's letter in the April 1932 issue you said, "We are still hoping to see the 'Skylark of Space' in book form." Well, why not print it yourself? I can guarantee you three sales in Pasadena. Now the population of this town is about 76,000. Suppose you sold only three copies in Pasadena, and only three copies to every 76,000 people in the United States. If that were true, you would sell more than 4,500 copies on the basis of 123,000,000 total population of the United States. I think I have been ridiculously conservative. Think it over, and in the meantime get Dr. Smith to write another "Skylark" story with the same characters as the other two, even a sequel to "Spacehounds of IPC" will be very acceptable.

John Buddhue,
Castle Green,
Pasadena, Calif.

(We wish that Dr. Smith had more time at his disposal so as to give us more stories. The Teck Publications, Inc., has not yet gone into book publishing, but it is not at all impossible that it may in the future. The calculation of the sale of books would be very tempting but for one thing. As a boy said about some animal, "There ain't no such animal," as three books sold for every 76,000 inhabitants. There is nothing ridiculous in predicting a four or five thousand copies sale of a book. Many have been published with the greatest expectations from authors and publishers but have fallen flat. The public is a testy, uncertain proposition. We want to establish more definitely the sale demand for the "Skylark" stories in book form before we publish it, but we are more hopeful of getting this started than ever. Anyhow, we would want a fair guaranteed amount first.—EDITOR.)

A LETTER FROM A READER WHO HAS PERUSED OUR MAGAZINE FOR OVER FOUR YEARS AND DURING THAT TIME HAS ONLY MANAGED TO REACH THE AGE OF SIXTEEN

Editor, AMAZING STORIES:

Although only sixteen, I have been a constant reader of AMAZING STORIES for over four years. Through all this time I have never screwed up my courage far enough to ask you why you did not run a sequel to, in mine and my friend's estimation, one of the best stories you have ever printed, "The Metal Horde," by John Campbell, Jr. This story appeared about two years ago in one of your issues. (I believe "The Metal Horde" is the name.)

It dealt with the subject of brain machines and interplanetary travel, and was a sequel to "When the Atoms Failed". The story ended very unsatisfactorily, leaving Earth and Mars trying to communicate with the star Sirius. Let the sequel tell of the success of the attempt and the results of it. By the way, whatever became of Campbell? He was good.

For the rest of the magazine I can say it is okay and far above the other magazines of its type on the market. There is one fault, however, that should be remedied. I agree with the criticism of the Argentinian as the illustrations, with the exception of a few cases, do not follow the description given by the author.

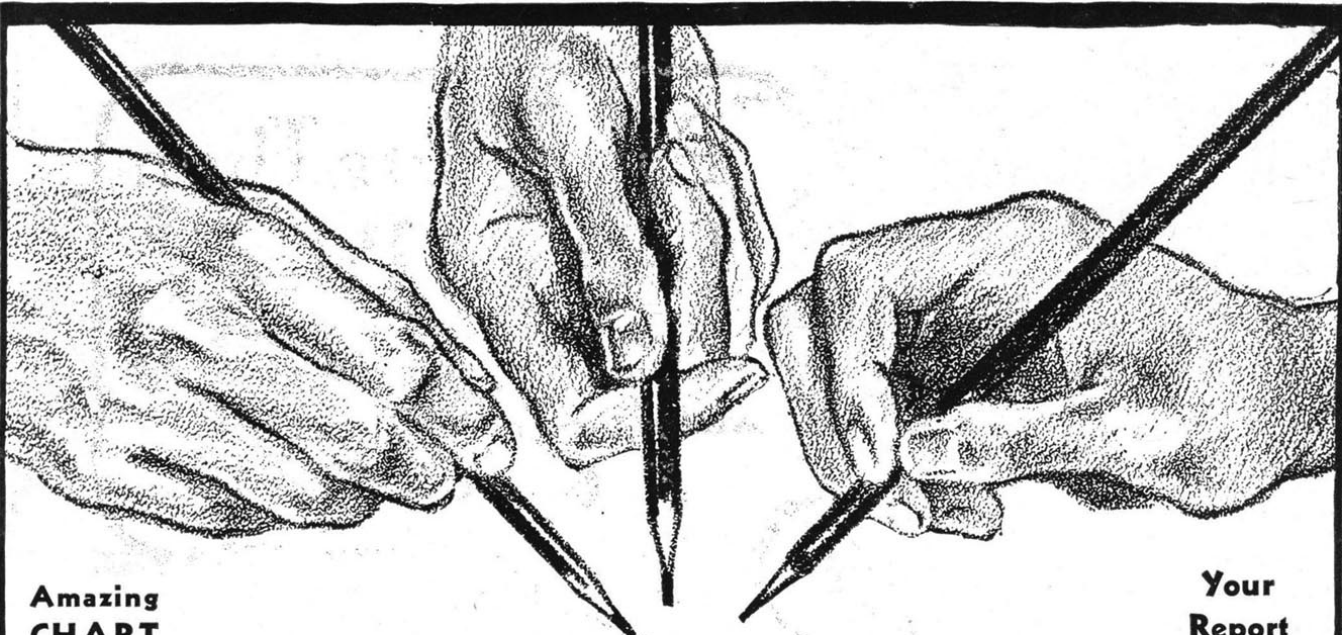
Vincent Doyle,
3280 Lynde St.
Oakland, Calif.

(As far as sequels are concerned, they rest with the authors. We are sure that our favorite authors, favorite in the sense that they are favorites of our readers, would give sequels if they saw their way clear to do so. But you must remember that a sequel must have some relation to the story and that a story which at its end seems to beg for a sequel is defective in that respect. We have to thank you for what you have to say in your last paragraph. The illustrations as a general rule, do follow the description given by the author, as interpreted by the artist. Interpretations also vary. The caption for each illustration will observe is taken from the text of the story.—EDITOR.)

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say does not count. THE MOST INTERESTING HANDWRITING WINS. Write with a pencil, a pen, or a goose quill—it makes no difference. Just a few lines of handwriting is all that's necessary for someone to receive this prize of \$250.00 Cash. Now that you know how simple and easy it is, write those few words and mail them today.

Your Report FREE

Just as soon as I get your letter I shall submit it to the American Institute of Grapho-Analysis (directed by Dr. M. N. Bunker, D. C. S., Ph.D., N. D., for a brief report on what your handwriting says about you. This will surprise you—fairly amaze you—in the way it reveals traits of character which you have. This report is FREE to everyone, over 16, answering my advertisement.

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BE PROMPT! I WILL SEND YOU A \$100.00 Cash Cer- tificate AT ONCE!

To make it worth your while to be prompt in sending your handwriting analysis—if you will see that your letter is postmarked not more than three days after you read this offer, I will send you a Cash Promptness Certificate entitling you to an extra \$100.00 in Cash should yours be the most interesting specimen of writing submitted.

RICHARD DAY, Mgr.

909 Cheapside St. Dept. BW-400-K, Cincinnati, Ohio

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