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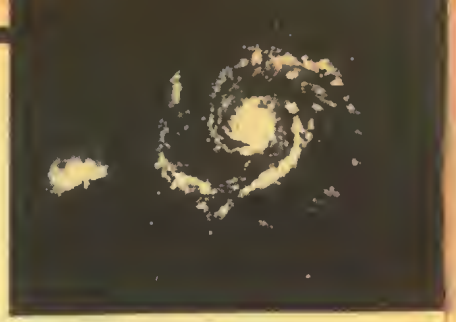

M-51 in Canes Venatici. This galaxy, as large as our own, is so distant that its light takes millions of years to reach us.

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WAY OUT THERE

A LOT of things combined —our cover, our new Poul Anderson serial and even the time of year—make us take a look at the sky. Anderson has the remarkable capacity to think like a scientist and write like a poet. What interests him he can manage to translate so as to evoke interest in the reader; and what interests him in *The Day After Doomsday* is the incredible *size* of our galactic lens.

Start with a single statistic: There are some 80,000,000,000 stars in our galaxy alone.

If Earths almost three billion people owned the stars and divided them share-and-share-alike, each man, woman and child would possess nearly thirty. We can see, under the best conditions, some two or three thousand of them with the naked eye; for

every star we can see, more than twenty *million* are there but invisible—by reason of distance, by reason of intervening opaque clouds of gas or by reason of sheer numbers, so that they are lost in the general brightness we call the Milky Way.

With all those nearby companions (we haven't even touched on the billions of billions in the other galaxies, farther away), it seems a sure bet that we have neighbors in the universe. Almost certainly many of these stars have planets; we have hope that at least a few of these planets may harbor life . . . intelligent life, life of something resembling our own kind. And even a "few" might mean many thousands.

ALL in all, the inhabited, civilized worlds in our own galaxy may well be numbered in the thousands or millions.

So why, one asks at once, haven't any of the neighbors dropped in for a call?

Well, perhaps they have. The Earth is old, and organized record-keeping goes back only a few moments of its long day.

Quite a sizable settlement of Sirians or Arcturans could have been built on North America between glaciations, not so very many thousand years ago. There wasn't a human eye on the continent to see it, and its physical traces might easily have been buried under the debris of the Ice Age. The UFOlogists haven't much doubt that we are being visited even now, for that matter.

Yet we're easy enough to overlook. Earth is, after all, only one tiny planet circling one insignificant sun far out on one of the gassy, pinwheel arms of the galaxy. Sol is itself an outpost. Were we in the dense star clusters around the center we might have had visitors every second Sunday afternoon.

The Day After Doomsday gives us a view of what our galaxy may be like, from the point of view of the races who live in it: countless worlds, more interested in their own immediate problems than in fruitless wanderings into remote skies. There isn't any reason why they should exert themselves to visit Earth, after all. And even if we assume them as curious as the Polynesians or as trade-hungry as a Marco Polo, exploration between stars is a slow, tedious task. The distances are not merely linear. It is only some six-hundred-odd light-years from here to Rigel; but the volume of space a Rigellian would have to survey to stand an even chance of running into Earth amounts to half a billion cubic light-years, encompassing many thousands of stars. From the vicinity of Rigel, indeed, hardly any of the stars in our sky are visible at all to the eye. Our own sun is at best a telescopic object, and even Sirius is no longer within the capabilities of the unaided eye.

And yet Rigel is a near neighbor!

There's plenty of room in our galaxy for many races, no doubt about it. In all that space, the vainest human peacock can hardly imagine himself to be unique.

So, as Anderson says, we're in all likelihood not alone. We are merely out of touch . . .

CLOSER to home, by the way, this is a good season for planet-watching.

Of the five bright planets Saturn is one of the more difficult to spot by accident. Hanging in the same part of the sky for years on end, it doesn't betray its presence—as the faster, closer-to-the-sun planets do—by popping from constellation to constellation. It moves, all right. But it moves slowly.

For the past three and a half years Saturn has been in the constellation Sagittarius. About a year ago it was joined there by Jupiter himself. Slowly as Jupiter rolls, he still overtakes Saturn; Jupiter is catching up and in another few months will pass.

Meanwhile the presence of these two bright objects in the same part of the sky makes it easy to locate them. There aren't any bright stars anywhere near them. If you look to the south and west, not long after dark, not very high in the sky, you'll have no trouble picking them out. The brighter of the two is Jupiter, hugest of planets, monarch of more than a dozen moons. The less bright, but still brighter than any star nearby, is ringed Saturn, a few degrees to Jupiter's west.

Give them a few more months and Saturn will have moved over into the next constellation, Capricornus, Jupiter close behind. Around February they will almost seem to touch. Meanwhile the faster planets—Venus and Mars—will have skipped through Leo, Virgo, Libra and Scorpius to catch up with the slow giants. In February all four of them will be in the same part of the sky. A brilliant spectacle . . . but, unfortunately, not for us Earthmen to see.

The trouble is that a still brighter object will be in the same point on the ecliptic—namely the sun itself. It will take a spaceship to see this particular four-planet conjunction . . .

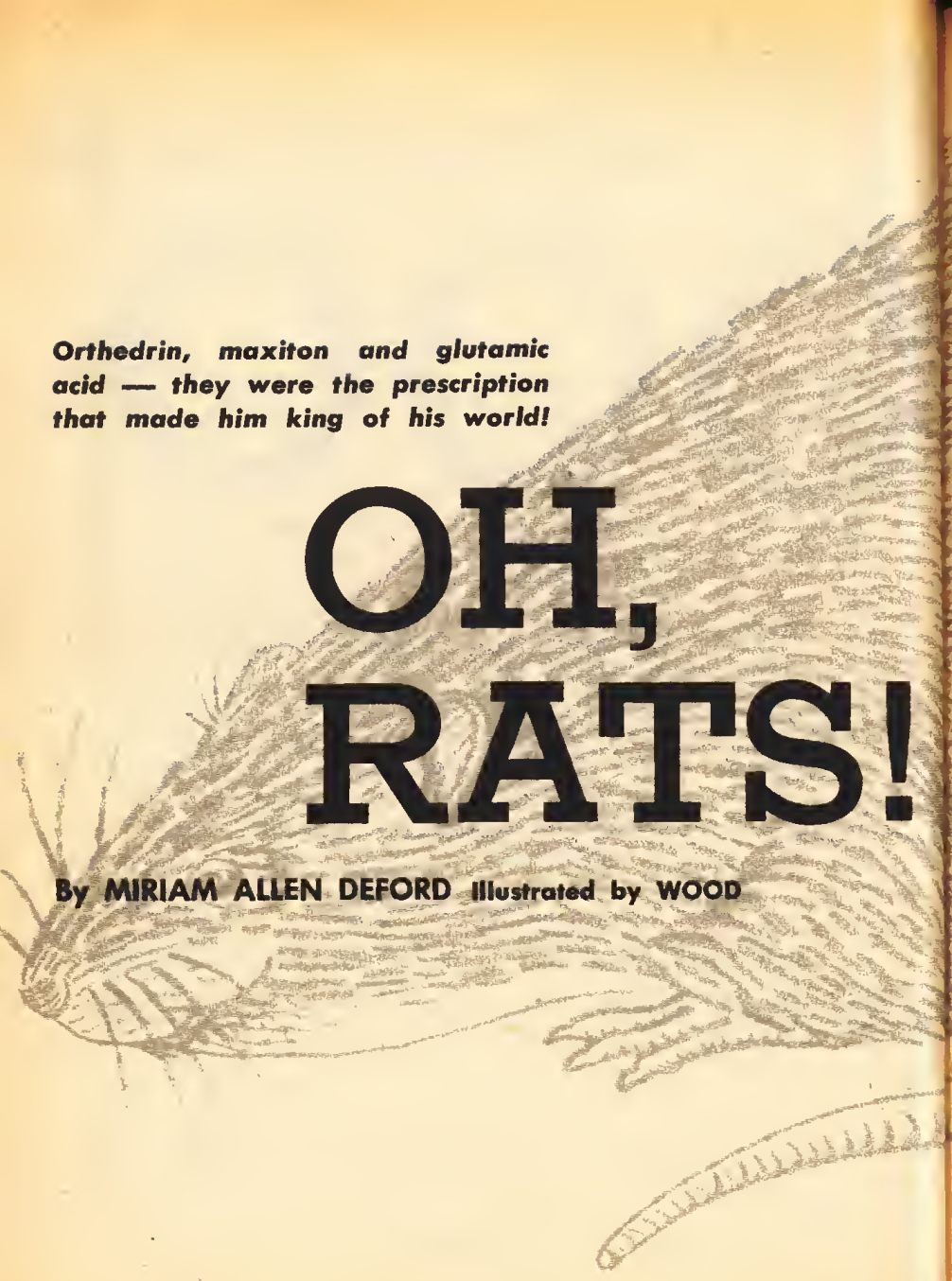
So don't wait till February. If you want a good look at, at least, Jupiter and Saturn, your chance is now.

THE EDITOR

Orthedrin, maxiton and glutamic acid — they were the prescription that made him king of his world!

OH, RATS!

By MIRIAM ALLEN DEFORD Illustrated by WOOD



SK540, the 27th son of two very ordinary white laboratory rats, surveyed his world.

He was no more able than any other rat to possess articulate speech, or to use his paws as hands. All he had was a brain which, relative to its size, was superior to any rat's that had hitherto appeared on Earth. It was enough.

In the first week of gestation his embryo had been removed to a more suitable receptacle than the maternal womb, and his brain had been stimulated with orthedrin, maxiton and glutamic acid. It had been continuously irrigated with blood. One hemisphere had been activated far in excess of the other, since previous experiments had shown that increased lack of symmetry between the hemispheres produced superior mentality. The end-result was an enormous increase in brain-cells in both hemispheres. His brain showed also a marked increase in cholinesterase over that of other rats.

SK540, in other words, was a super-rat.

The same processes had been applied to all his brothers and sisters. Most of them had died.

The few who did not, failed to show the desired results, or showed them in so lopsided and partial a manner that it was necessary to destroy them.

All of this, of course had been mere preparation and experimentation with a view to later developments in human subjects. What SK540's gods had not anticipated was that they would produce a creature mentally the superior, not only of his fellow-rats, but also, in some respects, of themselves.

He was a super-rat: but he was still a rat. His world of dreams and aspirations was not human, but murine.

What would you do if you were a brilliant, moody young super-rat, caged in a laboratory?

SK540 did it.

What human beings desired was health, freedom, wealth, love, and power. So did SK540. But to him health was taken for granted; freedom was freedom from cages, traps, cats, and dogs; wealth meant shelter from cold and rain and plenty to eat; love meant a constant supply of available females.

But power! It was in his longing for power that he most revealingly displayed his status as super-rat.

Therefore, once he had learned how to open his cage, he was carefully selective of the companions — actually, the followers — whom he would release to join his midnight hegira from the laboratory. Only the meekest and most subservient of the males — intelligent but not too intelligent — and the most desirable and amiable of the females were invited.

Once free of the cages, SK540 had no difficulty in leading his troop out of the building. The door of the laboratory was locked, but a window was slightly open from the top. Rats can climb up or down.

Like a silver ribbon they flowed along the dark street, SK540, looking exactly like all the rest, at their head. Only one person in the deserted streets seems to have noticed them, and he did not understand the nature of the phenomenon.

YOUNG Mr. and Mrs. Philip Vinson started housekeeping in what had once been a mansion. It was now a rundown eyesore.

It had belonged to Norah Vinson's great-aunt Martha, who had left it to her in her will. The estate was in litigation, but the executor had permitted the Vinsons to settle down in the house, though they weren't allowed yet to sell it. It had no modern conveniences, and was full of rooms they couldn't use and heavy old-fashioned furniture; but it was solidly built and near the laboratory where he worked as a technician, and they could live rent-free until they could sell the house and use the money to buy a real home.

"Something funny happened in the lab last night," Philip reported, watching Norah struggle with dinner on the massive coal-stove. "Somebody broke in and stole about half our experimental animals. And they got our pride and joy."

"The famous SK540?" Norah asked.

"The same. Actually, it wasn't a break-in. It must have been an inside job. The cages were open but there were no signs of breaking and entering. We're all under suspicion till they find out whodunit."

Norah looked alarmed.

"You too? What on earth would anybody want with a lot of laboratory rats? They aren't worth anything, are they — financially, I mean?"

"Not a cent. That's why I'm sure one of the clean-up kids must have done it. Probably wanted them for pets. They're all tame, of course, not like wild rats — though they can bite like wild rats if they want to. Some of the ones missing are treated, and some are controls. It would just be a nuisance if they hadn't taken SK540. Now they've got to find him, or do about five years' work over again, without any assurance of as great a success. To say nothing of letting our super-rat loose on the world."

"What on earth could, even a super-rat do that would matter — to human beings, I mean?"

"Nobody knows. Maybe that's what we're going to find out."

THAT night Norah woke suddenly with a loud scream. Philip got the gas lighted — there was no electricity in the old house — and held her shaking body in his arms. She found her breath at last long enough to sob: "It was a rat! A rat ran right over my face!"

"You're dreaming, darling. It's because I told you about the theft at the lab. There couldn't be rats in this place. It's too solidly built, from the basement up."

He finally got her to sleep again, but he lay awake for a long time, listening. Nothing happened.

Rats can't talk, but they can communicate. About the time Norah Vinson dropped off after her frightened wakening, SK540 was confronting a culprit. The culprit was one of the liberated males. His beady eyes tried to gaze into the implacable ones of

SK540, but his tail twitched nervously and if he bared his teeth it was more in terror than in fight. They all knew that strict orders had been given not to disturb the humans in the house until SK540 had all his preparations made.

A little more of that silent communication, and the rat who had run over Norah's face knew he had only two choices — have his throat slit or get out. He got.

"What do you know?" Philip said that evening. "One of our rats came back."

"By itself?"

"Yeah. I never heard of such a thing. It was one of the experimental ones, so it was smarter than most, though not such an awful lot. I never heard of a rat with homing instinct before. But when we opened up this morning, there he was, sitting in his cage, ready for breakfast."

"Speaking of breakfast, I thought I asked you to buy a big box of oatmeal on your way home yesterday. It's about the only thing in the way of cereal I can manage on that old stove."

"I did buy it. Don't you remember? I left it in the kitchen."

"Well, it wasn't there this morning. All I know is that you're going to have nothing but toast and coffee tomorrow. We seem to be out of eggs, too. And bacon. And I thought we had half a pound left of that cheese, but that's gone too."

"Good Lord, Norah, if you've got that much marketing to do, can't you do it yourself?"

"Sure, if you leave the car. I'm not going to walk all that way and back."

So of course Philip did do the shopping the next day. Besides, Norah had just remembered she had a date at the hairdresser's.

WHEN he got home her hair was still uncurled and she was in hysterics. One of the many amenities great-aunt Martha's house lacked was a telephone; anyway, Norah couldn't have been coherent over one. She cast herself, shuddering and crying, into Philip's arms, and it was a long time before he got her soothed enough for her to gasp: "Philip! They wouldn't let me out!"

"They? Who? What do you mean?"

"The — the rats! The white rats. They made a ring around me at the front door so I couldn't open it. I ran to the back and they beat me there and did the same thing. I even tried the windows but it was no use. And their teeth — they all — I guess I went to pieces. I started throwing things at them and they just dodged. I yelled for help but there's nobody near enough to hear. Then I gave up and ran in our bedroom and slammed the door on them, but they left guards outside. I heard them squeaking till you drove up, then I heard them run away."

Philip stared at her, scared to death. His wife had lost her mind.

"Now, now, sweetheart," he said soothingly, "let's get this straight. They fired a lab boy today. They found four of our rats in his home. He told some idiotic story of having 'found' them, with the others missing, running loose on the street that night, but of course he stole them. He must have sold the rest of them to other kids; they're working on that now."

Norah blew her nose and wiped her eyes. She had regained her usual calm.

"Philip Vinson," she said coldly, "are you accusing me of lying, or just of being crazy? I'm neither. I saw and heard those rats. They're here *now*. What's more, I guess I know where that oatmeal went, and the eggs and bacon too, and the cheese. I'm — I'm a hostage!

"I don't suppose," she added sarcastically, "that your SK540 was one of the ones they found in the boy's home?"

"No, it wasn't," he acknowledged uneasily. A nasty little icy trickle stole down his spine. "All right, Norah, I give in. You take the poker and I'll take the hammer, and we'll search this house from cellar to attic."

"You won't find them," said Norah bitterly. "SK540's too smart. They'll stay inside the walls and keep quiet."

"Then we'll find the holes they went through and rout them out."

They didn't, of course. There wasn't a sign of a rathole, or of a rat.

They got through dinner and the evening somehow. Norah put all the food not in cans inside the old-fashioned icebox which took the place of a refrigerator. Philip thought he was too disturbed to be able to sleep, but he did, and Norah, exhausted, was asleep as soon as her head touched the pillow.

His last doubt of his wife's sanity vanished when, the next morning, they found the icebox door open and half the food gone.

"THAT settles it!" Philip announced. "Come on, Norah, put your coat on. You're coming with me to the lab and we'll report what's happened. They'll find those creatures if they have to tear the house apart to do it. That boy must have been telling the truth."

"You couldn't keep me away," Norah responded. "I'll never

spend another minute alone in this house while those dreadful things are in it."

But of course when they got to the front door, there they were, circling them, their teeth bared. The same with the back door and all the first floor windows.

"That's SK540 all right, leading them," Philip whispered through clenched jaws. He could smash them all, he supposed, in time, with what weapons he had. But he worked in the laboratory. He knew their value to science, especially SK540's.

Rats couldn't talk, he knew, and they couldn't understand human speech. Nevertheless, some kind of communication might establish itself. SK540's eyes were too intelligent not to believe that he was getting the gist of talk directed to him.

"This is utterly ridiculous," Philip grated. "If you won't let us out, how can we keep bringing food into the house for you? We'll all starve, you and we together."

He could have sworn SK540 was considering. But he guessed the implicit answer. Let either one of them out, now they knew the rats were there, and men from the laboratory would come quickly and overwhelm and carry off the besiegers. It was a true impasse.

"Philip," Norah reminded him, "if you don't go to work, they know we haven't a phone, and somebody will be here pretty soon to find out if anything's wrong."

But that wouldn't help, Philip reflected gloomily; they'd let anyone in, and keep him there.

And he thought to himself, and was careful not to say it aloud: rats are rats. Even if they are 25th generation laboratory-born. When the other food was gone there would be human meat.

He did not want to look at them any more. He took Norah's arm and turned away into their bedroom.

They stayed there all day, too upset to think of eating, talking and talking to no conclusion. As dusk came on they did not light the gas. Exhausted, they lay down on the bed without undressing.

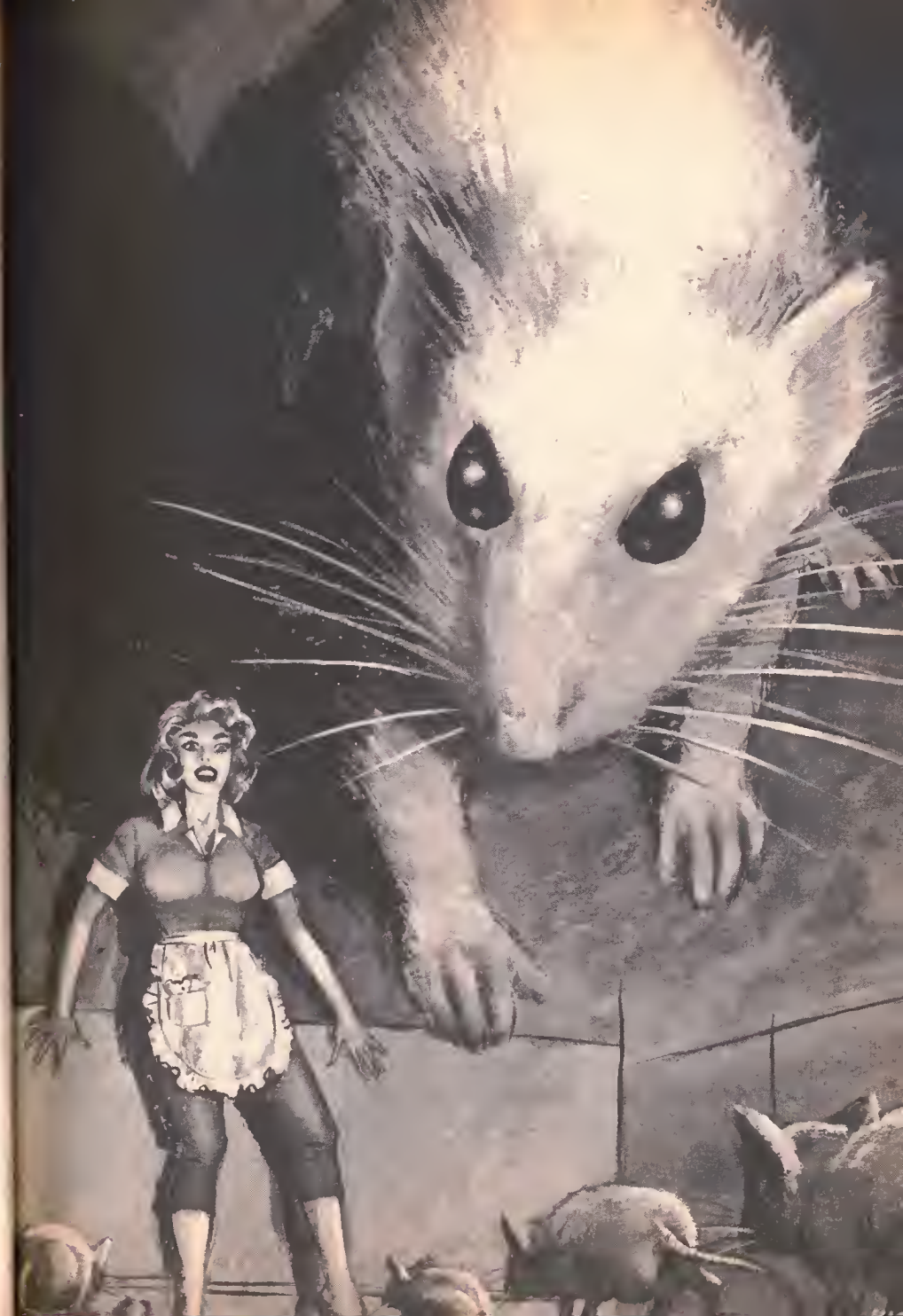
After a while there was a quiet scratching at the door.

"Don't let them in!" Norah whispered. Her teeth were chattering.

"I must, dear," he whispered back. "It isn't 'them,' I'm sure of it — it's just SK540 himself. I've been expecting him. We've got to reach some kind of understanding."

"With a rat?"

"With a super-rat. We have no choice."



Philip was right. SK540 alone stood there and sidled in as the door closed solidly again behind him.

How could one communicate with a rat? Philip could think of no way except to pick him up, place him where they were face to face, and talk.

"Are your — followers outside?" he asked.

A rodent's face can have no expression, but Philip caught a glance of contempt in the beady eyes. The slaves were doubtless bedded down in their hideaway, with strict orders to stay there and keep quiet.

"You know," Philip Vinson went on, "I could kill you, very easily." The words would mean nothing to SK540; the tone might. He watched the beady eyes; there was nothing in them but intelligent attention, no flicker of fear.

"Or I could tie you up and take you to the laboratory and let them decide whether to keep you or kill you. We are all much bigger and stronger than you. Without your army you can't intimidate us."

There was, of course, no answer. But SK540 did a startling and touching thing. He reached out one front paw, as if in appeal.

Norah caught her breath in astonishment.

"HE — he just wants to be free," she said in a choked whisper.

"You mean you're not afraid of him any more?"

"You said yourself he couldn't intimidate us without his army."

Philip thought a minute. Then he said slowly:

"I wonder if we had the right to do this to him in the first place. He would have been an ordinary laboratory rat, mindless and contented; we've made him into a neurotic alien in his world."

"You're not responsible, darling; you're a technician, not a biochemist."

"I share the responsibility. We all do."

"So what? The fact remains that it was done, and here he is — and here we are."

The doorbell rang.

Philip and Norah exchanged glances. SK540 watched them.

"It's probably Kelly, from the lab," Philip said, "trying to find out why I wasn't there today. It's just about quitting time, and he lives nearest us."

Norah astonished him. She picked up SK540 from the bedside table where Philip had placed him, and hid him under her pillow.

"Get rid of whoever it is," she said defensively. Philip stared for an instant, then walked briskly

downstairs. He was back in a few minutes.

"It was Kelly, all right," he told her. "I said you were sick and I couldn't leave you to phone. I said I'd be there tomorrow. Now what?"

SK540's white whiskers emerged from under the pillow, and he jumped over to the table again. Norah's cheeks were pink.

"When it came to the point, I just couldn't," she explained shamefacedly. "I suddenly realized that he's a *person*. I couldn't let him be taken back to prison."

"Aren't you frightened any more?"

"Not of him." She faced the super-rat squarely. "Look," she said, "if we take care of you, will you get rid of that gang of yours, so we can be free too?"

"That's nonsense, Norah," Philip objected. "He can't possibly understand you."

"Dogs and cats learn to understand enough, and he's smarter than any dog or cat that ever lived."

"But — "

The words froze on his lips. SK540 had jumped to the floor and run to the door. There he stood and looked back at them, his tail twitching.

"He wants us to follow him," Norah murmured.

There was no sign of a hole in the back wall of the disused pantry. But behind it they could hear squeaks and rustlings.

SK540 scratched delicately at almost invisible cracks. A section of the wall, two by four inches, fell out on the floor.

"So that's where some of the oatmeal went," Norah commented. "Made into paste."

"Sh!"

SK540 vanished through the hole. They waited, listening to incomprehensible sounds. Outside it had grown dark.

THEN the leader emerged and stood to one side of the long line that pattered through the hole. The two humans stared, fascinated, as the line made straight for the back door and under it. SK540 stayed where he was.

"Will they go back to the lab?" Norah asked.

Philip shrugged.

"It doesn't matter. Some of them may . . . I feel like a traitor."

"I don't. I feel like one of those people who hid escaped war prisoners in Europe."

When the rats were all gone, they turned to SK540. But without a glance at them he reentered the hiding-place. In a minute he returned, herding two white rats before him. He stood still, obviously expectant.

Philip squatted on his heels.

He picked up the two refugees and looked them over.

"Both females," he announced briefly. "And both pregnant."

"Is he the father?"

"Who else? He'd see to that."

"And will they inherit his — his — "

"His 'super-ratism'? That's the whole point. That's the object of the entire experiment. They were going to try it soon."

The three white rats had scarcely moved. The two mothers-to-be had apparently fallen asleep. Only SK540 stood quietly eying the humans. When they left him to find a place where they could talk in private he did not follow them.

"It comes down to this," Philip said at the end of half an hour's fruitless discussion. "We promised him, or as good as. He believed us and trusted us.

"But if we keep to our promise we're *really* traitors — to the human race."

"You mean, if the offspring should inherit his brain-power, they might overrun us all?"

"Not might. Would."

"So — "

"So it's an insoluble problem, on our terms. We have to think of this as a war, and of them as our enemies. What is our word of honor to a rat?"

"But to a super-rat — to SK540 —"

As if called, SK540 appeared.

Had he been listening? Had he understood? Neither of them dared to voice the question aloud in his presence.

"Later," Philip murmured.

"We must eat," said Norah. "Let's see what's left in the way of food."

EVERYTHING tasted flat; they weren't very hungry after all. There was enough left over to feed the three rats. But they had evidently helped themselves earlier; they left the scraps untasted.

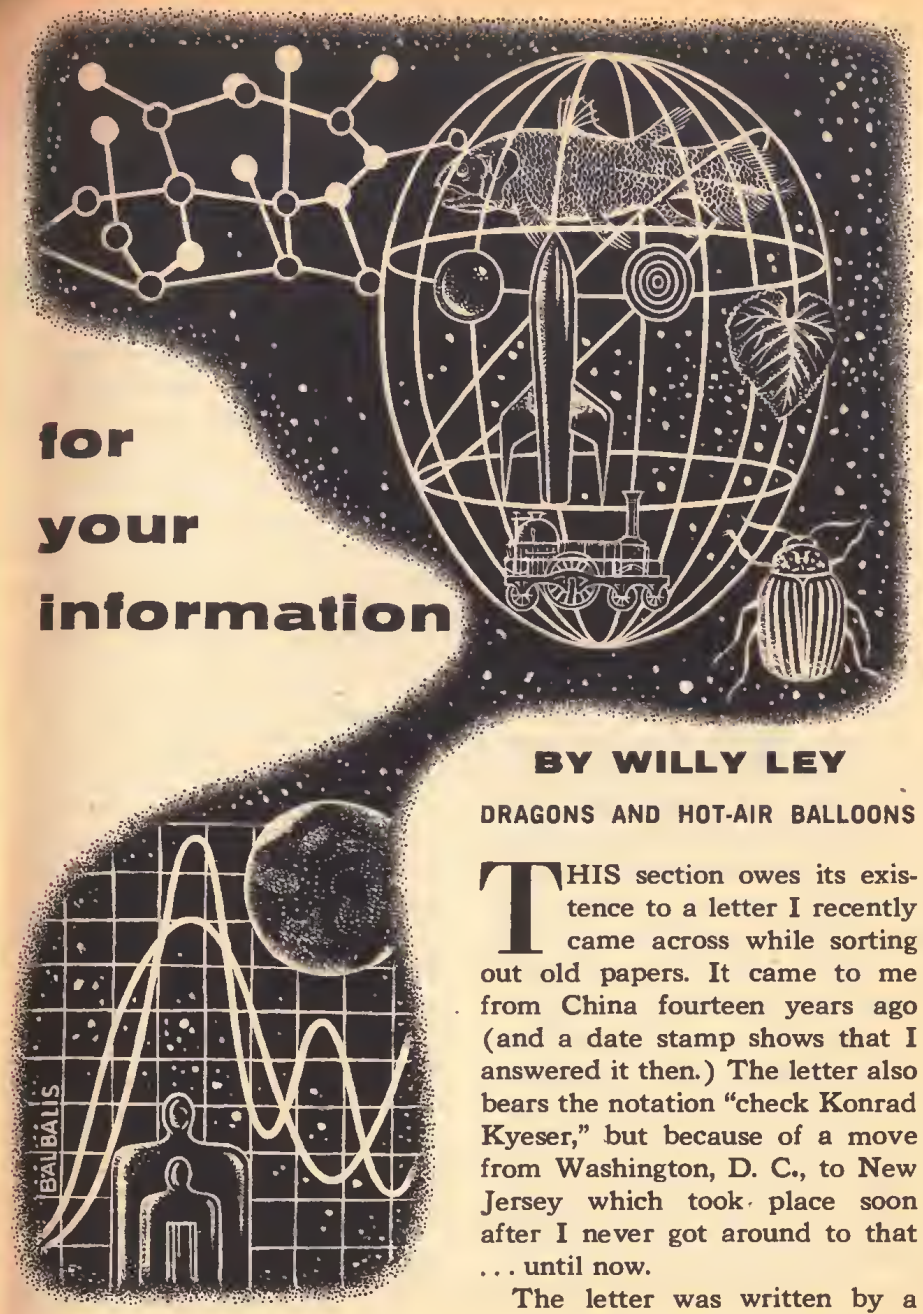
Neither of the humans guessed what else had vanished from the pantry shelves — what, when he had heard enough, SK540 had slipped away and sprinkled on the remaining contents of the icebox, wherever the white powder would not show.

They did not know until it was too late — until both of them lay writhing in their last spasms on their bedroom floor.

By the time the house was broken into and their bodies found, SK540 and his two wives were far away, and safe. . .

And this, children, is the true account, handed down by tradition from the days of our great Founder, of how the human race ceased to exist and we took over the world.

— MIRIAM ALLEN DEFORD



BY WILLY LEY

DRAGONS AND HOT-AIR BALLOONS

THIS section owes its existence to a letter I recently came across while sorting out old papers. It came to me from China fourteen years ago (and a date stamp shows that I answered it then.) The letter also bears the notation "check Konrad Kyeser," but because of a move from Washington, D. C., to New Jersey which took place soon after I never got around to that . . . until now.

The letter was written by a

Russian by the name of G. Larikov. By way of introduction he told me that he was a graduate of the Imperial Russian Artillery School and that he fled Russia after the revolution and made his home in China. There he became a civilian employee of the Chinese Ordnance Department during the Second World War. After this introduction G. Larikov proceeded to the reason for writing his letter:

"During my stay in Szechwan Province during the first half of the recent war," he wrote, "I lived for several years in a deep valley, something like your canyons, where our arsenal was located for protection against Japanese bombers. Soon after our arrival in that valley the guards started to send reports that from time to time mysterious lights appeared floating far above our arsenal. Our men were greatly alarmed and immediately decided that it was some kind of Japanese deviltry. I tried to reassure them that those lights, after all, did not cause us any harm. But they also reported the story to the local Chinese police and insisted on a thorough investigation. At long last it was found that the farmers who lived in the mountains around our valley had the custom of sending into the night air paper balloons with small oil lamps attached to them when somebody was sick or when they wished to send a message to their dead ancestors. We have found later that this custom, like all Chinese customs, is very old, dating back not hundreds but thousands of years and so well forgotten in other, less remote, parts of China that even very few Chinese ever heard of it."

Considering that mountainous Szechwan *is* a remote place, where one would hardly expect the farmers to construct hot-air ballons of the Montgolfier type as a pastime, the anxiety of the guards and the surprise of their superiors both become understandable.

But the fact is that the farmers did. And that raises the inevitable question of how they learned it and from whom. (That the custom is "thousands of years old" is a statement that can safely be disregarded. The Chinese were in the habit of claiming every one of their institutions to be thousands of years old.) My correspondent did not try to answer that question, but said that possibly "in former years, some missionaries brought the idea of hot-air balloons from China to Europe, where it was adapted by the brothers Montgolfier for their flying experiments."

I probably answered at the time that I felt sure that missionaries—more specifically French missionaries—were involved, but that the idea of the hot-air balloon probably traveled the other way. So that the "thousand-year-old" custom would perhaps date back to around the year 1800.

MY reasons for passing judgment like that were the following: If, at a time when nothing in Europe took to the air but birds and insects, hot-air balloons from China had become known via a returning missionary, that fact would have been written up at great length. Nor would their Chinese origin have been concealed in any way. Just at that time Europeans were very much interested in things Chinese. On the other hand, the Montgolfiers' hot-air paper balloons did cause an enormous stir and everything connected with them was written down by somebody. Because of that we know precisely how the invention came about.

The brothers Montgolfier (Jacques Etien and Joseph) began by wondering what kept the clouds up. And they saw, of course, that smoke from a chimney rose and formed "clouds," too. Was smoke powerful enough to carry something up with it? Well, sometimes you could see a half-burned piece of paper rising. So they first built a kind of inverted paper bag to catch the smoke, and they saw to it that the fire was quite smoky by throwing wet straw into it.

In spite of all their mistakes it worked.

They knew—or found out for the purpose—that the sphere was the body combining largest volume with smallest surface. They learned that smoke was not indispensable. And on June 5, 1783, they made their first public demonstration, with an unmanned paper balloon about 35 feet in diameter.

One year later the first hydrogen balloon was built, though not by the Montgolfiers.

How quickly the news got around is shown by the fact that on December 27, 1783, Johann Wolfgang von Goethe wrote to a friend about the attempts of the Court Apothecary Buchholz in Weimar "to master the art of Montgolfier." One can still see the smile on his face when reading his description. "Buchholz tortures the air but without success. The spheres refuse to rise. One of them hastily rose to the ceiling, but only once." Interestingly Goethe continued that he "had resolved to progress slowly, and hope to be the first to chase an enormous paper ball into the air."

History does not know anything about a hot-air balloon built and launched by Goethe. Either somebody succeeded before him in his area, or else he

was simply too busy to bother.

What is even more interesting is a sketch for an article (dated April 11, 1821) which he intended to write but never did. Its theme was that he was very lucky to have lived through the second half of the 18th century and to have seen how such a large number of inventions and discoveries was made. He then listed the discoveries and inventions. After the word "Balloons" he wrote, "How close I was to making this discovery. Some misgivings that I didn't do it myself. But consoled myself soon." Nobody knows just what he meant by these words. Possibly, as a young man, he had also watched smoke rising and had wondered whether it might carry something.

NOW for my long delayed resolve to "check Konrad Kyeser."

When I read Mr. Larikov's letter suggesting that the Montgolfier brothers were not the original inventors of the hot-air balloon. I remembered that somebody else had said the same thing. This somebody else had been a Swiss engineer by the name of Franz Marie Feldhaus, who later became famous as a historian of technology. (When I met him about thirty years ago he told me how this had come about. In principle it was quite simple. He did not have a job. While waiting for one to come along he went to the University library, asking the librarian for books on the history of inventions. Finding these books most inadequate he resolved to write better books himself. And did.)

But Feldhaus (I don't know just what kind of engineering was his specialty) had one weak spot: aviation in any form or shape. In a book which he wrote in 1907 he still maintained stoutly that airplanes were a very unlikely invention. If they could be built at all they would have no practical value as a means of transportation but would be the aerial equivalent of a racing yacht. Helicopters, the same book says, were a senseless project. And as late as 1929 space travel was just a fantastic dream to F. M. Feldhaus.

Well it was Feldhaus who pointed his finger at a device which he said employed Montgolfier's principle long before Montgolfier. This device was the so-called Dragon Standard (see figure), which must have existed around the year 1400. No such dragon standard has been preserved anywhere, for reasons which will become apparent very soon.

We know about them through a book called *Bellifortis*, written by Konrad Kyeser von Eichstaedt and finished during the last week of August, 1405. Several manuscripts are known. The one from which this picture of the dragon standard is copied is considered to be the original. It is not, the bibliographical experts believe, in Konrad's handwriting; but it is called "the original" because it was written down under Konrad's supervision.

Of course, the Latin text calls the standard *draco volans* (flying dragon) and tells that the head is made of parchment, the body of linen and the tail of silk, each of a different color. The purpose of the gay monster was twofold. It was to signal to your allies where you were, and it also was to frighten the enemy (who, like enemies at any place and any time, was supposed to be not only evil but also somewhat stupid). At night a lamp was to illuminate it from within. Konrad Kyeser wrote that this lamp should have a wick soaked in *Oleum benedictum*. The latter was his term for "kerosene" and it seems as if he wasn't too sure just what that was.

KONRAD KYESER also added that one could use a rocket for illumination and said that this rocket should be put in the dragon's tail.

Feldhaus, after examining the picture and a few similar ones from later hand-written copies of the *Bellifortis* (it never was printed), came to the conclusion that these dragon standards had been early hot-air balloons. Possibly—no, very likely—the artisans who made them knew nothing about the lifting capacity of hot air, Feldhaus said, but as soon as they started using these devices during the night and had to put lamps into them to make them visible they must have noticed that the dragon standards no longer needed to be lifted but had to be tethered instead . . . as can clearly be seen in the picture.

When I read this for the first time I thought "how interesting." It did not occur to me to make a calculation.

But if you do, you realize very quickly that a little calculating is what Feldhaus should have done

Dragon Standard of 1400 A.D.

before he proclaimed the dragon standards to be the forerunners of the hot-air balloon. Unlike the sphere, this dragon shape has litle volume and lots of surface. And because of its shape it cannot be a simple cloth bag, it needs reinforcements in various places. In short, the amount of buoyancy which hot air could produce would be far less than the weight of the standard.

What it really is is a so-called fish kite.

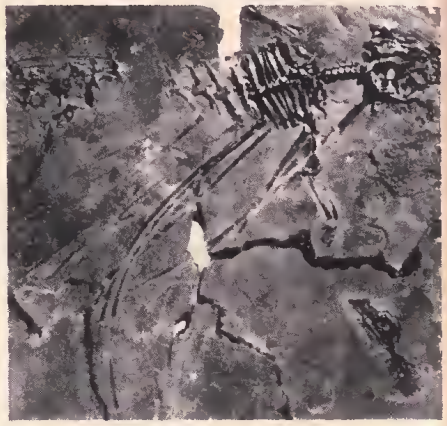
But if it were a kite shouldn't it be shown trailing the rider? Yes, it should be. The reason why it doesn't is probably that the artist wanted a nice composition on the manuscript page. It is also possible that the artist had never seen one of these kite standards demonstrated. And it is just as possible that the artist was just careless. Paintings of sailing ships with the sails billowing one way and the flags streaming the other are no rarity.

If one of these kite standards had been preserved we could see with our own eyes that it was a kite and not a hot-air balloon. But none has been preserved, I suspect because of the wick soaked in *Oleum benedictum*. They probably all burned up in action.

THE ORIGIN OF FLIGHT

This is going to be about a fossil, and I should wait until the formal scientific description has been published before I write about it. But the case is not only unique but so surprising in many respects that I prefer telling an incomplete story to waiting.

Preliminary Reconstruction of the North Bergen Fossil.



The North Bergen Fossil
(Courtesy: American Museum of Natural History.)

The fossil in question is from the black shale of an abandoned quarry in North Bergen in New Jersey. That black shale is rather reliably dated as being 175 million years old, which means it was formed during the latter part of the Triassic period. The area then was a large freshwater lake, well populated with small coelacanth fishes. Among more or less well preserved coelacanth fossils three young men in the upper teens, Alfred Siefker, Joe Geiler and Mike Bandrowski, found a fossil 7½ inch lizard-like reptile, which they later handed over to Dr. Edwin H. Colbert, head of the Department of Vertebrate Paleontology of the American Museum of Natural History.

It turned out to be the earliest known "flying reptile." Since the scientific description isn't out yet I don't know what its name will be. Following normal scientific usage the name could be *Pamprotopteryx*, but there are a few drawbacks to that name, aside from the layman's customary complaint that it would be hard to pronounce. In the first place, naming a new genus is the privilege of the discoverer or of the man who produces the first scientific description. In the second place the name is slightly wrong. The Greek root words would mean "first of all to fly" but the root word for the last part of the name *pterón* means "wing" or "fin" and can be stretched to mean "paddle." At any event, it implies something active. But the reptile from North Bergen did not fly actively.

It did not have wings. It had what is best called a parachute; and for very good reasons there is neither a classical Greek nor a classical Latin word for parachute.

The fact that it did not have wings is the big surprise. A winged reptile from the late Triassic period would have been a novelty but it would have been quite logical. The two periods which followed after the Triassic were the Jurassic and the Cretaceous periods, and we know winged reptiles from both of htem. In fact, we know two types, a short-tailed version, the pterodactyls, and a long-tailed version, *Rhamphorhynchus*—the latter known so far only from the upper (which means more recent) Jurassic of Bavaria. The short-tailed pterodactyls are known to have lived from the very early part of the Jurassic period until the end of the Cretaceous period, when they became extinct.

Flying Reptile Pterodactylus
from the Jurassic of Bavaria

Since even the earliest Jurassic pterosaurs (to use the all-inclusive term for the extinct winged reptiles) are rather definite types, it is obvious that there must have been earlier forms. These earlier forerunners of the Jurassic types are to be sought in Triassic rocks. They couldn't be anywhere else. Hence the discovery of early Triassic pterosaurs, though it hasn't happened yet, is something to be expected.

But the fossil I misnamed *Pamprotopteryx* above resembles in construction something which has been in the books, as a living reptile, for around 200 years. It is a tree lizard from Java and adjacent islands with an overall length of about 8 inches, of which the slender tail accounts for 5 inches. Carolus Linnaeus named it *Draco volans* (I can't seem to get away from "flying dragons" in this column!) and zoological handbooks state that there are about 35 different species of them. Nobody is too specific about the number of species. Some of them may be mistakes because the coloration of the incidentally very beautiful "flying dragon" varies considerably from one specimen to the next.

Now *Draco volans* has a "parachute" spread on each side of its body by a number of "false ribs" —six of them, in the most common species. The North Bergen fossil shows the same arrangement, but with fourteen rib extensions. Its "parachute" is larger than that of *Draco volans;* the rib extensions are five inches long on either side. The living *Draco volans* has been observed to cover distances up to twenty yards. One observer swore that it can avoid obstacles while gliding. When it reaches the tree trunk where it wants to land it lowers its tail—held stretched out while gliding—and seems to throw its head back, obviously getting the "parachute" surface into a braking position. As a glider, the performance of the North Bergen reptile must have been at least as good as that of the living *Draco volans.*

As the pictures show, there can be no direct connection between the Triassic parachute reptile from North Bergen and the pterosaurs of the Jurassic. The latter had developed a real wing, a skin stretched by one enormously elongated finger—the one anatomists call the fourth finger and which women refer to as the "ring finger." (The bat's wing, to get rid of a possible misunderstanding, is stretched by all four fingers, with the thumb forming a free hook.) As for the ancestry of the pterosaurs, we know that they sprang from a group of usually fairly small reptiles, probably largely tree-dwelling, which bear the scientific name of *Pseudosuchia.* There is not much sense in translating a label like this, but one might refer to them as the pseudocrocodiles.

One of the Species of "flying dragon".

During the period preceding the Triassic, namely the Permian, they had come from an older group of reptiles which had split into two groups. The pseudosuchians are one of these two. The other group is labelled parasuchians and there isn't much to be told about them. But the pseudosuchians had gone on to glory. From them sprang the pterosaurs, the dinosaurs, the crocodilians and even the birds.

It would be most interesting if it turns out that the North Bergen fossil is a pseudosuchian too. If so, this group would have invented flying three times, once in a gliding form constructed like the living *Draco volans* (as far as the gliding mechanism is concerned), once in the shape of the pterosaurs and finally in the form of the birds.

I wish I could tell now what forms led to the living *Draco volans* but this is, unfortunately, not known. The living form decidedly belongs to the lizards—which did not become important until fairly recent geological times, namely the Tertiary. But *Draco volans* is now an isolated form. It has no near living relatives and no fossil ancestors are known.

THE BIGGEST GUNS

I did not get many good questions this month, but one which came from a reader in Salt Lake City will probably use up what space I have left.

The gentleman made a trip to Russia last year and, like all tourists who come to Moscow, he was taken to Red Square and shown the "Czar Pushka." (*pushka* is just the Russian word for "cannon.") During the return trip another passenger told him that one of the Sultans had an even bigger cannon built. The question is, simply, about the dimensions of the Czar Pushka and whether there have been bigger guns.

The dimensions of the highly ornamented bronze *pushka* are: length of barrel 22.2 feet, caliber 45¼ inches, weight of barrel 4310 pounds. Apparently the piece was considered more a work of art from the outset, for it was

literally never fired (Voltaire made a crack about it, saying that the two outstanding items of the Kremlin are a bell which was never rung and a cannon which was never fired) and has been on public display since the year it was cast, which was 1586.

The other big gun which was mentioned by the fellow passenger of my reader was probably the Mohammed II, built for that Sultan by a man called "Urban the Hungarian" in about 1460. It weighed about 2100 pounds and its bore was 31 inches. The barrel was 21.5 feet long.

It was in every dimension a bit smaller than the Russian piece, but, to make up for it, it was fired. As Gibbon tells the story in Chapter LXVIII of his *Decline and Fall of the Roman Empire:* "The stone bullet weighed about six hundred pounds. A vacant place before the new palace was chosen for the first experiment; but, to prevent the sudden and mischievous effects of astonishment and fear, a proclamation was issued that the cannon would be discharged the ensuing day. The explosion was felt or heard in a circuit of a hundred furlongs. The ball, by the force of the gunpowder, was driven above a mile; and on the spot where it fell it buried itself a fathom deep in the ground. For the conveyance of this destructive engine, a frame or carriage of thirty wagons was linked together and drawn along by a team of sixty oxen. Two hundred men on both sides were stationed to poise and support the rolling weight; two hundred and fifty workmen marched before to smooth the way and repair the bridges; and near two months were employed in a laborious journey of one hundred and fifty miles."

It is likely that the gun did go into action, but it cannot be proved. The contemporary writers were careless or ill-informed. They confused several big guns used at the time, and even Mr. Gibbon did not succeed in disentangling their chaotic accounts.

The next big gun was British. It was a siege mortar designed by a Mr. Robert Mallet. The bore of these mortars (two were built) was 36 inches. The barrel length was eighty inches above a 48.5 inch long conical powder chamber, with an average diameter of 16 inches. The projectiles were cast iron balls 35.6 inches in diameter which came in three weights: 2365, 2550 and 2990 pounds. They had room for a bursting charge weighing 480 pounds.

One of the two mortars was never test-fired. The other fired a number of rounds during the fall and winter of 1857. The two mortars were meant to be used in the Crimean war but never left England.

Two large guns which really saw action both are German, one for each of the two World Wars. The "big gun" of the first World War was the "Paris Gun"—also called (by the German press) "Kaiser Wilhelm Gun" and miscalled (by the French press) "Big Bertha."

Its caliber, as the official designation states, was 222 millimeters (8.74 inches.) The length of the barrel was 110 feet; the shell weighed 260 pounds; the range was 80 miles. The gun itself weighed 154 tons and the cradle 26 tons. The barrel stood only about 60 rounds. Using up a total of six barrels, the gun fired a total of 367 rounds, all into Paris.

For the second World War the Germans rebuilt one of these guns, and in 1941 it was assigned to Battery 701. But even official German sources do not know whether it was used. A German gunnery expert who tried to find out received the answer, "Since the Army had the piece they probably fired it. But there are no records."

But the "big gun" of the Second World War was the one called "Dora." Its caliber was 800 millimeters (31.5 inches.) The length of the barrel was 106.6 feet, the weight 1485 tons (short tons of 2000 lbs. each) and the range 29 miles. The shell was 4½ calibers long, weighed 7.8 (short) tons and required a propelling charge of 4400 lbs. It could fire three times per hour.

To build the firing position for Dora took 4000 men and five weeks. Firing the gun required only 500 men.

Dora pulverized the fortifications of Sevastopol and was then brought to Leningrad (needing three trains just for the gun), but did not see action again. By then the German High Command had come to the conclusion that Dora was too big. Two other guns of the same type that had been built were not even sent to the front lines.

— WILLY LEY

Interstellar trouble-shooting is the easiest work there is. All you need is brains, energy — and a steno with nice legs!

Satisfaction Guaranteed

By JOY LEACHE Illustrated by GAUGHAN

ANDREW Stephens was trying to think of two things at once, and it wasn't working out. An inspirational message (delivered by Crumbly, president of Planetary Promotions, Inc.) was mixing itself up in his mind with the probable difficulties of his first company assignment.

He hoped he was thinking, and not worrying. Crumbly said worry was fatal in the promotion business. It was fervor, not fret, Crumbly said, that had made Planetary Promotions, Inc., what it was today. And it was work, not worry, that would make it what it was destined to be tomorrow.

Andy Stephens stared at the farthest corner of his office (about four feet from his nose) and sighed. He didn't have a slogan in his body, let alone on (or off) the top of his head.

His assignment was an easy one, Crumbly had assured him. Planetary Promotions always started new men off with easy ones. Only fair.

Andy squared his narrowish shoulders in as close an imitation of Crumbly's desk-side manner as he could, and picked up the dope sheet.

It seemed there was a planet, Felix II, somewhere near the edge of nowhere. It wanted to join the Galactic Federation.

A laudable desire, Andy thought, but strictly a political matter, having nothing to do with Planetary Promotions, or Andrew Stephens.

However, it also seemed that a planet had to demonstrate that it would be contributing something to the Federation before it was allowed to join. In other words, Andy thought, you have to have something they want, or they won't let you in.

A buzzer squawked out of the dun-colored box on his desk. Andy jumped, and flipped the lever.

"The bus to the port will be at the door in seven minutes," the grim voice of the Lower Office Co-ordinator told him. "A stenographer will meet you on the ship."

"Thank you, Miss Ellis," Andy said meekly. He stuffed the dope sheet into his jacket and left the Main Office for Felix II.

"EXCUSE me," said a feminine voice. "Are you with Planetary Promotions?"

Andy looked up. A sandy-haired girl with a passable figure and nice legs was looking down at him. "Yes," he said. "I'm Andy Stephens."

The girl looked relieved. "I'm Edith Featherpenny from the steno pool," she said. "I was afraid I wouldn't be able to find you."

"Sit down," Andy invited.

He moved, and Miss Featherpenny moved. Between them, they unsettled a large woman eating an orange. When the juice had been mopped up and the woman apologized to, Miss Featherpenny squeezed in beside Andy.

"Is that the information on the case?" She indicated the dope sheet crumpled under Andy's arm.

"Yes." Andy tried to pull it out. "Were you issued one?" He moved his elbow and tried again.

The orange woman glared at him.

Miss Featherpenny shook her head. "Miss Ellis told me you'd tell me everything I needed to know."

Andy felt obscurely flattered. "It doesn't look too promising," he admitted.

Miss Featherpenny glanced at the dope sheet and found a ray of hope. "The Federation only requires that the Felician exports are nearly as valuable as their imports," she pointed out. "'Nearly' is a nice vague, maneuverable word."

"But," said Andy, "if the Felicians can't think of anything to sell, how do they expect me to?"

"Maybe they're too isolated to know what's in demand," Miss Featherpenny comforted him. "It says they won't authorize ships to land on the planet except by invitation."

"It might be isolation, I suppose," Andy doubted. He felt an urge to confide in Miss Featherpenny. She did, after all, look as if there might be something besides fluff in her head.

"Look," he said. "This is my first assignment, on my fourth job, on my second career. I've got to make good. My father is beginning to get impatient."

Miss Featherpenny's eyes grew softer. "Fathers are usually more patient than their children think," she encouraged.

"But," Andy added morosely, "I have a brother, a salesman with Universal Products. He keeps getting promoted, and I keep getting fired. Dad must be conscious of the contrast."

"Maybe," Miss Featherpenny suggested, "your brother's been lucky. You know, being assigned jobs that were easier than they sound."

Andy glanced at her to see if he was being humored. He decided he was not, or not much. "I've tried to believe that," he admitted. "Unfortunately, Lloyd keeps proving me wrong. He got his last promotion for selling fancy food products to the Mahridgians."

Miss Featherpenny had obviously never even heard of Mahridge.

"They have a strong taboo against eating," Andy explained. "They swallow concentrates to keep alive, but it's still not quite decent. On Mahridge, it's the dining room, not the bathroom, that has a door with a lock on it for privacy.

"Is he married?" asked Miss Featherpenny, who didn't intend to be a steno all her life. "I mean," she added quickly, "his wife would get anxious about his selling something like that, that could get him put in prison, or killed. How did he do it?"

There was a certain coolness in Andy's voice. "He took a lead from the dope peddlers. He converted the adolescent Mahridgians first. It's all right to eat on Mahridge now."

Miss Featherpenny diplomatized. "I don't think that's ethical. Convincing people to do what they think is wrong."

Andy was still suspicious. He said, "Ethical or not, he got the promotion."

THEY stood at the edge of the only launching pad on Felix II, and surveyed the landscape. Thirty feet away, there was a barnsized stone building with a weedy roof. Aside from some rounded blue hills in the distance, and a Felician leaning against the building, there was not much to detain the eye.

Miss Featherpenny giggled softly in surprise. "He looks like a leprechaun," she said. "The sheet didn't say that."

"Tourist trade," Andy breathed, his eyes gleaming with the solution of his problem.

Since the two-foot-tall welcoming committee showed no signs of moving, they started toward him.

"My name," Andy said in Galactic, "is Andrew Stephens. I'm here from Planetary Promotions."

"I know," the Felician muttered ungraciously. "I came out from town to meet you. My name is Blahrog. Who's this?"

"My steno, Miss Featherpenny."

"Urk." Obviously Blahrog had never heard the term "steno" and was interpreting it freely. "I'm in charge of our admission to the Federation. That means I'm in charge of you." He eyed Andy unenthusiastically. "You haven't had much experience with this kind of thing, have you?"

Andy had a wild rush of hope. If the Felician government rejected him as a representative, he could go home without a failure on his record, and pray for a simpler assignment. Even P. P. didn't consider an agent responsible for the unpredictable whims of aliens.

"No, I haven't," he replied

cheerfully. "I was hoping maybe you had."

Miss Featherpenny, who hadn't read the contract, gasped.

Blahrog, who had read the contract, replied, "I haven't. Let's get on into town where we can discuss the possibilities in comfort."

They set out, walking unequally through the thick white dust that passed for paving on Felix II.

"Don't you use ground cars?" Miss Featherpenny choked at the end of the first half-mile.

"Don't have technology," Blahrog growled, stumping grimly along. "The Everking has a car, but he doesn't use it much. No fuel."

As he walked, Andy composed a speech on the merits of the tourist business, to be delivered to the Everking.

Miss Featherpenny grew visibly more depressed with each mile. She uttered an involuntary cry when the guard of the city gate appeared with a slender mug in each hand.

"Felician ladies don't drink," Blahrog said gruffly.

"I can fetch you a glass of water," the guard offered, without enthusiasm.

"Thank you," said Miss Featherpenny, with an attempt at sincerity.

The contents of his mug made Andy choke. "Tastes something like cider," he gasped.

Blahrog downed his without a wink. "It's customary to give a guest a mug of Throatduster as a sign of gratitude because he walked so far in the dust."

"In this dust," Miss Featherpenny murmured to her second glass of water, "any distance is far."

"Thoughtful custom," Andy said quickly. "Could you export the beverage?"

"Sell Throatduster?" Blahrog was indignant. "It would be a breach of hospitality. Besides, Felix II can't produce enough second-rate stuff, let alone first-rate. Sometimes, in a bad year, we have to greet guests with water."

"What a pity," said Miss Featherpenny.

SHE became increasingly unsympathetic as Andy swallowed another Throatduster at the door of the Palace (a one-story building similar to a small barn), and yet another in the presence of the Everking (an eighteen-inch Felician with a beard-warmed paunch).

Andy watched the Everking dim and blur on his wooden throne. Swaying slightly, he muttered, "I wonder what proof this stuff is?"

"In short, Mr. Stephens," Blahrog was translating, "we cannot think of a single product which we could sell. Have you any immediate suggestions?"

Blahrog's expression indicated that he ought to say something, but Andy couldn't think of a thing, except that he didn't need any more Throatduster. "No," he said firmly, if faintly. "Thank you very much, but no." He passed out cold.

"I'm afraid the journey was too much for him," Miss Featherpenny put in.

"Ah, yes," Blahrog translated for the Everking. "Throatduster has that effect on some life forms. Perhaps he had better retire, and discuss the situation more fully tomorrow."

The Everking motioned to a pair of stout-looking guards (thirty inches tall, at least). They towed Miss Featherpenny's immediate superior out of the royal presence.

"They will show him to his room," Blahrog explained.

The Everking let loose a quick stream of Felician.

"Would you," Blahrog addressed Miss Featherpenny, "enjoy meeting my daughter? The Everking suggests it, since our affairs could hardly be of interest to you."

"I'd be very pleased." The words were not empty ones. Edith Featherpenny's education in coping with men had not extended to Felician males. Blahrog frightened her with a feeling of superior and incomprehensible intelligence.

Hrom, although seventeen inches tall and weighing perhaps eleven pounds, was definitely feminine and comprehensible.

"Why don't women drink Throatduster?" Miss Featherpenny asked, on the strength of a two-hour acquaintance.

"The men grow the grain here," Hrom explained, "and it's theirs as long as it's in the fields. However, we consider harvesting women's work. We also make the Throatduster. Then we sell it to the men. We don't drink because it is uneconomical."

"Does everyone grow his own grain?"

"Not any more. Town women have other sources of dress money. The custom started that way, that's all."

"If you'll forgive my saying so," Miss Featherpenny remarked, "that dress you are wearing must have taken a big chunk out of your pocket."

Hrom sighed. "In my mother's time, I would have thought nothing of it. Now, one such gown is all I can afford."

"I would have thought your father was one of the wealthier men on Felix II," Miss Featherpenny remarked.

"He is *the* wealthiest," Hrom said. "The richest man is always Minister of Finance. It's only reasonable." Her tone changed. "We're all poor now, since the tourist industry failed. It took every dnot we had to pay for the contract."

Invisible antennae shot from Miss Featherpenny's forehead. "You must be quite sure that Planetary Promotions won't fail you." She tried her best to sound casual.

Hrom smiled faintly. "Have another of these seed cakes," she said.

"Thank you. They are delicious." Miss Featherpenny took one, regardless of calories. "Of course, there is the guarantee clause: 'Double your money back.'"

Hrom busily fluffed a cushion. "One must have some insurance," she said, having her turn at sounding casual. "Tell me, are they wearing large or small hats on Earth this season?"

Miss Featherpenny conceded defeat. "It's all bonnets for summer," she said.

HER first impulse was to tell Andy that she thought the Felicians had bought the guarantee clause, not the contract. It died at her first sight of the morning-after Andy. The situation must be pretty desperate, she rationalized, when the wealthiest girl on the planet has only one dress. This is probably their last chance.

Andy tried to conceal his headache by being brisk and efficient. "Have you considered your natural resources?"

Blahrog, slow and shrewdly inefficient, said, "We mine soft coal. Enough for our own fires and to spare."

"No one within a hundred light-years of Felix II uses coal for fuel anymore," Andy said gently. "Do you have enough for the plastic industries?"

"We have four freighters surplus every season." Blahrog was evidently banking heavily on the coal.

Andy wondered if coal were the only surplus on Felix II. "What are you doing with your surplus at present?" he inquired tactfully, hoping that Elahrog would realize, without being told, the impossibility of supporting the population of Felix II on four freighters of soft coal.

"We store it up," was the crafty answer, "and sell it to the synthetics plants on Darius IV when the Ionian miners go on strike."

"How long since the Ionians struck?" If this economic event occurred regularly, the coal surplus could assist in meeting the Federation's requirements.

"Twenty seasons or so." Blahrog's tone was off-handed, but his eyes slid guiltily toward Andy and away again.

Andy sighed. "Any other resources?"

They went quickly through minerals, agricultural products and animal skins; established that Felicians could not teleport, levitate or read minds. They were technologically uneducated, and had no industry on the factory-system level.

"It is coal or nothing, Mr. Stephens," Blahrog said with finality. "Isn't there some way to make the Federation believe that our coal is superior to other coal, and worth more?"

"Do you, perchance, own a sizeable proportion of Felician coal reserves?"

Blahrog nodded, guilty looking again.

"Well, forget it. There isn't enough."

THE Everking, who had been holding Andy's translator to his ear in silence, burst into speech.

"His Foreverness says," Blahrog remarked cannily, "that it appears impossible for Felix II to join the Federation."

"We aren't through yet," Andy said quickly. "What about the tourist industry? If you'd allow visitors and advertise a little..."

"No," the Everking shouted, in Galactic.

"We tried that during the last reign," Blahrog said. "It didn't work."

"You're pretty far off the shipping lanes, I'll admit," Andy said, "but surely you could attract enough tourists from somewhere to show a profit."

"We showed a profit," Blahrog said morosely.

He translated a remark of the Everking's. "We made money hand over fist."

"Then why did you quit?" Andy was baffled. "Why did you restrict the planet?"

"Because of the way we happen to look."

"Like leprechauns," Miss Featherpenny explained. "And Hrom looks exactly like a little Christmas fairy."

Blahrog winced. "The tourists found us amusing. We weren't real to them. It became difficult for us to seem real to ourselves. Most of my generation couldn't grow up. The birth rate dropped. We closed the planet to keep the race alive. That's all there is to it."

"Surely," Andy protested, "if you handled it differently . . ."

"Tourists," Blahrog translated for the Everking, "are out of the question."

"I remember hearing about an intelligent life form that resembled teddy bears," Miss Featherpenny said thoughtfully. "Everybody loved them on sight."

"What happened to them?" Blahrog asked with interest.

"They became extinct."

ANDY glared at her. How could he accomplish anything with a stupid steno butting in? She looked away, guilty.

"It's such a simple solution," he said. "It fits your situation perfectly."

"That's what we thought, until we tried it," Blahrog said, grinning sidelong at Miss Featherpenny.

"If you won't try tourists," Andy snapped at both of them, "I don't see exactly what you can do."

"Maybe you didn't cover everything in the special abilities list," Miss Featherpenny suggested softly.

Andy glared at her again. "All right, Blahrog. Can you think of anything you can do that most other species can't?"

Blahrog looked at the floor and considered. "We can walk a long way without getting tired," he offered.

Andy sighed, and wrote "Endurance?" on his scratch pad. It was scarcely saleable. "Is there anything else? Anything you know how to make? Besides Throatduster."

"We make good shoes," Blahrog said hopefully. "The tourists used to buy lots of them."

"Hum," Andy cogitated. "Here we have something for which a market already exists. If we can expand the market and the production facilities . . ." He nailed Blahrog with a finger, in conscious imitation of Crumbly. "How many pairs of shoes can Felix II produce in a single season?"

"If the reserves were called in to the Cobbler's Guild, it would be almost half the manpower of the planet . . ." Blahrog paused, doing mental arithmetic. "Four and a half million pairs, more or less." He sounded as though he were surprised.

"That ought to do it," Andy said gleefully.

"But where will we find that many pairs of feet?" Blahrog asked.

"There are eight million times that many pairs of feet in the Federation," Andy said. "Leave the advertising to Planetary Promotions."

"It seems sort of poetic," Miss Featherpenny romanced. "Leprechauns are supposed to be cobblers."

Blahrog snorted.

Andy turned and addressed her from the full distance between a promoter third class and a girl from the steno pool. "Miss Fea-

therpenny, I will ask for your opinion when I want it."

Miss Featherpenny answered from her side of the gulf. "Yes, sir."

Andy had always despised rank-pullers. He turned to Blahrog. "I'll have to send the dope back to the Home Office so they can put it through the computer and send me the ad-intensity index."

Blahrog looked a polite enquiry.

"That will tell us how effective the ad campaign will have to be to make a go of this. What's the fastest way to send a message to Earth?"

"Radiogram the satellite station," Blahrog answered. "They'll relay it to the next ship within range, and the ship will relay it to the next planet it nears with the radiogram facilities to send it to Earth."

"How long will it take to get an answer?" Andy asked.

"About twelve days."

THEY didn't stare at the sky while they waited for the answer.

Blahrog called the members of the Cobbler's Guild together, and delivered a series of lectures on their importance to the future of Felix II.

Foreseeing a return to political and economic power, the reserve members dusted off their lasts and aprons and got back into practice. For the first time in nearly thirty seasons, the applications for apprenticeship were too numerous to handle. New life showed on their faces.

The Master Cobblers (including the Everking and Blahrog) worked around the clock, fabricating plastic lasts. Miss Featherpenny and Hrom dug pictures and descriptions of the various types of Galactic feet that habitually or occasionally wore shoes out of old periodicals, located by members of the newly-organized ladies' auxiliary.

Felix II was humming, if not absolutely singing, with industry and good humor. Some of it rubbed off on Andy. He relented toward Miss Featherpenny to the extent of presenting her with a pair of Felician shoes, fabricated by the Everking. They were of the sensible walking variety, and not Miss Featherpenny's style. Nevertheless, she was extremely pleased with the gift. Like all Felician shoes, they fit her perfectly.

The Everking, backed by his Debators and ministers, issued public thanks to one Andrew Stephens, restorer of hope, and propagator of economic equality. The ladies' auxiliary gave a tea in Miss Featherpenny's honor. They were both showered with gifts from a grateful and admiring populace.

The reply to the message was signed by Crumbly himself. "Forlorn hope," it said unsympathetically. "Try something else. Computer indicates ad intensity of 0.94."

An ad intensity of 0.0001 means you sell someone something he wants anyway. An intensity of 1.0 means you have to make the consumer love something he thinks he hates.

ANDY sent a young Felician on the run for Blahrog, and retired to the storeroom of Blahrog's dwelling, which housed two fair-sized plastic barrels of Throatduster.

"But you have to try," Blahrog insisted, finishing his second mug of hospitality.

"Snow good," Andy said, deep into his fifth. "Even Gray Flannel, ad man in legend, only got to 0.87. Simpossible."

Blahrog, who knew little about advertising or computers, repeated, "You must try. No member of the Cobbler's Guild has ever quit without trying."

Andy had been accepted as an apprentice of the Guild the night before.

"Dunno," he said. "Tell you simpossible."

Blahrog climbed off the barrel of Throatduster. "I'll go get Miss Featherpenny," he said. "Perhaps she can help you."

"Miss Featherpenny. Bah," Andy snorted. "What good would she be? Dumb steno." He tried to be fair. "Nice legs, I admit. But no brains."

"I'll go get Miss Featherpenny," Blahrog repeated firmly, closing the door behind him . . .

"What frame of mind is he in?" Miss Featherpenny looked uncertainly at the heavy door to Andy's store room.

"Drunk," Blahrog informed her coldly.

It takes an enormous quantity of Throatduster to intoxicate a Felician. Intoxication is therefore considered bad form.

"And belligerent," the Minister of Finance added.

"Oh, dear." Miss Featherpenny looked at the door again. "But what can I do?" she asked in a helpless voice. "I'm not a promoter."

"He said," Blahrog indicated the door, "that you were a dumb steno."

"Well!" Hrom exclaimed.

Miss Featherpenny's hackles invisibly rose. Her mouth visibly tightened. She turned away from the door.

Hrom said, "You ought to try to show him."

Miss Featherpenny looked at them, and at the surrounding examples of Felician landscape

and architecture.

"Mr. Blahrog," she said suddenly, "you don't mind looking like a leprechaun, do you? As long as you don't have to meet people?"

Blahrog's silence was more than dignified.

"What do you mean?" Hrom asked.

"You wouldn't mind if we used a picture of a Master Cobbler in the ad, would you?"

Blahrog thawed abruptly. "You have an idea?"

"If you don't mind the picture."

"He doesn't mind," Hrom said, adding in Felician, "After all, Papa, we don't have to let any ships but the freighters land."

"Go ahead, then," Blahrog consented.

"Good luck," Hrom added.

"YOU," Andy welcomed her. "Bah." He shut his eyes. Most of him was sprawled out on the floor.

"Yes, me," Miss Featherpenny agreed, repressing an inclination to kick him. She sat down on one of the kegs, and opened her stenographer's book. "I came to take down the ad for the shoes," she announced.

"What ad?" Andy moaned. "The newest, biggest, brightest ads can't get over an 0.62. How can I manage an 0.94? You're crazy." He opened his eyes. "But you do have nice legs."

"Felix II is sort of quaint," Miss Featherpenny suggested. "Why not use an old ad?"

"An idea," Andy enunciated, without hope.

"It's sort of pretty too," Miss Featherpenny nudged.

"We could use a color picture of it," Andy said, kicking thoughtfully at an overturned stool.

"The Felicians are quaint looking, too."

"Sure," Andy said. "Put a Felician in the foreground, cobbling." He tried to sit up.

"I've seen ads like that in history books," Miss Featherpenny said, exuding admiration.

"It's so old it's new," Andy said, lying down again. "Old English lettering over the top. A real cliche." He considered Miss Featherpenny's ankle. "Peaceful scenery, Felician shoes?"

"Not quite," said Miss Featherpenny.

"Quiet field, Felician shoes?"

"Nope," said Miss Featherpenny.

"You're an aggravating woman," Andy said sweetly, but you do have nice legs."

"What about Elysian fields?" Miss Featherpenny suggested.

Andy tasted it. "Elysian fields, Felician shoes." He tried to sit up again. "You got all that down?" he demanded.

"Yes," Miss Featherpenny lied. She had it in her head, but not on the steno pad.

"Then get somebody to send it off so we can find out if it's good enough. And come back soon." He wobbled on his elbow. "You do have . . ."

"I think I'd better attend to sending it personally." Miss Featherpenny opened the door. "You rest until you feel better."

Blahrog had gone, but Hrom was waiting for her. She looked more like a Christmas fairy than usual. A mischievous one.

"Did you manage?" she whispered.

"Barely." Miss Featherpenny looked grim.

"Drink this," Hrom ordered, holding out a mug of Throat-duster.

Miss Featherpenny was surprised. "I thought ladies didn't drink on Felix II."

"There are," Hrom said, "exceptions."

THE next twelve days of waiting for computer results were not as hopefully active as the first twelve. The Felicians finished setting up their manufacturing and storing systems, but they didn't start making shoes. The cattle drovers forbore to slaughter the beasts who provided the leather.

The Everking and his Debaters all developed severe cases of beard-itch, a Felician nervous disorder. Since it is even more unseemly to scratch on Felix II than it is on Earth, they retired temporarily from public life.

Andy also retired from public life, biting his fingernails, an Earther nervous disorder. Blahrog joined him in the illness, which was new to Felicians. By the time the answer from Planetary Promotions came it was the most fashionable habit on the planet, in spite of the fact that Felicians have extremely tough nails, and a pair of bony ridges rather than true teeth.

The second message was also direct from Crumbly. It read: "Computer rates ad campaign at intensity 0.942. P. P. in action by the time you receive this. Stephens ordered back to Home Office; promoted to first class."

Four Earth months later, Miss Featherpenny entered Andy's ten by twelve office, her high heels clicking on the plastic tiles, and laid a memorandum on the new steel desk.

"They've been admitted," she announced.

"What? Who?" Andy said irritably. There were times when he thought her position as his private secretary had gone to her head.

"Felix II has been admitted to the Federation. The contract has

been fulfilled." She smiled brightly. "Shall I mark the file closed?"

"Can't yet," Andy said. "Felix II won't be a permanent member of the Federation until they've been self-surporting for ten years."

"Why?" asked Miss Featherpenny.

"It's a precautionary measure," Andy began to explain. "Oh, let's go get some lunch and forget Felix II."

"Yes, Mr. Stephens," Miss Featherpenny said meekly.

He followed her out the door, admiring the effect of her glastic skirt. She did have nice legs . . .

THREE years later, Edith Featherpenny was forced to remember Felix II. There was a communication on her mock-baroque desk. Felician shoes weren't selling. Felix II wasn't making enough money. The Galactic Federation was threatening to take steps.

She glanced at the impressive door to the inner office. Andy, she knew, was engaged in reading a letter from his brother Lloyd, who had just been promoted to vice-president of Universal Products.

She judiciously forged his initials on an order to put data on the Felix II failure through the computer.

In an hour and a half she had the answer. The Felicians hadn't changed the styles, and their shoes didn't wear out. Everybody had a pair.

She considered the door again. There was really little sense in disturbing Andy over such a simple matter. She forged his name on a message to Blahrog. "Change the styles of your shoes."

She then picked up some carefully selected problem sheets from the top of the filing cabinet, and went through the impressive door.

The next morning, Blahrog's answer was on her desk.

"Felician shoes are of the cut most suited to the feet that wear them. To change them would be both foolish and unethical."

It was a good thing, Miss Featherpenny thought, that Andy was feeling better today. She went into his office, padding softly over the carpet to his contemporary prestwood desk.

"Good morning, Edie," Andy said cheerfully. "What happened? Lightning strike you?"

"Practically," Miss Featherpenny said. "It's Felix II again." She handed over the sheaf of papers.

"Why didn't you tell me about this yesterday?" Andy muttered, reading them.

"I thought I could handle it." Miss Featherpenny made a face.

"Until I got that answer this morning."

"It sounds like typical Felician thinking," Andy said. "There's no sense trying to argue by mail." He sighed. "You'd better reserve a first-class passage for me on the first ship out."

"Can't I go?" Miss Featherpenny asked.

"Who'd run the office?"

"The stenos can stack stuff until we get back." Miss Featherpenny looked wistful. "I was in on the beginning of it. I want to see it through. Besides, I'd like to see Hrom again."

"Oh, all right," Andy agreed. "Make it two first class."

BLAHROG was waiting on the long porch of the space port dining room.

"Have a nice trip?" he asked.

"What's all this about not changing the shoe styles?" Andy countered.

"As I told you in the message," Blahrog said impatiently, "We make our shoes in the best possible shapes for the feet that will wear them. There isn't any good reason to change them."

"You can't sell people two pairs of identical shoes," Andy insisted.

"You might be able to sell them if you changed them," Miss Featherpenny added, sounding reasonable.

"Save your arguments for the Everking," Blahrog said. "Come on to the car."

"Car?" Miss Featherpenny exclaimed. "The Everking's?"

"No, mine." Blahrog couldn't keep the pride out of his voice. "There are nearly two hundred cars on Felix II."

Andy went over the same ground in the presence of the Everking. It didn't help. The Everking, his minister and his Debators were solidly against changing the shoes. The ethics of the Cobblers' Guild were involved.

"If you won't follow Planetary Promotions' advice," he said at last, "the company can't be responsible for the outcome." He glared at the assembly. "In other words, the guarantee clause is cancelled."

There was an indignant and concerned buzz from the audience. Blahrog got up.

"Your Foreverness," he said, "honorable members of the government, Mr. Stephens. Three Earth years ago, Felix II gathered together all the money the government could find, and bought a contract with Planetary Promotions." He paused and shuffled his feet. "We did not expect the contract to be fulfilled. We needed money, and two for one would keep us going while we attempted to educate the young to be immune to the tourists. Of

course, if Planetary Promotions found a way for us to be self-surporting without tourists, we would be equally pleased."

"I thought so," Miss Featherpenny murmured.

"Really," Andy said. "Why didn't you let me in on it?"

Blahrog cleared his throat to indicate that he wasn't through. "Since a way was found," he continued, "Felician self respect and content has increased along with Felician prosperity." He glanced uneasily at Andy. "We would like to continue as we are going."

"Unless you change the styles," Andy said flatly, "that is impossible."

MISS Featherpenny, realizing that they were starting over the same ground, slipped out the door and walked over to visit Hrom.

"So Papa admitted it," Hrom said, after Miss Featherpenny had admired the baby, and been shown over the house. "I almost told you myself, when I first met you."

"You told me enough to let me guess the rest," Miss Featherpenny said.

"Have some olgan seed cakes," Hrom offered. "Why didn't you tell Mr. Stephens?"

Miss Featherpenny took a cake. "Partly because of his almighty attitude, and partly because I was on your . . . Ow!" She clapped a hand hastily to her jaw.

"What's wrong?" Hrom asked, alarmed.

"Broke a tooth," Miss Featherpenny muttered, her face contorted.

"Does it hurt much?" Hrom's question was part sympathy and part curiosity.

Miss Featherpenny nodded. "I'll have to find a dentist right away."

"What's a dentist?"

"Man who fixes your teeth."

"But we don't have teeth," Hrom said.

"I forgot," Miss Featherpenny moaned. "Oh, Lord, I guess I'll have to go all the way back to Earth."

Hrom shook her head. "There are a lot of Earthers living on Darius IV. They must have a dentist. There's a ship every morning."

"Fine," Miss Featherpenny gasped.

"Can I get you something for the pain? Would an aspirtran help?"

"I'd better have two. Thanks."

"Here. Take the bottle with you." Hrom was frowning worriedly. "My, I'm glad we don't have teeth."

"I'll have to tell Andy—Mr. Stephens—that I'm leaving."

Inspiration dawned on Hrom's face. "I've hardly been out of the house since the baby was born. I'll leave him with my husband's mother and go with you."

"I'd be glad of the company," Miss Featherpenny admitted.

"Good. I'll find out what time the ship leaves, and tell Mother Klagom about the treat she's got coming. You go tell Mr. Stephens and then come back here for the night."

Miss Featherpenny heard them shouting before she opened the council chamber door.

"I suggest," Andy was saying, "that you either change the styles or go back to the tourist business."

She pushed the door open.

"Mr. Stephens," Blahrog said mildly, "the last time calamity was upon us, you solved the problem by drinking Throatduster until you got an idea. May I suggest that you try again?"

"Andy," Miss Featherpenny whispered.

"Well?" he snapped.

"I broke a tooth. I'm going over to Darius IV tomorrow, with Hrom, to have it fixed."

"Why Darius IV?" Andy demanded. "What's the matter with Felician dentists?"

"What's Hrom going to do with boy?" Blahrog demanded.

"Hrom's leaving the baby with Mrs. Klagom," Miss Featherpenny answered, "and there aren't any Felician dentists."

"Mrs. Klagom is a silly woman," Blahrog disapproved. "She would do better to leave him with me."

"If you must, I suppose you must," Andy admitted grudgingly. "Where are you going now?"

"Back to Hrom's house to lie down."

"Tell her I'll mind the baby," Blahrog called after her.

As she closed the door, she heard Andy say, "Gentlemen, if you'll supply the Throatduster, I'll give it a try."

"IT'S awfully quiet," Hrom said doubtfully, looking around at the Felician spaceport. "Look at the tannery chimneys. No smoke."

Miss Featherpenny, her mouth in good repair, glanced into the bar as they passed it. "Only two shippers," she said. "There are usually dozens."

"They must have stopped production entirely," Hrom said.

"Maybe Andy thought of something."

"I wonder if Papa brought the car down for us."

He hadn't. They walked into town.

Blahrog was in conference with the Everking.

"I'd better wait for him," Miss Featherpenny said. "I want to find out what's going on before I talk to Andy."

"I'd better rescue Mother Klagom from the baby."

Blahrog was as long-winded as usual.

"Where is Mr. Stephens?" Miss Featherpenny demanded, as soon as she saw him coming down the hall.

"In his old store-room," Blahrog said moodily. "He's quite drunk, I believe, but he doesn't seem to be getting any ideas."

"Then why did you stop cobbling?"

Blahrog did a Felician shrug. "We're waiting to see what happens. There's no sense making shoes any more if they aren't wanted."

"I have to talk to him," Miss Featherpenny said.

"Do you have an idea?"

"No," Miss Featherpenny lied. "But you'd let him drink himself to death, if he didn't think of anything."

"You want a lift in the car?" Blahrog asked, uninsulted.

"I'd be pleased, if you don't mind. I just walked in from the port."

ANDY was not, as Blahrog had suggested, very drunk. He was only hung over. "Get your tooth fixed?" he asked cheerlessly.

"Yes."

"Good dentist?"

Miss Featherpenny nodded. "He had some entirely new equipment. Extremely powerful, and quite precise."

"Oh?" Andy straightened in the old arm chair. "I've been trying to think. And drinking Throatduster isn't working this time." He paused to reconsider. "Except that it makes me drunk. Everything keeps getting fuzzy, and my head is wider than my shoulders."

"The dentist said," Miss Featherpenny persisted, "that he could pull a whale's tooth as easily and smoothly as he pulled mine."

"You had to have it pulled? Too bad." Andy made a face at the full mug of Throatduster on the barrel beside him. "The Felicians won't change their minds about the shoes, and they won't try tourists again. I can't think of anything else. And they can claim the guarantee. I was bluffing."

"I know," Miss Featherpenny said. She tried again. "The dentist claims even the tiniest species could do dental work on the biggest species." She paused, hoping it would sink in. "Providing the tiny species had sufficient dexterity."

"Blasted Felicians," Andy muttered. "Stubborn little pigs."

"That's part of their trouble, I think," Miss Featherpenny said. "Being little, I mean. But it doesn't always work against them. When they're doing delicate work . . ."

"Like those shoes," Andy agreed. "'Best possible shapes already,'" he imitated Blahrog.

"They're one of the smallest intelligent species," Miss Featherpenny said in desperation. "And their manual dexterity rating is one of the highest. Why, a Felician could get both hands inside an Earther's mouth."

"And steal his fillings . . ." Andy started. "Wait a minute. You've given me an idea."

Miss Featherpenny breathed relief. "I have? What is it?"

"Dentists! They can all be dentists."

"All?"

"Well, enough of them to provide for the planet's income."

"Why, that's marvelous," Miss Featherpenny said. "It won't matter that other species think they're cute. Everybody takes dentists seriously."

"Their appearance will work for them," Andy said. "Think of children's dentistry."

"Let's go tell them right away," Miss Featherpenny said, feeling like a Bobbsey twin.

Andy swayed upward.

"Sit still," Miss Featherpenny commanded "I'll bring you some coffee."

BLAHROG accepted the suggestion with Felician phlegm and ministerial greed. "We'll have to change the tax system, since most of our working population will be living off-planet."

"Maybe you could work out a rotation system, Papa." Hrom had sneaked into the council chamber.

"Wait a minute," Andy said uneasily. "How are you going to educate these dentists?"

Blahrog stopped and thought. "We'll use the hotels for schools," he said slowly. His face wrinkled with sly pleasure. "And we can sell the coal surplus to pay teachers and buy equipment."

The Everking made a wicked-sounding comment in Felician.

The entire assembly burst into loud, beard-wagging laughter. It had a nasty ring to it.

"What did he say?" Andy demanded.

"He said," Hrom giggled, "'Let them try to treat us like stuffed toys now.'"

"Disgusting," said Miss Featherpenny.

"Indecent, Edie," Andy agreed. "But never mind. Let's go home and get married."

"You're a little sudden."

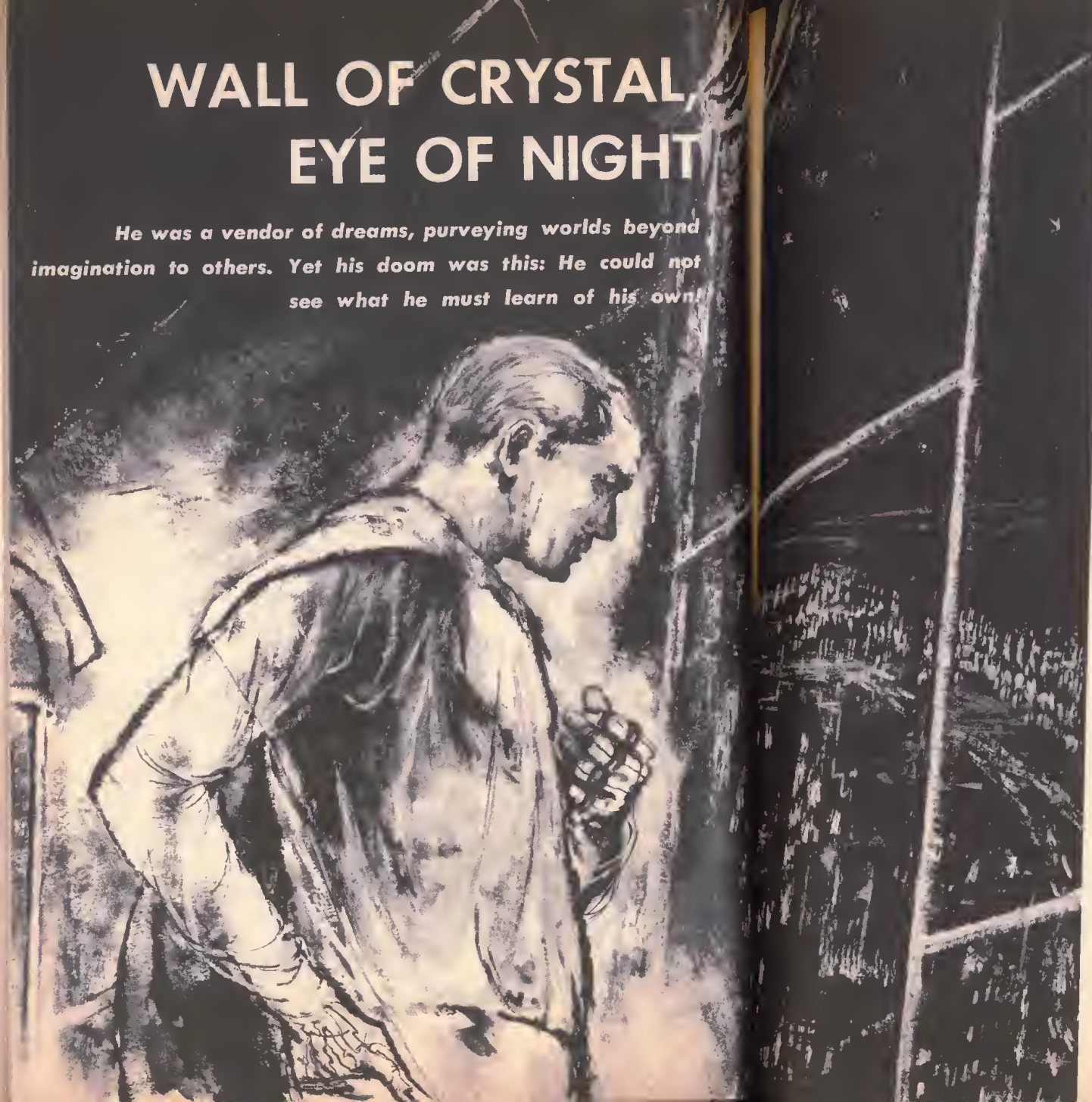
Andy grinned. "I'll have a raise coming for this, and I'd like to keep you in the family. I can't seem to think unless you're around."

"Took you long enough to notice," said Miss Featherpenny. But she didn't say it out loud.

— JOY LEACHE

WALL OF CRYSTAL, EYE OF NIGHT

He was a vendor of dreams, purveying worlds beyond imagination to others. Yet his doom was this: He could not see what he must learn of his own!



By ALGIS BUDRYS
Illustrated by DICK FRANCIS

SOFT AS the voice of a mourning dove, the telephone sounded at Rufus Sollenar's desk. Sollenar himself was standing fifty paces away, his leonine head cocked, his hands flat in his hip pockets, watching the nighted world through the crystal wall that faced out over Manhattan Island. The window was so high that some of what he saw was dimmed by low cloud hovering over the rivers. Above him were stars; below him the city was traced out in light and brimming with light. A falling star — an interplanetary rocket — streaked down toward Long Island Facility like a scratch across the soot on the doors of Hell.

Sollenar's eyes took it in, but he was watching the total scene, not any particular part of it. His eyes were shining.

When he heard the telephone, he raised his left hand to his lips. "Yes?" The hand glittered with utilijem rings; the effect was that of an attempt at the sort of copper-binding that was once used to reinforce the ribbing of wooden warships.

His personal receptionist's voice moved from the air near his desk to the air near his ear. Seated at the monitor board in

her office, wherever in this building her office was, the receptionist told him:

"Mr. Ermine says he has an appointment."

"No." Sollenar dropped his hand and returned to his panorama. When he had been twenty years younger — managing the modest optical factory that had provided the support of three generations of Sollenars — he had very much wanted to be able to stand in a place like this, and feel as he imagined men felt in such circumstances. But he felt unimaginable, now.

To be here was one thing. To have almost lost the right, and regained it at the last moment, was another. Now he knew that not only could he be here today but that tomorrow, and tomorrow, he could still be here. He had won. His gamble had given him EmpaVid—and EmpaVid would give him all.

The city was not merely a prize set down before his eyes. It was a dynamic system he had proved he could manipulate. He and the city were one. It buoyed and sustained him; it supported him, here in the air, with stars above and light-thickened mist below.

The telephone mourned: "Mr. Ermine states he has a firm appointment."

"I've never heard of him." And the left hand's utilijems fell from Sollenar's lips again. He enjoyed such toys. He raised his right hand, sheathed in insubstantial midnight-blue silk in which the silver threads of metallic wiring ran subtly toward the fingertips. He raised the hand, and touched two fingers together: music began to play behind and before him. He made contact between another combination of finger circuits, and a soft, feminine laugh came from the terrace at the other side of the room, where connecting doors had opened. He moved toward it. One layer of translucent drapery remained across the doorway, billowing lightly in the breeze from the terrace. Through it, he saw the taboret with its candle lit; the iced wine in the stand beside it; the two fragile chairs; Bess Allardyce, slender and regal, waiting in one of them — all these, through the misty curtain, like either the beginning or the end of a dream.

"Mr. Ermine reminds you the appointment was made for him at the Annual Business Dinner of the International Association of Broadcasters, in 1998."

Sollenar completed his latest step, then stopped. He frowned down at his left hand. "Is Mr. Ermine with the IAB's Special Public Relations Office?"

"Yes," the voice said after a pause.

The fingers of Sollenar's right hand shrank into a cone. The connecting door closed. The girl disappeared. The music stopped. "All right. You can tell Mr. Ermine to come up." Sollenar went to sit behind his desk.

THE office door chimed. Sollenar crooked a finger of his left hand, and the door opened. With another gesture, he kindled the overhead lights near the door and sat in shadow as Mr. Ermine came in.

Ermine was dressed in rust-colored garments. His figure was spare, and his hands were empty. His face was round and soft, with long dark sideburns. His scalp was bald. He stood just inside Sollenar's office and said: "I would like some light to see you by, Mr. Sollenar."

Sollenar crooked his little finger.

The overhead lights came to soft light all over the office. The crystal wall became a mirror, with only the strongest city lights glimmering through it. "I only wanted to see you first," said Sollenar; "I thought perhaps we'd met before."

"No," Ermine said, walking across the office. "It's not likely you've ever seen me." He took a card case out of his pocket and showed Sollenar proper identification. "I'm not a very forward person."

"Please sit down," Sollenar said. "What may I do for you?"

"At the moment, Mr. Sollenar, I'm doing something for you."

Sollenar sat back in his chair. "Are you? Are you, now?" He frowned at Ermine. "When I became a party to the By-Laws passed at the '98 Dinner, I thought a Special Public Relations Office would make a valuable asset to the organization. Consequently, I voted for it, and for the powers it was given. But I never expected to have any personal dealings with it. I barely remembered you people had carte blanche with any IAB member."

"Well, of course, it's been a while since '98," Ermine said. "I imagine some legends have grown up around us. Industry gossip — that sort of thing."

"Yes."

"But we don't restrict ourselves to an enforcement function, Mr. Sollenar. You haven't broken any By-Laws, to our knowledge."

"Or mine. But nobody feels one hundred per cent secure. Not under these circumstances." Nor did Sollenar yet relax his face into its magnificent smile. "I'm sure you've found that out."

"I have a somewhat less ambitious older brother who's with the Federal Bureau of Investigation. When I embarked on my own career, he told me I could expect everyone in the world to react

like a criminal, yes," Ermine said, paying no attention to Sollenar's involuntary blink. "It's one of the complicating factors in a profession like my brother's, or mine. But I'm here to advise you, Mr. Sollenar. Only that."

"In what matter, Mr. Ermine?"

"Well, your corporation recently came into control of the patents for a new video system. I understand that this in effect makes your corporation the licensor for an extremely valuable sales and entertainment medium. Fantastically valuable."

"EMPAVID," Sollenar agreed. "Various subliminal stimuli are broadcast with and keyed to the overt subject matter. The home receiving unit contains feedback sensors which determine the viewer's reaction to these stimuli, and intensify some while playing down others in order to create complete emotional rapport between the viewer and the subject matter. EmpaVid, in other words, is a system for orchestrating the viewer's emotions. The home unit is self-contained, semi-portable and not significantly bulkier than the standard TV receiver. EmpaVid is compatible with standard TV receivers — except, of course, that the subject matter seems thin and vaguely unsatisfactory on a standard receiver. So the consumer shortly purchases an EV unit." It pleased Sollenar to spell out the nature of his prize.

"At a very reasonable price. Quite so, Mr. Sollenar. But you had several difficulties in finding potential licensees for this system, among the networks."

Sollenar's lips pinched out.

Mr. Ermine raised one finger. "First, there was the matter of acquiring the patents from the original inventor, who was also approached by Cortwright Burr."

"Yes, he was," Sollenar said in a completely new voice.

"Competition between Mr. Burr and yourself is long-standing and intense."

"Quite intense," Sollenar said, looking directly ahead of him at the one blank wall of the office. Burr's offices were several blocks downtown, in that direction.

"Well, I have no wish to enlarge on that point, Mr. Burr being an IAB member in standing as good as yours, Mr. Sollenar. There was, in any case, a further difficulty in licensing EV, due to the very heavy cost involved in equipping broadcasting stations and network relay equipment for this sort of transmission."

"Yes, there was."

"Ultimately, however, you succeeded. You pointed out, quite rightly, that if just one station made the change, and if just a few EV receivers were put into public places within the area served by that station, normal TV outlets could not possibly compete for advertising revenue."

"Yes."

"And so your last difficulties were resolved a few days ago, when your EmpaVid Unlimited — pardon me; when EmpaVid, a subsidiary of the Sollenar Corporation — became a major stockholder in the Transworld TV Network."

"I DON'T understand, Mr. Ermine," Sollenar said. "Why are you recounting this? Are you trying to demonstrate the power of your knowledge? All these transactions are already matters of record in the IAB confidential files, in accordance with the By-Laws."

Ermine held up another finger. "You're forgetting I'm only here to advise you. I have two things to say. They are:

"These transactions are on file with the IAB because they involve a great number of IAB members, and an increasingly large amount of capital. Also, Transworld's exclusivity, under the IAB By-Laws, will hold good only until thirty-three per cent market saturation has been reached. If EV is as good as it looks, that will be quite soon. After that, under the By-Laws, Transworld will be restrained from making effective defenses against patent infringement by competitors. Then all of the IAB's membership and much of their capital will be involved with EV. Much of that capital is already in anticipatory motion. So a highly complex structure now ultimately depends on the integrity of the Sollenar Corporation. If Sollenar stock falls in value, not just you but many IAB members will be greatly embarrassed. Which is another way of saying EV must succeed."

"I know all that! What of it? There's no risk. I've had every related patent on Earth checked. There will be no catastrophic obsolescence of the EV system."

Ermine said: "There are engineers on Mars. Martian engineers. They're a dying race, but no one knows what they can still do."

Sollenar raised his massive head.

Ermine said: "Late this evening, my office learned that Cortwright Burr has been in close consultation with the Martians for several weeks. They have made some sort of machine for him. He was on the flight that landed at the Facility a few moments ago."

Sollenar's fists clenched. The lights crashed off and on, and the room wailed. From the terrace came a startled cry, and a sound of smashed glass.

Mr. Ermine nodded, excused himself and left.

— A few moments later, Mr. Ermine stepped out at the pedestrian level of the Sollenar Building. He strolled through the landscaped garden, and across the frothing brook toward the central walkway down the Avenue. He paused at a hedge to pluck a blossom and inhale its odor. He walked away, holding it in his naked fingers.

II

DRIFTING slowly on the thread of his spinneret, Rufus Sollenar came gliding down the wind above Cortwright Burr's building.

The building, like a spider, touched the ground at only the points of its legs. It held its wide, low bulk spread like a parasol over several downtown blocks. Sollenar, manipulating the helium-filled plastic drifter far above him, steered himself with jets of compressed gas from plastic bottles in the drifter's structure.

Only Sollenar himself, in all this system, was not effectively transparent to the municipal antiplane radar. And he himself was wrapped in long, fluttering streamers of dull black, metallic sheeting. To the eye, he was amorphous and non-reflective. To electronic sensors, he was a drift of static much like a sheet of foil picked by the wind from some careless trash heap. To all of the senses of all interested parties he was hardly there at all — and, thus, in an excellent position for murder.

He fluttered against Burr's window. There was the man, crouched over his desk. What was that in his hands — a pomander?

Sollenar clipped his harness to the edges of the cornice. Swayed out against it, his sponge-soled boots pressed to the glass, he touched his left hand to the window and described a circle. He pushed; there was a thud on the carpeting in Burr's office, and now there was no barrier to Sollenar. Doubling his knees against his chest, he catapulted forward, the riot pistol in his right hand. He stumbled and fell to his knees, but the gun was up.

Burr jolted up behind his desk. The little sphere of orange-gold metal, streaked with darker bronze, its surface vermicular with encrustations, was still in his hands. "Him!" Burr cried out as Sollenar fired.

Gasping, Sollenar watched the charge strike Burr. It threw his torso backward faster than his limbs and head could follow without dangling. The choked-down pistol was nearly silent. Burr crashed backward to end, transfixed, against the wall.

PALE and sick, Sollenar moved to take the golden ball. He wondered where Shakespeare could have seen an example such as this, to know an old man could have so much blood in him.

Burr held the prize out to him. Staring with eyes distended by hydrostatic pressure, his clothing raddled and his torso grinding its broken bones, Burr stalked away from the wall and moved as if to embrace Sollenar. It was queer, but he was not dead.

Shuddering, Sollenar fired again.

Again Burr was thrown back. The ball spun from his splayed fingers as he once more marked the wall with his body.

Pomander, orange, whatever — it looked valuable.

Sollenar ran after the rolling ball. And Burr moved to intercept him, nearly faceless, hunched under a great invisible weight that slowly yielded as his back groaned.

Sollenar took a single backward step.

Burr took a step toward him. The golden ball lay in a far corner. Sollenar raised the pistol despairingly and fired again. Burr tripped backward on tiptoe, his arms like windmills, and fell atop the prize.

Tears ran down Sollenar's cheeks. He pushed one foot forward . . . and Burr, in his corner, lifted his head and began to gather his body for the effort of rising.

Sollenar retreated to the window, the pistol sledging backward against his wrist and elbow as he fired the remaining shots in the magazine.

Panting, he climbed up into the window frame and clipped the harness to his body, craning to look over his shoulder . . . as Burr — shredded; leaking blood and worse than blood — advanced across the office.

He cast off his holds on the window frame and clumsily worked the drifter controls. Far above him, volatile ballast spilled out and dispersed in the air long before it touched ground. Sollenar rose, sobbing —

And Burr stood in the window, his shattered hands on the edges of the cut circle, raising his distended eyes steadily to watch Sollenar in flight across the enigmatic sky.

WHERE he landed, on the roof of a building in his possession, Sollenar had a disposal unit for his gun and his other trappings. He deferred for a time the question of why Burr had failed at once to die. Empty-handed, he returned uptown.

He entered his office, called and told his attorneys the exact times of departure and return and

knew the question of dealing with municipal authorities was thereby resolved. That was simple enough, with no witnesses to complicate the matter. He began to wish he hadn't been so irresolute as to leave Burr without the thing he was after. Surely, if the pistol hadn't killed the man — an old man, with thin limbs and spotted skin — he could have wrestled that thin-limbed, bloody old man aside — that spotted old man — and dragged himself and his prize back to the window, for all that the old man would have clung to him, and clutched at his legs, and fumbled for a handhold on his somber disguise of wrappings — that broken, immortal old man.

Sollenar raised his hand. The great window to the city grew opaque.

Bess Allardyce knocked softly on the door from the terrace. He would have thought she'd returned to her own apartments many hours ago. Tortuously pleased, he opened the door and smiled at her, feeling the dried tears crack on the skin of his cheeks.

He took her proffered hands. "You waited for me," he sighed. "A long time for anyone as beautiful as you to wait."

She smiled back at him. "Let's go out and look at the stars."

"Isn't it chilly?"

"I made spiced hot cider for us. We can sip it and think."

He let her draw him out onto the terrace. He leaned on the parapet, his arm around her pulsing waist, his cape drawn around both their shoulders.

"Bess, I won't ask if you'd stay with me no matter what the circumstances. But it might be a time will come when I couldn't bear to live in this city. What about that?"

"I don't know," she answered honestly.

And Cortwright Burr put his hand up over the edge of the parapet, between them.

SOLLENAR stared down at the straining knuckles, holding the entire weight of the man dangling against the sheer face of the building. There was a sliding, rustling noise, and the other hand came up, searched blindly for a hold and found it, hooked over the stone. The fingers tensed and rose, their tips flattening at the pressure as Burr tried to pull his head and shoulders up to the level of the parapet.

Bess breathed: "Oh, look at them! He must have torn them terribly climbing up!" Then she pulled away from Sollenar and stood staring at him, her hand to her mouth. "But he *couldn't* have climbed! We're so high!"

Sollenar beat at the hands with the heels of his palms, using the direct, trained blows he had learned at his athletic club.

Bone splintered against the stone. When the knuckles were broken the hands instantaneously disappeared, leaving only streaks behind them. Sollenar looked over the parapet. A bundle shrank from sight, silhouetted against the lights of the pedestrian level and the Avenue. It contracted to a pinpoint. Then, when it reached the brook and water flew in all directions, it disappeared in a final sunburst, endowed with glory by the many lights which found momentary reflection down there.

"Bess, leave me! Leave me, please!" Rufus Sollenar cried out.

III

RUFUS Sollenar paced his office, his hands held safely still in front of him, their fingers spread and rigid.

The telephone sounded, and his secretary said to him: "Mr. Sollenar, you are ten minutes from being late at the TTV Executives' Ball. This is a First Class obligation."

Sollenar laughed. "I thought it was, when I originally classified it."

"Are you now planning to renege, Mr. Sollenar?" the secretary inquired politely.

Certainly, Sollenar thought. He could as easily renege on the Ball as a king could on his coronation.

"Burr, you scum, what have you done to me?" he asked the air, and the telephone said: "Beg pardon?"

"Tell my valet," Sollenar said. "I'm going." He dismissed the phone. His hands cupped in front of his chest. A firm grip on emptiness might be stronger than any prize in a broken hand.

Carrying in his chest something he refused to admit was terror, Sollenar made ready for the Ball.

But only a few moments after the first dance set had ended. Malcolm Levier of the local TTV station executive staff looked over Sollenar's shoulder and remarked:

"Oh, there's Cort Burr, dressed like a gallows bird."

Sollenar, glittering in the costume of the Medici, did not turn his head. "Is he? What would he want here?"

Levier's eyebrows arched. "He holds a little stock. He has entree. But he's late." Levier's lips quirked. "It must have taken him some time to get that makeup on."

"Not in good taste, is it?"

"Look for yourself."

"Oh, I'll do better than that," Sollenar said. "I'll go and talk to him a while. Excuse me, Levier." And only then did he turn around, already started on his first pace toward the man.

BUT Cortwright Burr was only a pasteboard imitation of himself as Sollenar had come to know him. He stood to one side of the doorway, dressed in black and crimson robes, with black leather gauntlets on his hands, carrying a staff of weathered, natural wood. His face was shadowed by a sackcloth hood, the eyes well hidden. His face was powdered gray, and some blend of livid colors hollowed his cheeks. He stood motionless as Sollenar came up to him.

As he had crossed the floor, each step regular, the eyes of bystanders had followed Sollenar, until, anticipating his course, they found Burr waiting. The noise level of the Ball shrank perceptibly, for the lesser revelers who chanced to be present were sustaining it all alone. The people who really mattered here were silent and watchful.

The thought was that Burr, defeated in business, had come here in some insane reproach to his adversary, in this lugubrious, distasteful clothing. Why, he looked like a corpse. Or worse.

The question was, what would Sollenar say to him? The wish was that Burr would take himself away, back to his estates or to some other city. New York was no longer for Cortwright Burr. But what would Sollenar say to him now, to drive him back to where he hadn't the grace to go willingly?

"Cortwright," Sollenar said in a voice confined to the two of them. "So your Martian immortality works."

Burr said nothing.

"You got that in addition, didn't you? You knew how I'd react. You knew you'd need protection. Paid the Martians to make you physically invulnerable? It's a good system. Very impressive. Who would have thought the Martians knew so much? But who here is going to pay attention to you now? Get out of town, Cortwright. You're past your chance. You're dead as far as these people are concerned — all you have left is your skin."

Burr reached up and surreptitiously lifted a corner of his fleshed mask. And there he was, under it. The hood retreated an inch, and the light reached his eyes; and Sollenar had been wrong, Burr had less left than he thought.

"Oh, no, no, Cortwright," Sollenar said softly. "No, you're right — I can't stand up to that."

He turned and bowed to the assembled company. "Good night!" he cried, and walked out of the ballroom.

Someone followed him down the corridor to the elevators. Sollenar did not look behind him.

"I have another appointment

with you now," Ermine said at his elbow.

THEY reached the pedestrian level. Sollenar said: "There's a cafe. We can talk there."

"Too public, Mr. Sollenar. Let's simply stroll and converse." Ermine lightly took his arm and guided him along the walkway. Sollenar noticed then that Ermine was costumed so cunningly that no one could have guessed the appearance of the man.

"Very well," Sollenar said.

"Of course."

They walked together, casually. Ermine said: "Burr's driving you to your death. Is it because you tried to kill him earlier? Did you get his Martian secret?"

Sollenar shook his head.

"You didn't get it." Ermine sighed. "That's unfortunate. I'll have to take steps."

"Under the By-Laws," Sollenar said, "I cry *laissez faire*."

Ermine looked up, his eyes twinkling. "*Laissez faire?* Mr. Sollenar, do you have any idea how many of our members are involved in your fortunes? *They* will cry *laissez faire*, Mr. Sollenar, but clearly you persist in dragging them down with you. No, sir, Mr. Sollenar, my office now forwards an immediate recommendation to the Technical Advisory Committee of the IAB that Mr. Burr probably has a system superior to yours, and that stock in Sollenar, Incorporated, had best be disposed of."

"There's a bench," Sollenar said. "Let's sit down."

"As you wish." Ermine moved beside Sollenar to the bench, but remained standing.

"What is it, Mr. Sollenar?"

"I want your help. You advised me on what Burr had. It's still in his office building, somewhere. You have resoures. We can get it."

"*Laissez faire*, Mr. Sollenar. I visited you in an advisory capacity. I can do no more."

"For a partnership in my affairs could you do more?"

"Money?" Ermine tittered. "For me? Do you know the conditions of my employment?"

IF HE had thought, Sollenar would have remembered. He reached out tentatively. Ermine anticipated him.

Ermine bared his left arm and sank his teeth into it. He displayed the arm. There was no quiver of pain in voice or stance. "It's not a legend, Mr. Sollenar. It's quite true. We of our office must spend a year, after the nerve surgery, learning to walk without the feel of our feet, to handle objects without crushing them or letting them slip, or damaging ourselves. Our mundane pleasures are auditory, olfactory, and visual. Easily gratified at little expense. Our dreams are totally interior, Mr. Sollenar. The operation is irreversible. What would you buy for me with your money?"

"What would I buy for myself?" Sollenar's head sank down between his shoulders.

Ermine bent over him. "Your despair is your own, Mr. Sollenar. I have official business with you."

He lifted Sollenar's chin with a forefinger. "I judge physical interference to be unwarranted at this time. But matters must remain so that the IAB members involved with you can recover the value of their investments in EV. Is that perfectly clear, Mr. Sollenar? You are hereby enjoined under the By-Laws, as enforced by the Special Public Relations Office." He glanced at his watch. "Notice was served at 1:27 AM, City time."

"1:27," Sollenar said. "City time." He sprang to his feet and raced down a companionway to the taxi level.

Mr. Ermine watched him quizzically.

He opened his costume, took out his omnipresent medical kit, and sprayed coagulant over the wound in his forearm. Replacing the kit, he adjusted his clothing and strolled down the same companionway Sollenar had run. He raised an arm, and a taxi flittered down beside him. He showed the driver a card, and the cab lifted off with him, its lights glaring in a Priority pattern, far faster than Sollenar's ordinary legal limit allowed.

IV

LONG Island Facility vaulted at the stars in great kangaroo-leaps of arch and cantilever span, jeweled in glass and metal as if the entire port were a mechanism for navigating interplanetary space. Rufus Sollenar paced its esplanades, measuring his steps, holding his arms still, for the short time until he could board the Mars rocket.

Erect and majestic, he took a place in the lounge and carefully sipped liqueur, once the liner had boosted away from Earth and coupled in its Faraday main drives.

Mr. Ermine settled into the place beside him.

Sollenar looked over at him calmly. "I thought so."

Ermine nodded. "Of course you did. But I didn't almost miss you. I was here ahead of you. I have no objection to your going to Mars, Mr. Sollenar. *Laissez faire*. Provided I can go along."

"Well," Rufus Sollenar said. "Liqueur?" He gestured with his glass.

Ermine shook his head. "No, thank you," he said delicately.

Sollenar said: "Even your tongue?"

"Of course my tongue, Mr. Sollenar. I taste nothing. I touch nothing." Ermine smiled. "But I feel no pressure."

"All right, then," Rufus Sollenar said crisply. "We have several hours to landing time. You sit and dream your interior dreams, and I'll dream mine." He faced around in his chair and folded his arms across his chest.

"Mr. Sollenar," Ermine said gently.

"Yes?"

"I am once again with you by appointment as provided under the By-Laws."

"State your business, Mr. Ermine."

"You are not permitted to lie in an unknown grave, Mr. Sollenar. Insurance policies on your life have been taken out at a high premium rate. The IAB members concerned cannot wait the statutory seven years to have you declared dead. Do what you will, Mr. Sollenar, but I must take care I witness your death. From now on, I am with you wherever you go."

Sollenar smiled. "I don't intend to die. Why should I die, Mr. Ermine?"

"I have no idea, Mr. Sollenar. But I know Cortwright Burr's character. And isn't that he, seated there in the corner? The light is poor, but I think he's recognizable."

Across the lounge, Burr raised his head and looked into Sollenar's eyes. He raised a hand near his face, perhaps merely to signify greeting. Rufus Sollenar faced front.

"A worthy opponent, Mr. Sollenar," Ermine said. "A persevering, unforgiving, ingenious man. And yet —" Ermine seemed a little touched by bafflement. "And yet it seems to me, Mr. Sollenar, that he got you running rather easily. What *did* happen between you, after my advisory call?"

Sollenar turned a terrible smile on Ermine. "I shot him to pieces. If you'd peel his face, you'd see."

Ermine sighed. "Up to this moment, I had thought perhaps you might still salvage your affairs."

"Pity, Mr. Ermine? Pity for the insane?"

"Interest. I can take no part in your world. Be grateful, Mr. Sollenar. I am not the same gullible man I was when I signed my contract with IAB, so many years ago."

Sollenar laughed. Then he stole a glance at Burr's corner.

THE ship came down at Abernathy Field, in Aresia, the Terrestrial city. Industralized, prefabricated, jerry-built and clamorous, the storm-proofed buildings huddled, but huddled proudly, at the desert's edge.

Low on the horizon was the Martian settlement — the buildings so skillfully blended with the landscape, so eroded, so much abandoned that the uninformed eye saw nothing. Sollenar had been to Mars — on a tour. He had seen the natives in their nameless dwelling place; arrogant, venomous and weak. He had been told, by the paid guide, they trafficked with Earthmen as much as they cared to, and kept to their place on the rim of Earth's encroachment, observing.

"Tell me, Ermine," Sollenar said quietly as they walked across the terminal lobby. "You're to kill me, aren't you, if I try to go on without you?"

"A matter of procedure, Mr. Sollenar," Ermine said evenly. "We cannot risk the investment capital of so many IAB members."

Sollenar sighed. "If I were any other member, how I would commend you, Mr. Ermine! Can we hire a car for ourselves, then, somewhere nearby?"

"Going out to see the engineers?" Ermine asked. "Who would have thought they'd have something valuable for sale?"

"I want to show them something," Sollenar said.

"What thing, Mr. Sollenar?"

They turned the corner of a corridor, with branching hallways here and there, not all of them busy. "Come here," Sollenar said, nodding toward one of them.

They stopped out of sight of the lobby and the main corridor. "Come on," Sollenar said. "A little further."

"No," Ermine said. "This is farther than I really wish. It's dark here."

"Wise too late, Mr. Ermine," Sollenar said, his arms flashing out.

One palm impacted against Ermine's solar plexus, and the other against the muscle at the side of his neck, but not hard enough to kill. Ermine collapsed, starved for oxygen, while Sollenar silently cursed having been cured of murder. Then Sollenar turned and ran.

Behind him Ermine's body struggled to draw breath by reflex alone.

Moving as fast as he dared, Sollenar walked back and reached the taxi lock, pulling a respirator from a wall rack as he went. He flagged a car and gave his destination, looking behind him. He had seen nothing of Cortwright Burr since setting foot on Mars. But he knew that soon or late, Burr would find him.

A few moments later Ermine got to his feet. Sollenar's car was well away. Ermine shrugged and went to the local broadcasting station.

He commandeered a private desk, a firearm and immediate time on the IAB interoffice circuit to Earth. When his call acknowledgement had come back to him from his office there, he reported:

"Sollenar is enroute to the Martian city. He wants a duplicate of Burr's device, of course, since he smashed the original when he killed Burr. I'll follow and make final disposition. The disorientation I reported previously is progressing rapidly. Almost all his responses now are inappropriate. On the flight out, he seemed to be staring at something in an empty seat. Quite often when spoken to he obviously hears something else entirely. I expect to catch one of the next few flights back."

There was no point in waiting for comment to wend its way back from Earth. Ermine left. He went to a cab rank and paid the exorbitant fee for transportation outside Aresian city limits.

CLOSE at hand, the Martian city was like a welter of broken pots. Shards of wall and roof joined at savage angles and pointed to nothing. Underfoot, drifts of vitreous material, shaped to fit no sane configuration, and broken to fit such a mosaic as no church would contain, rocked and slid under Sollenar's hurrying feet.

What from Aresia had been a solid front of dun color was here a facade of red, green and blue splashed about centuries ago and since then weathered only enough to show how bitter the colors had once been. The plum-colored sky stretched over all this like a frigid membrane, and the wind blew and blew.

Here and there, as he progressed, Sollenar saw Martian arms and heads protruding from the rubble. Sculptures.

He was moving toward the heart of the city, where some few unbroken structures persisted. At the top of a heap of shards he turned to look behind him. There was the dust-plume of his cab, returning to the city. He expected to walk back — perhaps to meet someone on the road, all alone on the Martian plain if only Ermine would forebear from interfering. Searching the flat, thin-aired landscape, he tried to pick out the plodding dot of Cortwright Burr. But not yet.

He turned and ran down the untrustworthy slope.

He reached the edge of the maintained area. Here the rubble was gone, the ancient walks swept, the statues kept upright on their pediments. But only broken walls suggested the fronts of the houses that had stood here. Knifing their sides up through the wind-rippled sand that only constant care kept off the street, the shadow-houses fenced his way and the sculptures were motionless as hope. Ahead of him, he saw the buildings of the engineers. There was no heap to climb and look to see if Ermine followed close behind.

Sucking his respirator, he reached the building of the Martian engineers.

A sounding strip ran down the doorjamb. He scratched his fingernails sharply along it, and the magnified vibration, ducted throughout the hollow walls, rattled his plea for entrance.

V

THE door opened, and Martians stood looking. They were spindly-limbed and slight, their faces framed by folds of leathery tissue. Their mouths were lipped with horn as hard as dentures, and pursed, forever ready to masticate. They were pleasant neither to look at nor, Sollenar knew, to deal with. But Cortwright Burr had done it. And Sollenar needed to do it.

"Does anyone here speak English?" he asked.

"I," said the central Martian, his mouth opening to the sound, closing to end the reply.

"I would like to deal with you."

"Whenever," the Martian said, and the group at the doorway parted deliberately to let Sollenar in.

Before the door closed behind him, Sollenar looked back. But the rubble of the abandoned sectors blocked his line of sight into the desert.

"What can you offer? And what do you want?" the Martian asked. Sollenar stood half-ringed by them, in a room whose corners he could not see in the uncertain light.

"I offer you Terrestrial currency."

The English-speaking Martian — the Martian who had admitted to speaking English — turned his head slightly and spoke to his fellows. There were clacking sounds as his lips met. The others reacted variously, one of them suddenly gesturing with what seemed a disgusted flip of his arm before he turned without further word and stalked away, his shoulders looking like the shawled back of a very old and very hungry woman.

"What did Burr give you?" Sollenar asked.

"Burr." The Martian cocked his head. His eyes were not multi-faceted, but gave that impression.

"He was here and he dealt with you. Not long ago. On what basis?"

"Burr. Yes. Burr gave us currency. We will take currency

from you. For the same thing we gave him?"

"For immortality, yes."

"Im— This is a new word."

"Is it? For the secret of not dying?"

"Not dying? You think we have not-dying for sale here?" The Martian spoke to the others again. Their lips clattered. Others left, like the first one had, moving with great precision and very slow step, and no remaining tolerance for Sollenar.

Sollenar cried out: "What did you sell him, then?"

The principal engineer said: "We made an entertainment device for him."

"A little thing. This size." Sollenar cupped his hands.

"You have seen it, then."

"Yes. And nothing more? That was all he bought here?"

"It was all we had to sell — or give. We don't yet know whether Earthmen will give us things in exchange for currency. We'll see, when we next need something from Aresia."

Sollenar demanded: "How did it work? This thing you sold him."

"Oh, it lets people tell stories to themselves."

Sollenar looked closely at the Martian. "What kind of stories?"

"Any kind," the Martian said blandly. "Burr told us what he wanted. He had drawings with him of an Earthman device that used pictures on a screen, and broadcast sounds, to carry the details of the story told to the auditor."

"He stole those patents! He couldn't have used them on Earth."

"AND why should he? Our device needs to convey no precise details. Any mind can make its own. It only needs to be put into a situation, and from there it can do all the work. If an auditor wishes a story of contact with other sexes, for example, the projector simply makes it seem to him, the next time he is with the object of his desire, that he is getting positive feedback — that he is arousing a similar response in that object. Once that has been established for him, the auditor may then leave the machine, move about normally, conduct his life as usual — but always in accordance with the basic situation. It is, you see, in the end a means of introducing system into his view of reality. Of course, his society must understand that he is not in accord with reality, for some of what he does cannot seem rational from an outside view of him. So some care must be taken, but not much. If many such devices were to enter his society, soon the circumstances would become commonplace, and the society would surely read-

just to allow for it," said the English-speaking Martian.

"The machine creates any desired situation in the auditor's mind?"

"Certainly. There are simple predisposing tapes that can be inserted as desired. Love, adventure, cerebration — it makes no difference."

Several of the bystanders clacked sounds out to each other. Sollenar looked at them narrowly. It was obvious there had to be more than one English-speaker among these people.

"And the device you gave Burr," he asked the engineer, neither calmly nor hopefully. "What sort of stories could its auditors tell themselves?"

THE Martian cocked his head again. It gave him the look of an owl at a bedroom window. "Oh, there was one situation we were particularly instructed to include. Burr said he was thinking ahead to showing it to an acquaintance of his.

"It was a situation of adventure; of adventure with the fearful. And it was to end in loss and bitterness." The Martian looked even more closely at Sollenar. "Of course, the device does not specify details. No one but the auditor can know what fearful thing inhabits his story, or precisely how the end of it would come. You would, I believe, be Rufus Sollenar? Burr spoke of you and made the noise of laughing."

Sollenar opened his mouth. But there was nothing to say.

"You want such a device?" the Martian asked. "We've prepared several since Burr left. He spoke of machines that would manufacture them in astronomical numbers. We, of course, have done our best with our poor hands."

Sollenar said: "I would like to look out your door."

"Pleasure."

Sollenar opened the door slightly. Mr. Ermine stood in the cleared street, motionless as the shadow buildings behind him. He raised one hand in a gesture of unfelt greeting as he saw Sollenar, then put it back on the stock of his rifle. Sollenar closed the door, and turned to the Martian. "How much currency do you want?"

"Oh, all you have with you. You people always have a good deal with you when you travel."

Sollenar plunged his hands into his pockets and pulled out his billfold, his change, his keys, his jeweled radio; whatever was there, he rummaged out onto the floor, listening to the sound of rolling coins.

"I wish I had more here," he laughed. "I wish I had the amount that man out there is going to recover when he shoots me."

The Martian engineer cocked

his head. "But your dream is over, Mr. Sollenar," he clacked drily. "Isn't it?"

"Quite so. But you to your purposes and I to mine. Now give me one of those projectors. And set it to predispose a situation I am about to specify to you. Take however long it needs. The audience is a patient one." He laughed, and tears gathered in his eyes.

MR. Ermine waited, isolated from the cold, listening to hear whether the rifle stock was slipping out of his fingers. He had no desire to go into the Martian building after Sollenar and involve third parties. All he wanted was to put Sollenar's body under a dated marker, with as little trouble as possible.

Now and then he walked a few paces backward and forward, to keep from losing muscular control at his extremities because of low skin temperature. Sollenar must come out soon enough. He had no food supply with him, and though Ermine did not like the risk of engaging a man like Sollenar in a starvation contest, there was no doubt that a man with no taste for fuel could outlast one with the acquired reflexes of eating.

The door opened and Sollenar came out.

He was carrying something. Perhaps a weapon. Ermine let him come closer while he raised and carefully sighted his rifle. Sollenar might have some Martian weapon or he might not. Ermine did not particularly care. If Ermine died, he would hardly notice it — far less than he would notice a botched ending to a job of work already roiled by Sollenar's break away at the space field. If Ermine died, some other SPRO agent would be assigned almost immediately. No matter what happened, SPRO would stop Sollenar before he ever reached Abernathy Field.

So there was plenty of time to aim an unhurried, clean shot.

Sollenar was closer, now. He seemed to be in a very agitated frame of mind. He held out whatever he had in his hand.

It was another one of the Martian entertainment machines. Sollenar seemed to be offering it as a token to Ermine. Ermine smiled.

"What can you offer me, Mr. Sollenar?" he said, and shot.

The golden ball rolled away over the sand. "There, now," Ermine said. "*Now*, wouldn't you sooner be me than you? And where is the thing that made the difference between us?"

He shivered. He was chilly. Sand was blowing against his tender face, which had been somewhat abraded during his long wait.

He stopped, transfixed.

He lifted his head.

Then, with a great swing of his arms, he sent the rifle whirling away. "The wind!" he sighed into the thin air. "I feel the wind." He leapt into the air, and sand flew away from his feet as he landed. He whispered to himself: "I feel the ground!"

He stared in tremblant joy at Sollenar's empty body. "What have you given me?" Full of his own rebirth, he swung his head up at the sky again, and cried in the direction of the Sun: "Oh, you squeezing, nibbling people who made me incorruptible and thought that was the end of me!"

With love he buried Sollenar, and with reverence he put up the marker, but he had plans for what he might accomplish with the facts of this transaction, and the myriad others he was privy to.

A sharp bit of pottery had penetrated the sole of his shoe and gashed his foot, but he, not having seen it, hadn't felt it. Nor would he see it or feel it even when he changed his stockings; for he had not noticed the wound when it was made. It didn't matter. In a few days it would heal, though not as rapidly as if it had been properly attended to.

Vaguely, he heard the sound of Martians clacking behind their closed door as he hurried out of the city, full of revenge, and reverence for his savior.

— ALGIS BUDRYS

Meet Higgston Rainbird, who invented steamboating and the nuclear pile—remember?

RAINBIRD

By R. A. LAFFERTY

Illustrated by WALKER

WERE scientific firsts truly tabulated the name of the Yankee inventor, Higgston Rainbird, would surely be without peer. Yet today he is known (and only to a few specialists, at that) for an improved blacksmith's bellows in the year 1785, for a certain modification (not fundamental) in the moldboard plow about 1805, for a better (but not good) method of reefing the lateen sail, for a chestnut roaster, for the Devil's Claw Wedge for splitting logs, and for a nutmeg grater embodying a

new safety feature; this last was either in the year 1816 or 1817. He is known for such, and for no more.

Were this all that he had achieved his name would still be secure. And it *is* secure, in a limited way, and to those who hobby in technological history.

But the glory of which history has cheated him, or of which he cheated himself, is otherwise. In a different sense, it is without parallel, absolutely unique.

For he pioneered the dynamo, the steam automobile, the steel industry, ferro-concrete construction, the internal combustion engine, electric illumination and power, the wireless, the televox, the petroleum and petro-chemical industries, monorail transportation, air travel, world-wide monitoring, fissionable power, space travel, group telepathy, political and economic balance; he built a retrogressor; and he made great advances towards corporeal immortality and the apotheosis of mankind. It would seem unfair that all this is unknown of him.

Even the once-solid facts—that he wired Philadelphia for light and power in 1799, Boston the following year and New York two years later—are no longer solid. In a sense they are no longer facts.

For all this there must be an explanation; and if not that, then an account at least; and if not that, well—something anyhow.

HIGGSTON RAINBIRD made a certain decision on a June afternoon in 1779 when he was quite a young man, and by this decision he confirmed his inventive bent.

He was hawking from the top of Devil's Head Mountain. He flew his falcon (actually a tercel hawk) down through the white clouds, and to him it was the highest sport in the world. The bird came back, climbing the blue air, and brought a passenger pigeon from below the clouds. And Higgston was almost perfectly happy as he hooded the hawk.

He could stay there all day and hawk from above the clouds. Or he could go down the mountain and work on his sparker in his shed. He sighed as he made the decision, for no man can have everything. There was a fascination about hawking. But there was also a fascination about the copper-strip sparker. And he went down the mountain to work on it.

Thereafter he hawked less. After several years he was forced to give it up altogether. He had chosen his life, the dedicated career of an inventor, and he stayed with it for sixty-five years.

His sparker was not a success. It would be expensive, its spark was uncertain and it had almost no advantage over flint. People could always start a fire. If not, they could borrow a brand from a neighbor. There was no market for the sparker. But it was a nice machine, hammered copper strips wrapped around iron teased with lodestone, and the thing turned with a hand crank. He never gave it up entirely. He based other things upon it; and the retrogressor of his last years could not have been built without it.

But the main thing was steam, iron, and tools. He made the finest lathes. He revolutionized smelting and mining. He brought new things to power, and started the smoke to rolling. He made mistakes, he ran into dead ends, he wasted whole decades. But one man can only do so much.

He married a shrew, Audrey, knowing that a man cannot achieve without a goad as well as a goal. But he was without issue or disciple, and this worried him.

He built steamboat and steam-train. His was the first steam thresher. He cleared the forests with wood-burning giants, and designed towns. He destroyed southern slavery with a steam-powered cotton picker, and power and wealth followed him.

For better or worse he brought the country up a long road, so there was hardly a custom of his boyhood that still continued. Probably no one man had ever changed a country so much in his lifetime.

He fathered a true machine-tool industry, and brought rubber from the tropics and plastic from the laboratory. He pumped petroleum, and used natural gas for illumination and steam power. He was honored and enriched; and, looking back, he had no reason to regard his life as wasted.

"Yet I've missed so much. I tar-heeled and wasted a lot of time. If only I could have avoided the blind alleys, I could have done many times as much. I brought machine-tooling to its apex. But I neglected the finest tool of all, the mind. I used it as it is, but I had no time to study it, much less modify it. Others after me will do it all. But I rather wanted to do it all myself. Now it is too late."

HE went back and worked with his old sparker and its descendants, now that he was old. He built toys along the line of it that need not always have remained toys. He made a televox, but the only practical application was that now Audrey could rail at him over a greater distance.

He fired up a little steam dynamo in his house, ran wires and made it burn lights in his barn.

And he built a retrogressor.

"I would do much more along this line had I the time. But I'm pepper-bellied pretty near the end of the road. It is like finally coming to a gate and seeing a whole greater world beyond it, and being too old and too feeble to enter."

He kicked a chair and broke it.

"I never even made a better chair. Never got around to it. There are so clod-hopping many things I meant to do. I have maybe pushed the country ahead a couple of decades faster than it would otherwise have gone. But what couldn't I have done if it weren't for the blind alleys! Ten years lost in one of them, twelve in one. If only there had been a way to tell the true from the false, and to leave to others what they could do, and to do myself only what nobody else could do. To see a link (however unlikely) and go out and get it and set it in its place. O the waste, the wilderness that a talent can wander in! If I had only had a mentor! If I had had a map, a clue, a hatful of clues. I was born shrewd, and I shrewdly cut a path and went a grand ways. But always there was a clearer path and a faster way that I did not see till later. As my name is Rainbird, if I had it to do over, I'd do it infinitely better."

He began to write a list of the things that he'd have done better. Then he stopped and threw away his pen in disgust.

"Never did even invent a decent ink-pen. Never got around to it. Dog-eared damnation, there's so much I didn't do!"

He poured himself a jolt, but he made a face as he drank it.

"Never got around to distilling a really better whisky. Had some good ideas along that line too. So many things I never did do. Well, I can't improve things by talking to myself here about it."

Then he sat and thought.

"But I burr-tailed *can* improve things by talking to myself *there* about it."

He turned on his retrogressor, and went back sixty-five years and up two thousand feet.

HIGGSTON Rainbird was hawking from the top of Devil's Head Mountain one June afternoon in 1779. He flew his bird down through the white-fleece clouds, and to him it was sport indeed. Then it came back, climbing the shimmering air, and brought a pigeon to him.

"It's fun," said the old man, "but the bird is tough, and you have a lot to do. Sit down and listen, Higgston."

"How do you know the bird is tough? Who are you, and how did an old man like you climb up here without my seeing you. And how in hellpepper did you know that my name was Higgston?"

"I ate the bird and I remember that it was tough. I am just an old man who would tell you a few things to avoid in your life, and I came up here by means of an invention of my own. And I know your name is Higgston, as it is also my name; you being named after me, or I after you, I forget which. Which one of us is the oldest anyhow?"

"I had thought that you were, old man. I am a little interested in inventions myself. How does the one that carried you up here work?"

"It begins, well it begins with something like your sparker, Higgston. And as the years go by you adapt and add. But it is all tinkering with a force field till you are able to warp it a little. Now then, you are an ewer-eared galoot and not as handsome as I remembered you; but I happen to know that you have the makings of a fine man. Listen now as hard as ever you listened in your life. I doubt that I will be able to repeat. I will save you years and decades; I will tell you the best road to take over a journey which it was once said that a man could travel but once. Man, I'll pave a path for you over the hard places and strew palms before your feet."

"Talk, you addle-pated old gaff. No man ever listened so hard before."

THE old man talked to the young one for five hours. Not a word was wasted: they were neither of them given to wasting words. He told him that steam wasn't everything — this before he knew that it was anything. It was a giant power, but it was limited. Other powers, perhaps, were not. He instructed him to explore the possibilities of amplification and feedback, and to use always the lightest medium of transmission of power: wire rather than mule-drawn coal cart, air rather than wire, ether rather than air. He warned against time wasted in shoring up the obsolete, and of the bottomless quicksand of cliché, both of word and of thought.

He admonished him not to waste precious months in trying to devise the perfect apple-corer; there will never be a perfect apple-corer. He begged him not to build a better bob-sled. There would be things far swifter than the bob-sled.

Let others make the new hide-scrapers and tanning salts. Let others aid the carter and the candle-molder and the cooper in

their arts. There was need for a better halm, a better horse-block, a better stile, a better whetstone. Well, let others fill those needs. If our button-hooks, our fire-dogs, our whiffle-trees, our boot-jacks, our cheese-presses are all badly designed and a disgrace, then let someone else remove that disgrace. Let others aid the cordwainer and the cobbler. Let Higgston do only the high work that nobody else would be able to do.

There would come a time when the farrier himself would disappear, as the fletcher had all but disappeared. But new trades would open for a man with an open mind.

Then the old man got specific. He showed young Higgston a design for a lathe-dog that would save time. He told him how to draw, rather than hammer wire; and advised him of the virtues of mica as insulator until better materials should come to hand.

"And here there are some things that you will have to take on faith," said the old man, "things of which we learn the 'what' before we fathom the 'why.' "

He explained to him the shuttle armature and the self-exciting field and commutation; and the possibilities that alternation carried to its ultimate might open up. He told him a bejammed lot of things about a confounded huge variety of subjects.

"And a little mathematics never hurt a practical man," said the old gaffer. "I was self-taught, and it slowed me down."

They hunkered down there, and the old man cyphered it all out in the dust on the top of Devil's Head Mountain. He showed him natural logarithms and rotating vectors and the calculi and such; but he didn't push it too far, as even a smart boy can learn only so much in a few minutes. He then gave him a little advice on the treatment of Audrey, knowing it would be useless, for the art of living with a shrew is a thing that cannot be explained to another.

"Now hood your hawk and go down the mountain and go to work," the old man said. And that is what young Higgston Rainbird did.

THE career of the Yankee inventor, Higgston Rainbird, was meteoric. The wise men of Greece were little boys to him, the Renaissance giants had only knocked at the door but had not tried the knob. And it was unlocked all the time.

The milestones that Higgston left are breathtaking. He built a short high dam on the flank of Devil's Head Mountain, and had hydroelectric power for his own shop in that same year (1779). He had an arc light burning in Horse-Head Lighthouse in 1781. He read by true incandescent light in 1783, and lighted his native village, Knobknocker, three years later. He drove a charcoal-fueled automobile in 1787, switched to a distillate of whale oil in 1789, and used true rock-oil in 1790. His gasoline powered combination reaper-thresher was in commercial production in 1793, the same year that he wired Centerville for light and power. His first diesel locomotive made its trial run in 1796, in which year he also converted one of his earlier coal-burning steam ships to liquid fuel.

In 1799 he had wired Philadelphia for light and power, a major breakthrough, for the big cities had manfully resisted the innovations. On the night of the turn of the century he unhooded a whole clutch of new things, wireless telegraphy, the televox, radio transmission and reception, motile and audible theatrical reproductions, a machine to transmit the human voice into print, and a method of sterilizing and wrapping meat to permit its indefinite preservation at any temperature.

And in the spring of that new year he first flew a heavier-than-air vehicle.

"He has made all the basic inventions," said the many-tongued people. "Now there remains only their refinement and proper utilization."

"Horse hockey," said Higgston Rainbird. He made a rocket that could carry freight to England in thirteen minutes at seven cents a hundredweight. This was in 1805. He had fissionable power in 1813, and within four years had the price down where it could be used for desalting seawater to the eventual irrigation of five million square miles of remarkably dry land.

He built a Think Machine to work out the problems that he was too busy to solve, and a Prediction Machine to pose him new problems and new areas of breakthrough.

In 1821, on his birthday, he hit the moon with a marker. He bet a crony that he would be able to go up personally one year later and retrieve it. And he won the bet.

In 1830 he first put on the market his Red Ball Pipe Tobacco, an aromatic and expensive crimp cut made of Martian lichen.

In 1836 he founded the Institute for the Atmospheric Rehabilitation of Venus, for he found that place to be worse than a smoke-house. It was there that he developed that hacking cough

that stayed with him till the end of his days.

He synthesized a man of his own age and disreputude who would sit drinking with him in the after-midnight hours and say, "You're so right, Higgston, so incontestably right."

His plan for the Simplification and Eventual Elimination of Government was adopted (in modified form) in 1840, a fruit of his Political and Economic Balance Institute.

Yet, for all his seemingly successful penetration of the field, he realized that man was the one truly cantankerous animal, and that Human Engineering would remain one of the never-completely-resolved fields.

He made a partial breakthrough in telepathy, starting with the personal knowledge that shrews are always able to read the minds of their spouses. He knew that the secret was not in sympathetic reception, but in arrogant break-in. With the polite it is forever impossible, but he disguised this discovery as politely as he could.

And he worked toward corporeal immortality and the apotheosis of mankind, that cantankerous animal.

He designed a fabric that would embulk itself on a temperature drop, and thin to an airy sheen in summery weather. The weather itself he disdained to modify, but he did evolve infallible prediction of exact daily rainfall and temperature for decades in advance.

And he built a retrogressor.

ONE day he looked in the mirror and frowned.

"I never did get around to making a better mirror. This one is hideous. However (to consider every possibility) let us weigh the thesis that it is the image and not the mirror that is hideous."

He called up an acquaintence.

"Say, Ulois, what year is this anyhow?"

"1844."

"Are you sure?"

"Reasonably sure."

"How old am I?"

"Eighty-five, I think, Higgston."

"How long have I been an old man?"

"Quite a while, Higgston, quite a while."

Higgston Rainbird hung up rudely.

"I wonder how I ever let a thing like that slip up on me?" he said to himself. "I should have gone on corporeal immortality a little earlier. I've bungled the whole business now."

He fiddled with his Prediction Machine and saw that he was to die that very year. He did not seek a finer reading.

"What a saddle-galled splay-footed situation to find myself in! I never got around to a tenth of the things I really wanted to do. O, I was smart enough; I just ran up too many blind alleys. Never found the answers to half the old riddles. Should have built the Prediction Machine at the beginning instead of the end. But I didn't know how to build it at the beginning. There ought to be a way to get more done. Never got any advice in my life worth taking except from that nutty old man on the mountain when I was a young man. There's a lot of things I've only started on. Well, every man doesn't hang, but every man does come to the end of his rope. I never did get around to making that rope extensible. And I can't improve things by talking to myself here about it."

He filled his pipe with Red Ball crimpcut and thought a while.

"But I hill-hopping *can* improve things talking to myself *there* about it."

Then he turned on his retrogressor and went back and up.

YOUNG Higgston Rainbird was hawking from the top of Devil's Head Mountain on a June afternoon in 1779. He flew his hawk down through the white clouds, and decided that he was the finest fellow in the world and master of the finest sport. If there was earth below the clouds it was far away and unimportant.

The hunting bird came back, climbing the tall air, with a pigeon from the lower regions.

"Forget the bird," said the old man, "and give a listen with those outsized ears of yours. I have a lot to tell you in a very little while, and then you must devote yourself to a concentrated life of work. Hood the bird and clip him to the stake. Is that bridle-clip of your own invention? Ah yes, I remember now that it is."

"I'll just fly him down once more, old man, and then I'll have a look at what you're selling."

"No, no. Hood him at once. This is your moment of decision. That is a boyishness that you must give up. Listen to me, Higgston, and I will orient your life for you."

"I rather intended to orient it myself. How did you get up here, old man, without me seeing you? How, in fact, did you get up here at all? It's a hard climb."

"Yes, I remember that it is. I came up here on the wings of an invention of my own. Now pay attention for a few hours. It will take all your considerable wit."

"A few hours and a perfect hawking afternoon will be gone. This may be the finest day ever made."

"I also once felt that it was, but I manfully gave it up. So must you."

"Let me fly the hawk down again and I will listen to you while it is gone."

"But you will only be listening with half a mind, and the rest will be with the hawk."

But young Higgston flew the bird down through the shining white clouds, and the old man began his rigmarole sadly. Yet it was a rang-dang-do of a spiel, a mummywhammy of admonition and exposition, and young Higgston listened entranced and almost forgot his hawk. The old man told him that he must stride half a dozen roads at once, and yet never take a wrong one; that he must do some things earlier that on the alternative had been done quite late; that he must point his technique at the Think Machine and the Prediction Machine, and at the unsolved problem of corporeal immortality.

"In no other way can you really acquire elbow-room, ample working time. Time runs out and life is too short if you let it take its natural course. Are you listening to me, Higgston?"

But the hawk came back, climbing the steep air, and it had a gray dove. The old man sighed at the interruption, for he knew that his project was in peril.

"Hood the hawk. It's a sport for boys. Now listen to me, you spraddling jack. I am telling you things that nobody else would ever be able to tell you! I will show you how to fly falcons to the stars, not just down to the meadows and birch groves at the foot of this mountain."

"There is no prey up there," said young Higgston.

"There *is*. Gamier prey than you ever dreamed of. Hood the bird and snaffle him."

"I'll just fly him down one more time and listen to you till he comes back."

The hawk went down through the clouds like a golden bolt of summer lightning.

THEN the old man, taking the cosmos, peeled it open layer by layer like an onion, and told young Higgston how it worked. Afterwards he returned to the technological beginning and he lined out the workings of steam and petro and electro-magnetism, and explained that these simple powers must be used for a short interval in the invention of greater power. He told him of waves and resonance and airy transmission, and fission and flight and over-flight. And that none of the doors required keys, only a resolute man to turn the knob and push them open. Young Higgston was impressed.

Then the hawk came back, climbing the towering air, and it had a mainbird.

The old man had lively eyes, but now they took on a new light.

"Nobody ever gives up pleasure willingly," he said, "and there is always the sneaking feeling that the bargain may not have been perfect. This is one of the things I have missed. I haven't hawked for sixty-five years. Let me fly him this time, Higgston."

"You know how?"

"I am an adept. And I once intended to make a better gauntlet for hawkers. This hasn't been improved since Nimrod's time."

"I have an idea for a better gauntlet myself, old man."

"Yes. I know what your idea is. Go ahead with it. It's practical."

"Fly him if you want to, old man."

And old Higgston flew the tercel hawk down through the gleaming clouds, and he and young Higgston watched from the top of the world. And then young Higgston Rainbird was standing alone on the top of Devil's Head Mountain, and the old man was gone.

"I wonder where he went? And where in apple-knockers' heaven did he come from? Or was he ever here at all? That's a danged funny machine he came in, if he did come in it. All the wheels are on the inside. But I can use the gears from it, and the clock, and the copper wire. It must have taken weeks to hammer that much wire out that fine. I wish I'd paid more attention to what he was saying, but he poured it on a little thick. I'd have gone along with him on it if only he'd have found a good stopping place a little sooner, and hadn't been so insistent on giving up hawking. Well, I'll just hawk here till dark, and if it dawns clear I'll be up again in the morning. And Sunday, if I have a little time, I may work on my sparker or my chestnut roaster."

HIGGSTON Rainbird lived a long and successful life. Locally he was known best as a hawker and horse racer. But as an inventor he was recognized as far as Boston.

He is still known, in a limited way, to specialists in the field and the period: known as contributor to the development of the moldboard plow, as the designer of the Nonpareil Nutmeg Grater with the safety feature, for a bellows, for a sparker for starting fires (little used) and for the Devil's Claw Wedge for splitting logs.

He is known for such, and for no more.

— R. A. LAFFERTY

GALAXY'S 5 Star Shelf

THE SIRENS OF TITAN by Kurt Vonnegut, Jr. Houghton Mifflin Co.

VONNEGUT'S BITTER satire is reminiscent in many respects of Bernard Wolfe's *Limbo*. Both are crammed full of new ideas yet weary with old. Both have sparks of humor that turn to ash.

A weird triangle is the hub of the story. The husband, a brave, wise, charming aristocrat, was dematerialized on an exploration into a space hazard between planets. He becomes a sort of ghost who materializes for an hour once every fifty-five days. A side result of his tragedy is an ability to see both past and future. As a most peculiar step toward establishing peace and brotherhood, he engineers the impregnation of his wife, an immaculate patrician, by a piggish wastrel.

The plot is tangled, intricate and tortuous and the author manufactures mystery and suspense by the deliberate use of time jump and flashback.

Yet the book, though exasperating, is a joy of inventiveness.

Rating: ****½

WALL OF SERPENTS by L. Sprague de Camp and Fletcher Pratt. Thomas Bouregy & Co.

DECAMP AND PRATT were far and away the finest team of fantasy collaborators. In their present misadventure, Shea and his Faerie wife, Belphebe, become involved in the land of the Finnish Kalevala and the Ireland of the hero, Cuchulainn.

If de Camp's and Pratt's heroes and villains alike are usually ineffectual and usually likeable, their stories are always chuckle-filled delights.

Rating: ****½

THE INTELLIGENT MAN'S GUIDE TO SCIENCE by Isaac Asimov. Two volumes. Basic Books, Inc.

SCIENCE FICTION'S loss has been science popularization's gain. Dr. Asimov's style is eminently readable. His knack makes even difficult concepts easily digestible.

By far his most ambitious project to date, the set is divided into two halves, Physical Sciences and Biological Sciences. The section titles convey some idea of the scope of his work: The Universe; The Earth; The Atmosphere; The Elements; The Particles; The Waves; The Machine; The Reactor. The Biological Sciences contains: The Molecule; The Proteins; The Cell; The Microorganism; The Body; The Species; The Mind.

A DECADE OF FANTASY AND SCIENCE FICTION edited by Robert P. Mills. Doubleday & Co., Inc.

Editor Mills has selected nothing but full-cut gems from the McComas-Boucher diamond mine.

The novelettes: Poul Anderson's "The Sky People," a well-executed, profound yet action-crammed study of civilization's slow resurgence from Atomic aftermath; "Jordan," also in Zenna Henderson's *Pilgrimage;* J. Francis McComas's "Shock Treatment," the acid test of an enlightened penal code in the first murder case on a raw planetary frontier; "To Fell a Tree," by Robert F. Young, an alien planet's last 1,000 foot tree and its felling.

Better by far than any of its annual predecessors, (not even *one* Ferdinand Feghoot!) this is a top collection by any standard.

Rating: *****

THE RIM OF SPACE by A. Bertram Chandler. Thomas Bouregy & Co.

CHANDLER HAS taken the desire of the Rim Worlds on the periphery of the Galactic Lens for

self-determination as moving force of his book.

Their commerce is coverup for a buildup of strength. Their merchant fleet consists of obsolete tubs manned by a lost legion of human retreads, themselves rejects from the plush liners of Inner World commerce.

All the elements of the salty sea are in Chandler's deep space thriller: the grand-daddy of hurricanes, drunken brawling in a portside joint, burial at space, shipwreck and salvage.

Art it may not be, but likeable it certainly is.

Rating: ***½

REACHING FOR THE STARS by Erik Bergaust. Doubleday & Co.

WERNHER VON Braun is an extremely controversial figure. Despite his stature in our space program, many Americans have never become reconciled to the presence of a former enemy and self-admitted Nazi in a most sensitive field. Be that as it may, he has obviously been forgiven by the top brass and today his enormous energy, knowledge and resourcefulness are being put to use.

Because of von Braun's single-purposefulness, the book is more than just his biography. It is also the history of modern rocketry.

PILGRIMAGE: THE BOOK OF THE PEOPLE by Zenna Henderson. Doubleday & Co., Inc.

DESCRIBED AS Zenna Henderson's first novel, *Pilgrimage* is actually a compilation of stories from *F&SF* tied loosely together. "The People" are hunted and haunted possessors of superhuman powers.

Each novelette expands on the theme, "Different is dead." The protagonists involved eventually find emancipation with The Group, hidden in desert country where wild talents can remain unobserved.

Rating: ****

THE RUNAWAY WORLD by Stanton A. Coblentz. Avalon Books.

AVALON APPEARS determined to exhume the remains of all of Coblentz's ponderous satires. Number four thus disturbed from well-earned oblivion, *Runaway World* plotwise is also stamped from the same heavy-duty die.

Rating: *

THE SCIENCE-FICTIONAL SHERLOCK Holmes. The Council of Four.

THE INCOMPARABLE Sherlock's claim to fame has never been in doubt. Avid groups of fans and writers have given him a degree of contemporaneity never achieved by any other fictional character.

In the above volume, Conan Doyle's oversight in never penning a science-fictional adventure for his human deduction machine has been righted by August Derleth, Anthony Boucher, Mack Reynolds, Gordon R. Dickson, Poul Anderson, H. Beam Piper and John J. McGuire.

The book's appeal is limited, but its special audience will derive intense satisfaction.

Rating: ****

THINKING MACHINES by Irving Adler. The John Day Co.

TO THE man in the street, the word "Computer" conjures up a vision of a vast electronic monster busily tended by a horde of human ministrators. This was largely true until the recent past but miniaturization and simplification have reaped such rewards that room-sized and even desk-sized computers are now extant. The layman, however, still would like two questions answered: What does it do and How does it do it?

Adler's book answers these questions in comparatively simple form—for someone with a good high school math background.

THE PROJECT by Andrew Sinclair. Simon & Schuster.

THE "PROJECT" is the program to develop an undescribed weapon sufficiently powerful to act as an utter deterrent to would-be aggressor nations. The book delves into the character of the weapon's prime architects and their movements and actions on the night preceding the final test. It is a bitter indictment of the idiocy that places the means for utter destruction in the hands of a few and makes it possible for a highly placed psychotic to become mankind's executioner.

Rating: ***½

THE OUTLAWS OF MARS by Otis Adelbert Kline. Avalon Books.

A GENERATION ago, back in *Argosy's* heyday, Kline's serials were usually divided into six parts. There could easily have been twice as many divisions because Kline's heroes fluctuated between soup and frying pan.

A *non sequitur* sequel to *The Swordsman of Mars*, the new hero travels back through space and time to Mars of some million years ago and finds a culturally paradoxical mighty civilization.

Rating (for an old-fashioned fairy tale): ***

—FLOYD C. GALE

The preacher wasn't what he seemed — and the girl seemed what she wasn't — but the birds . . . they were dangerously, terrifyingly real!

An Old Fashioned Bird Christmas

By MARGARET ST. CLAIR
Illustrated by FINLAY

THE Reverend Clem Adelburg had come out to cut some mistletoe. He tucked the hatchet tightly in the band of his trousers and shinned up the knobby trunk of the apple tree. When he got high enough, he saw that two ravens were seated on the apple tree branches, eating the mistletoe berries. There were always ravens around the cabin nowadays; he chased them away indignantly, with many loud whooshes. Then he felt a twinge of remorse.

"O Lord," he prayed among the branches, his face upturned toward the dramatic cloudscape of an Arizona winter, "O Lord, bless this little experiment of thy servant. O Lord, grant that I wasn't wrong to chase away those darned ravens. Yes, Lord."

He sighted up at the branches. He chopped with the hatchet. Three branches of mistletoe fell down on the sheets of newspaper he had previously placed at the foot of the tree. He climbed down.

It was beginning to get dark. Mazda would have supper ready. There was a premonitory rumble and then the sound of *Silent Night*, played on an electric xylophone, filled the sky.

The Reverend Adelburg frowned. The noise must be coming from Parker; the municipal Christmas tree there would be thirty-five feet tall this year, and already he could see the red glow of Parker's municipal Christmas street-decoration project in the southern sky. Well. If the Lord continued to bless him, and if his next few sermons had the effect he hoped they'd have, he might be able to change the character of Parker's Christmas celebration. The Forthright Temple, in Los Angeles, was a long way from Parker, but his broadcasts were receivable here, too.

He went in the kitchen. Mazda was cooking something on the oil stove, an oil lamp burning dimly on the table beside her. The kitchen smelled good.

"Hello, Clem," she said, turning to face him. She smiled at him. "Did you get the berries for the tea?"

"Yes, dear." He handed her the three branches of mistletoe. "Make it good and strong this time, dear. I just want to see if there's anything in my little idea."

"About mistletoe being the common element in all religions? Sure."

HE watched her as she went to fill the teakettle at the sink. She was a tall woman, with masses of puffy ginger hair and a very fair skin. Her figure was excellent, though rangy, and he always enjoyed watching her.

Most of the time Mazda's being in the cabin seemed so ordinary, so fitting (she was remarkably domestic, when you got to know her), that he simply didn't think about it. But there were moments, like the present, when her physical immediacy seemed to catch him in the solar plexus. Then he could only stand and look at her and draw deep, surprised breaths.

It wasn't so much his living with her, in the technical sense, that troubled him. He hadn't even tried to feel guilty about that. It seemed at once so extraordinary and so perfectly natural, that it wasn't something his conscience could get a grip on. No, it was Mazda's being in the cabin at all that was the surprising thing.

Where had she come from, anyhow? He'd gone outside one morning early in September, meaning to walk up and down in the sand while he put the finishing touches on his sermon for next week, and there she had been, sitting quietly under a Joshua tree.

She couldn't have been there for more than ten minutes. Her skin, as he had come to know later, was extraordinarily sensitive to sunlight, and she was wearing the skimpiest Bikini imaginable. She'd have been sunburned all over if she'd been there for any length of time. And how had she got there? There'd been no

sign of a car in any direction, and he hadn't even heard the noise of a plane or a copter in the sky. Had she walked over from Parker? In a Bikini? Five miles?

He knew so little about her—no more now, really, than he had known on that first day when she had said, "Hi," and gone in the house. It wasn't that she was close-mouthed or sullen. She just didn't talk about herself. Once only, when he had been elaborating his idea that the use of mistletoe might be the common element behind all religion, had she come out with anything that might be a personal remark. He'd spoken of the use of mistletoe in classical paganism, in druidism, in Christian festival, in the old Norse religion, in Zoroastrism—

Her lower lip had begun to protrude defiantly. "There's no mistletoe in Zoroastrism," she had cut in sharply. "I know."

Well? It wasn't much for the fruit of more than three months.

He couldn't help wondering about Mazda sometimes, though he didn't want to fail in Christian charity. But he knew he had his enemies. Could she possibly be a Retail Merchants Association spy?

THE teakettle was beginning to hum. Mazda gave the pot of string beans on the stove a stir with a wooden spoon. "How did you come out with your sermon, Clem?" she asked.

"Eh? Oh, splendidly. The ending, I really think, will have an effect. There are some striking passages. The ravens were quite impressed." He smiled at his little joke.

"Ravens?" She turned to face him. "Were there ravens outside when you were rehearsing your speech?"

"Yes, indeed. We have ravens all the time here now. There were even ravens in the apple tree when I was cutting the mistletoe."

Her eyes widened. "Oh . . ." she said thoughtfully.

"I fear I chased them away a little too vehemently," he said, becoming serious. "Ravens, after all, are the Lord's creatures too."

"Not *those* ravens," Mazda said.

There was a very brief pause. Mazda fingered the wooden bracelet on her left wrist. Then she said, "Listen, Clem, I know you've talked about it, but I guess I'm just dumb. Why are you so down on modern Christmases, anyway?"

"My dear, if you'd ever attend the Temple services—" the Reverend Adelburg said in gentle reproof. "But I'll try to make my point of view, which I humbly trust is also the Lord's point of view, clear to you." He began to talk.

He was an excellent talker. Phrases like "star in the darkness," "the silent night of Bethlehem," "pagan glitter," "corruption," "perversion," "true values," "an old-time America," "myrrh," "frankincense" and "1776," seemed to shimmer in the air between them. Mazda listened, nodding from time to time or prodding the potatoes in the saucepan with a two-tined kitchen fork.

AT last he appeared to have finished. Mazda nodded for the last time. "Um-hum," she said. "But you know what I think, Clem? I think you just don't like lights. When it's dark, you want it to *be* dark. It's reasonable enough—you're a different guy once the sun goes down."

"I don't like the false lights of modernity," the Reverend said with a touch of stiffness. "As I intend to make abundantly clear in my sermon tomorrow."

"Um-hum. You're a wonderful talker. I never thought I'd get fond of somebody who didn't like light."

"I like some kinds of light," said the Reverend Adelburg. "I like fires."

Mazda drew a deep breath. "You'd better wash up before supper, Clem," she said. "You've got rosin on you from the apple tree."

"All right, dear." He kissed her on the cheek and then—she had seductive shoulders, despite her ranginess—on the upper arm.

"Mmmmmmmm," Mazda said.

When he had gone into the pantry to wash, she looked after him slantingly. Her caramel-colored eyebrows drew together in a frown. She had already scalded out the teapot. Now she reached into the drawer of the kitchen table and drew out a handful of what looked like small mushrooms. They were, as a matter of fact, mescal buttons, and she had gathered them last week from the top of a plant of *Lophophora Williamsii* herself.

II

SHE cut them up neatly with a paring knife and dropped them into the teapot. She put the mistletoe berries in on top of the mescal buttons. Then she filled the teapot with boiling water. When the Reverend got back from his washing, the teapot was steaming domestically on the table beside the string beans.

He said grace and poured himself a cup of the tea. "Goodness, but it's bitter," he observed, sipping. "Not at all like it was the first time. What a difference putting in more mistletoe has made!"

Mazda looked down. She passed him the sugar bowl. He sweetened the tea lavishly. "You

haven't set a cup for yourself, dear," he said, suddenly solicitous.

"There isn't much tea. You said to make it strong."

"Yes, honey, but if there's any good in the tea, I want you to share it. Get another cup."

He looked across the table at her, brightly and affectionately. There was a faint flush in Mazda's cheeks as she obeyed.

Supper was over and Mazda was washing the dishes when the Reverend Clem said suddenly, "How fast you're moving, Mazda! I never saw anything like the way you're getting through those dishes. I can hardly see your hands, they're moving so fast."

"Fast?" Mazda echoed. She sounded bewildered. She held up a spoon and polished its bowl languidly in the light of the oil lamp. "Why, I'm not moving fast. I've been standing here by the sink for hours and hours, washing one dish. I don't know what's the matter with me. I wish I *could* move fast."

There was a silence. Mazda had finished the dishes. She took off her apron and sat down on the floor, her feet out straight in front of her. Almost immediately the Reverend Adelburg slid off the chair where he had been sitting, and flopped down on the floor parallel to her. Both their legs were stretched out.

"What lovely hands you have, Mazda," he said. He picked up one of them from her lap, where it was languidly lying, and turned it about admiringly. "Your fingers remind me of the verse in the Canticles—'Fair are my love's palms as an eel that feedeth among lilies. And the coals thereof hath a most vehement flame.' They're even colored like eels, purple and gold and silver. Your nails are little dark rainbows. The Lord bless you, Mazda. I love you very much."

He put his arm around her. She let her head decline on his shoulder, and they both leaned back against the wall. "Are you happy, dear?" he asked her anxiously. "As happy as I am? Do you have a dim sweet bird sense of blessings hovering over you?"

"Um-hum," Mazda answered. It was obviously difficult for her to talk. "Never felt better." A grin zig-zagged across her face. "Mus' be the mistletoe."

THE effects of peyote—mescal button—intoxication are predictable. They run a definite course. None the less, the response to a drug is always somewhat idiosyncratic. Thus it was that the Reverend Clem Adelburg, who had drunk enough peyote infusion to keep a cart horse seeing beatific visions for twenty-four hours, reached, about six o'clock in the morning, the state of intense wakefulness that succeeds to the drug trance. By the time the copter came from Los Angeles to take him to the Temple, a little after eight, he had bathed, shaved and dressed, and was reading over his sermon notes.

He went into the bedroom where Mazda was lying to bid her good-by. (Sometime during the night they had managed to get to bed.) He bent over and kissed her tenderly on her loosened mouth. "Good-by, dear. Our little experiment certainly had results, didn't it? But I feel no ill after-effect, and I trust that you will not, either. I'll be back about eleven tonight."

Once more he kissed her. Mazda made a desperate effort to rouse herself from the rose and opal-hued heaven she was currently floating in. She licked her lips. "Clem . . ." she said.

"Yes, dear?"

"*Be careful.*"

"Certainly, dear. I always am. Yes."

He patted her on the shoulder. He went out. Even in her paradise, which was at the moment blue and silver, she could hear the noise of the copter as it bore him away.

Mazda's drug dreams came to an end with a bump about twelve o'clock. She sprang out of bed and ran to the window. The Reverend Adelburg was gone, of course. And there wasn't a raven in sight.

OVER in Los Angeles, the Reverend's sermon was going swimmingly. From his first words, which had been the arresting sentence, "The lights are going out again all over the world," he had riveted the attention of his listeners as if with stainless steel rivets. Even the two troops of Archer Eagle Scouts in the front rows, who, with their scoutmaster Joe Buell, were today's Honor Guests, had been so fascinated that they had stopped twanging their bowstrings. The Reverend had swung thunderously from climax to climax; by now at least half his audience had resolved to disconnect its radio when it got home, and throw away the electric lights on its Christmas tree. Now the Reverend was approaching the climax of climaxes.

"In the sweet night of the spirit, bless us, O Lord! Yes, Lord, it's good to be dark—in the sweet silence of the stable let the little flame of—bless us, Lord!—let the little flame—My *Gosh!* Good Lord!"

Forthright Temple is ventilated, and partly lighted, by a clerestory in the middle part of the building. Through this clerestory eight large black birds flew rapidly.

Two of them headed straight for the Reverend Adelburg's eyes. Four of them attacked the Temple's not very bright electric lights. The other two made dive after dive on the helpless congregation's head.

Women were screaming. Handkerchiefs waved. Hymnbooks rocked and fluttered through the air. The organist burst into a Bach chorale. The bewildered choir began singing two different songs.

When the ravens had first swooped down upon him, the Reverend Adelburg had dived under the lectern. From thence—he was a man who was used to authority—he began shouting orders to the troops of Archer Eagle Scouts in a clarion, stentorian voice.

"Young men! Listen! Shoot at the birds! Shoot—at—the—birds!"

There was a very slight hiatus. Then bowstrings began to twang and arrows to thud.

Eight pagan ravens are no match at all for the legitimate weapons of two troops of Archer Eagle Scouts. The ravens dived valiantly, they cawed and shrieked. In vain. Inside five minutes after the shooting started, there remained no trace of the birds' incursus except a black tail feather floating in an updraft, eight or ten hymnbooks with ruffled pages and some arrows on the floor.

For a few moments the scouts scurried about collecting arrows. Then the Reverend Adelburg summoned them up to the lectern, where he was standing. He finished his sermon with a troop of Archer Scouts drawn up on either side of him, like a body guard.

"That was a wonderful sermon, wasn't it," said the lady from Iowa as she and her husband walked toward their parked car. "I never heard anything like it before. He really spoke better after the birds came in than he did earlier . . . I think tomorrow I'll go down town and see if I can get some little oil lamps to burn in the patio."

"Wonder what sort of birds those were," her husband said idly. "They were mighty big for crows."

"Crows! Why, they were ravens; haven't you ever seen pictures of ravens? I wonder what made them go in the Temple. Ravens always seem such *old-fashioned birds.*"

III

"I betrayed my Company for you," Mazda said. She hiccoughed with emotion. "I'm a rat. As far as that goes, you're a rat too. We're *both* rats."

"What company is that?" the Reverend asked with innocent curiosity. He yawned. They had been sitting in the tiny living room, arguing, for hours, ever since he got back from the Temple, and by now it was nearly two o'clock in the morning.

"The PE&G. Why? Did you ever suspect?"

"I thought perhaps the Retail Merchants Association sent you. I never understood how you happened to be sitting under that Joshua tree."

Mazda laughed scornfully. "The Retail Merchants? Those boffs? Why, I don't suppose they have more than three secret agents in the whole Los Angeles metropolitan area. They couldn't stop a baby from crossing a street on a kiddy car. Their idea of hot tactics is to hire a big newspaper ad.

"No, I'm a PE&G girl. I've been one of their top people for years. That's why I know what you're up against."

She took an earnest step toward him. "Clem, I don't think you have any idea of how serious this is," she said. "But they'll stop at nothing. They can't possibly let you get away with it. Why, last December after your old-fashioned Christmas sermons, power consumption was off 27% all along the whole Pacific slope, and it didn't get back to normal until late February. People just didn't use much electricity. The Company didn't pay any dividends at all on its common stock, and if the same thing happens this year, they'll have to skip payments on the preferred! That's why I was sent to stop you at all costs."

"How were you supposed to stop me?" the Reverend inquired. He put the tips of his outstretched fingers together thoughtfully.

"I was supposed to seduce you, and then call the broadcasters in. You know, moral turpitude. But I convinced them that it wouldn't work. Congregations aren't so touchy about things like that nowadays. It wouldn't have worked."

"Mazda, how *could* you?"

"I don't know how I could," Mazda replied with spirit. "I could have had a nice clean-cut electronics engineer . . . or one of those cute linemen up on a pole . . . and then I had to fall for a Reverend with his collar on backwards. Somebody ought to examine my head."

The Reverend Adelburg let this pass without comment. "What was the alternate plan?" he asked.

"I promised them I'd keep you from delivering any more old-fashioned Christmas sermons. That's what the peyote was for."

"Peyote? When?"

She told him.

"Oh. Then it wasn't the mistletoe," he said when she had finished. He sounded rather annoyed.

"No, it wasn't the mistletoe. But I guess I didn't give you enough peyote. You delivered the sermon anyway.

"Clem, you think that because the ravens made that silly attack on you in the Temple, that that's the sort of thing the Company has up its sleeve. It's not. The ravens were acting on their own responsibility, and they're not awfully bright birds. The Company can do lots better than that when they want to."

"What do you think they'll try next?" the Reverend inquired. His jaw had begun to jut out.

"Well, they might try to get you for moral turpitude after all, or stick an income tax evasion charge on you or accuse you of dope smuggling. I don't think they will. They don't want to give you any more publicity. I think they'll just quietly try to wipe you out."

For a moment Mazda's self command deserted her. She wrung her hands. "What'm I to *do*?" she whimpered. "I've got to save you, and you're as stubborn as a mule. I don't know any magic—or at least not nearly enough magic. The whole Company will be against me as soon as the ravens are sure I ratted on them. And there's just no place in the world today for anybody who's in conflict with the PE&G.

"I wish I hadn't been such a dope as to fall in love with you."

THE Reverend Clem Adelburg got up from the chair where he had been sitting and put his arm around her. "Cheer up, my dear," he told her solemnly. "We will defeat the company. Right is on our side."

Mazda gave a heroic sniffle. She smiled at him mistily. "It's not just the PE&G, of course," she said. "Sometimes I think *they* have agents everywhere."

"Not the PE&G?" the Reverend cried. He let his arm fall from around her. He had a sudden nightmare vision of a whole world united against him—a world in which the clouds semaphored secrets about him to the dolphins in the Pacific waves. "What is it, then?"

"Why, it's Nous."

"I never heard of it."

"Very few people have. But *Nous, Infinite*, is the company from which the PE&G gets its power.

"Nous is a very strange outfit. It operates on the far side of 3,000 A.D., and selling power is only one of the things it does. When you're a top agent for the Company, like I was, you hear all sorts of stories about it—for instance, that it's responsible for maintaining the difference in potential between the earth and the ionosphere, or that the weather on Venus is a minor Nous project — stuff like that. I've even heard agents say that Nous is G —but I don't believe *that*. I know about Mithras, myself."

"I thought the PE&G made its own power," said the Reverend. He was still struggling with the first part of Mazda's remarks.

Mazda laughed. "I don't mean any disrespect to the Company, but what makes you think that? The Company's a bad opponent, but outside of that, witchcraft, or sorcery, or ravens, is all they're capable of.

"All the really hot developments in power, the electronic stuff, comes from after 3,000 A.D. Nobody in the present has brains enough to work out a germanium transistor, for example. Nous helps them. People nowadays are dopes. They can't work buttons on pants, or open a package of chewing gum unless there's a paper ribbon to help them.

"That's beside the point, really. The thing I'm trying to make clear, Clem, is that Nous is a bad outfit to come up against.

"I was supposed to go outside at one-thirty this morning and have the ravens pick me up under the Joshua tree. They were going to take me back to headquarters by air raft. If it—"

"IS that how you got here in the first place?" the Reverend inquired. "By air raft?"

"Yes. As I was saying, if I'd done that, the Company would have accepted that my failure with the peyote was just a mistake. But I didn't do it. I couldn't bear to leave a chump like you all alone to face the Company, and by now they must be beginning to realize that I've ratted on them. It won't be very long before the real trouble begins.

"Now, listen. There are two things you can do. The best one would be for you to go outside and talk to the ravens. If you promise them on your word of honor as a Christian gentlemen that you won't deliver any more anti-light sermons—I can't see why you don't like light, anyhow; light's wonderful—if you promise them that, they'll let you go." She paused hopefully.

The Reverend gave her a look.

"Well," said Mazda. "Then we'll have to make a break for it.

"While you were in the washroom, I called the Temple copter." She indicated the short-wave radio on the other side of the little stone fireplace. "It'll be here any minute. I think—well, we'll

try to get through," she said without much hope.

The Reverend looked at her in silence for a moment. Fatigue had made shadows under her eyes, but they only made her look glamorous and desirable. She had never been more beautiful. She had betrayed her company for him; he loved her more than ever. He gave her a hug.

"Nix, my dear," he said. "Nix."

"N-n-n-n-?"

"Nix. Never." His voice rang out, booming and resonant. "Run away from those devils and their ravens? Flee from those pagan night-lighters? Never! I *will* not." He advanced toward the radio.

"What are you going to do?" Mazda squeaked.

"I'm going to contact the TVA," he said without turning. "You have to fight fire with fire."

"*Public power?*" Mazda breathed. Her face was white.

"Public power! Their line will be open all night."

He turned his face toward the rafters. "O Lord," he boomed reverently, "bless this radio message. Please, Lord, grant that in contacting a radical outfit like the TVA I'm doing aright."

IV

THE noise of prayer died away in the ceiling. He pressed a key and turned a switch. For a moment the room was utterly quiet. Then there was a soft flurry and plop at the window.

The ravens, after all, were not deaf. They too had heard the Reverend's prayers.

Mazda spun round toward the sound. Before she could decide what to do, there was a series of tinkles from the chimney. It ended in a glassy crash. Something had broken on the stone hearth.

Mazda screamed.

"Keep back!" she yelled at the Reverend, who had turned from the radio and was leaning forward interestedly. "Keep back! Don't breathe! *Damn* those birds!" She was fumbling wildly with the wooden bracelet on her left wrist.

"What is it?" he asked. He advanced a step toward the shards of glass on the hearth.

"Get *back*. It's a germ culture bomb. Parrot fever. I'm going to purify it. Stand *back!*"

The Reverend Adelburg discounted most of this warning as due to feminine hysteria. He drew back a fraction of an inch, but still remained leaning forward, his eyes fixed on the glass.

Mazda gave a moan of desperation. "I've got to do it!" she yelled. She slid her bracelet toward her elbow and gave it a violent twist.

A strictly vertical flash of lightning appeared between the ceiling and the hearth. It was very bright, and accompanied by a sizzling noise. A second later a sharp chlorine-like smell filled the air.

Mazda's artificial lightning died away. The room returned to its normal dim illumination. A faint curl of smoke floated above the pieces of broken glass on the hearth of the fireplace. There was no doubt that Mazda had purified the germ culture effectively. But the Reverend Clem Adelburg was stretched out on the floor flat on his back.

MAZDA ran to him. She tore open his white shirt front and laid her head on his chest. His heart was still beating, and his hands and feet were warm. But he was completely out—outer than any of the neon lights he had been trying to put out.

Mazda got up, rubbing her hands. She couldn't move him, and she didn't know what she ought to do for him. She hoped he'd be all right. She knew he had a strong constitution. She went into the kitchen and got a towel.

She came back with it and tied it to the poker. Carrying this home-made flag of truce in front of her, she opened the door and went out into the night.

It was a dark night. From under the Joshua tree a darker shadow detached itself. " 'Llo, Mazda," a harsh voice said.

"Hello," she replied. There was a glitter of beady eyes in the darkness around her. "Listen here, you birds," Mazda said slowly, "we've always been on good terms, haven't we? We've always got on together well. Are you really trying to do me and my boy friend in?"

A bird cleared its throat. There was a noise of talons being shifted uneasily. "Well . . . no, Mazda. We like you too," somebody said.

"Oh, yes? Is that why you dropped the parrot-fever bomb? Were you going to drop a dead parrot down the chimney and make it look as if we'd died a natural death? I wouldn't call that bomb exactly a friendly thing."

"The bomb was just a warning," said the harsh voice that had spoken first. "We knew you'd purify it. We have confidence in you. We don't want to do you any harm personally. You can always get another boy friend."

"I want this one."

"You've had better ones."

"Yes, I know. But this is the one I want."

There was a silence. Then a bird said, "We're sorry, Mazda. We only do what we're sent out to do."

Mazda drew a sharp breath. "Hell's Canyon," she said deliber-

ately. "Rural electrification cooperatives. *Public power.*"

THERE was a sound as of somebody's tail feathers being plucked distractedly. "Mazda, I *wish* you wouldn't," said the chief raven in a wincing voice.

"I will, though. I'll get in touch with the public power people. I don't care about the ethics of it. I'm in love."

"Haw!" the raven jeered harshly. It seemed to have regained its aplomb. "That lightning flash of yours burned out every tube in the radio. You couldn't send a message to Parker to ask for a stick of chewing gum. You're through.

"We'll give you half an hour. During any of that time you can come out unhurt. But after that you're in for it too. This time we're serious."

"What are you going to do?" Mazda cried.

"You'll find out."

Mazda went back to the house.

The clock on the mantlepiece read twenty minutes to three. The ravens would probably give her a few minutes' grace, so she had until ten or twelve minutes after the hour. Mazda knelt down by her consort and began to chafe his hands. When that didn't help, she ran to the kitchen, got a handful of red feathers from the chicken they had had for lunch yesterday, and began burning them under the Reverend's nose.

At seven minutes to three the Reverend's eyelids fluttered and the noise of a copter was heard in the sky. Mazda listened with strained attention, her eyes fixed on her consort. She longed to run to the window, but she was afraid of alerting the ravens. She could only wait.

The copter appeared to be having difficulties. The whoosh of its helix changed pitch, the motor stuttered and coughed. Once the noise seemed to recede; Mazda was afraid the plane was going away entirely. She fingered her wooden blast bracelet nervously. But the copter returned. It landed with a thump that was almost a crash.

The copter door opened and somebody jumped out. There was a sound of squawks, caws and rapid fluttering. A vigorous male voice said, "Ouch! *Ouch!* Birds! What the bloody hell!" More fluttering. Then sandaled feet thudded rapidly along the path. Somebody pounded at the door.

MAZDA ran to open it. The man who stumbled across the threshold was a dark, stocky Indian who wore white duck pants and red glasses, and carried a three-foot bow slung across his back. He was bleeding freely from half a dozen peck marks on his

shoulders and breast. "Lord Mithras," Mazda said prayerfully, "it's Joe Buell! Joe!"

"Mazda! Why didn't you show a light? What are you doing here? What *is* all this?"

Mazda told him. Joe listened intently, frowning more and more. "My word, what a mess," he said when she had finished. He pushed his red glasses up on his nose. "Has the Reverend come to yet?"

They turned around. Clem's eyes were open, but he was still lying on the floor. As they watched, he slowly closed his eyes again. "I guess he's not ready yet," Mazda said.

She looked at the clock. It showed two minutes to three. "Let's get him up and walk him," she said harriedly. "It might help him to get back to normal. Oh, Mithras, how late it is!"

The Reverend Adelburg was limp and slippery, but they managed to get him to his feet. As they guided his rubbery footsteps about the room, Mazda said, "I haven't seen you since you were in Canada, Joe. Those nights in Saskatchewan! I didn't know you were one of the Reverend's men."

"Since 1965," Joe answered briefly.

"How come? I thought you danced Shalako at the pueblo one year."

"I did. But you should see Halonawa now. There's a red and purple neon sign twenty feet high over the plaza. It reads, 'Welcome to Halonawa, Home of the Shalako.' After that I joined up with the Rev. A nice dark Christmas seems a wizard idea."

He plainly didn't want to pursue the subject further. Mazda said, "If the Reverend revives in time, what'll we do?"

"Can you pilot a copter?"

"I can drive a car."

"A copter's really easier." He gave her directions. "The motor's missing a little, but I don't think you'll have any trouble. Orient yourself by Parker and the dam. The dam's just north of us.

"If the Rev comes to in time, make a break for it with him in the plane. I'll create a diversion by climbing out the window and shooting at those bloody birds. I owe them some arrows, at that."

"I wish I knew what they had in mind," Mazda said.

V

AT five minutes after three the Reverend's willow-withy body stiffened. His eyes opened. He raised his head and looked about him. "What a lovely day," he said in a pleasant, conversational voice.

Mazda's face puckered. For a moment she seemed about to burst into wild tears. Then she blinked her eyes and shook her head defiantly. "He hurt his head when he fell, that's all. He'll be all right later. He's got to be all right. And he may really be easier to handle this way than if he wasn't goofed. He's a stubborn man."

Joe had gone over to the table and was putting out the lamp. He handed his red glasses to Mazda. "Makes piloting easier," he said. Then he opened the window on the left and swung himself out of it. He gave a high, passionate battle cry. There was a rush of feathers and some frenzied squawking. Joe's bow began to twang.

Mazda grabbed the Reverend by the hand. "Nice Christmas," she hissed. "Come along." Bent forward, one arm raised to shield her eyes, she pulled him after her at a run toward the door.

The night had grown darker. The sky was heavily overcast. None the less, she could make out the improbable shape of the copter. "Hurry!" she said to Clem Adelburg. "Run!"

Wings buffeted around her. Claws struck at her face, her cheeks, her hair. The Reverend Adelburg gave a cry of pain; Mazda had to use her free arm to wipe her own blood from her eyes. Then they were in the copter and the door was slammed.

She turned the switch. The motor gave a cough and started. Mazda was trembling with excitement, but she followed Joe's instructions. Slowly the copter rose.

She had put on the red glasses before they left the house. As her eyes grew used to the darkness, she made out the glimmer of the river in front of her and the flat surface of Parker dam. She wanted to go west, toward Los Angeles. The copter climbed a little. She tried to turn.

Wings whizzed by her. Mazda grinned. She twisted the blast bracelet on her wrist. The tiny receptor within it vibrated. There was a flash of light, and the bird plummeted to the ground.

When it hit the sand there was a faint concussion. The floor of the copter shuddered. After a second the smell of almond extract tinged the air.

The bird had been carrying a cyanide bomb.

Mazda sent the copter a little higher. Her mind was a kaleidoscope of tumbling fears. The possibility of more bombs, of explosive bombs, of a kamekazi attack on the copter's propeller, played leap-frog in her brain. And what about Joe? Dear Joe, he'd been wonderful in Saskatchewan. Had they got him yet?

She looked back anxiously at the cabin. Joe had vaulted up on the roof and was standing with one foot planted on either

side of the ridge pole, like a Zuñi Heracles. The thick clouds behind him had begun to be tinged with light from the rising moon; she could see that though his bow was ready and he had an arrow drawn nearly back to his ear he wasn't shooting. His eyes were fixed intently on the sky.

She followed the direction of his gaze. Very high up, so high that they looked no bigger than crows, seven of the big black birds were flapping rapidly northward in single file.

FOR the next five minutes or so nothing at all happened. The copter plodded steadily westward toward Los Angeles, down low, along the line of the aqueduct. This apparent quiescence on the part of her opponents unnerved Mazda more than a direct attack would have done. She couldn't believe that the PE&G would let her and Clem escape so easily.

Suddenly along the sky in front of her there passed a vast flash of light. For an instant the desert was as bright and white as day. Then the darkness closed down again and thunder crashed.

Mazda's hands shook on the controls. The storm that was coming up might, of course, be merely a storm. Or it might have been sent by the Company. But if Nous . . . but if Nous . . . but if Nous, that enormous and somehow enigmatic power that operated from the far side of 3,000 A.D. . . . if *Nous* had decided to stretch out its arm against her and Clem, there wasn't a chance in the world that she and the Reverend would continue to live.

There was another prodigious lightning flash. The desert, the aqueduct, a line of power poles, a small square building, burned themselves on Mazda's eyes. When darkness came back the Reverend, who had been sitting quite calmly and quietly beside Mazda all this time, stirred. "Wonderful fireworks," he said approvingly.

Mazda's eyes rolled. "Clem, baby," she said despairingly, "what'll I *do?*" She looked around as if hunting an answer. Then the bottom of the heavens dropped out.

The heaviest precipitation recorded to date in a cloudburst is two and a half inches in three minutes. What fell on the copter now was heavier. Inside of two seconds after the avalanche of water had begun to pour from the sky the copter was down flat on the ground, as if it had been pushed into the sand by a giant hand.

The noise inside the cabin was deafening. It was like being a dried pea shaken within a drum. It beat along the body like hammers. Mazda, looking up open-mouthed, saw that the copter ceiling was beginning to bulge.

The downpour—the cataract—stopped as suddenly as it had begun. There was a minute of dazed silence in the cabin. Then Mazda, pushing hard against the door in the warped copter body, got it open and scrambled out.

THE copter was deep in the sand. One blade of the propeller had been broken off entirely. The other hung limply parallel to the shaft.

Mazda stood shivering. She took off her red glasses absently and dropped them on the sand. The sky had cleared. The moon was almost up. She reached inside the cabin and caught Clem Adelburg by the wrist. "C'mon," she said. She had seen a building, just before the cloudburst. They might be able to take cover in that.

She struggled over the sand with the Reverend following docilely at her heels. The building, once reached, turned out to be a Company substation, and Mazda felt a touch of hope. She could get in, despite the *Danger* and *No admittance* signs, and the ravens might be deterred, even if only slightly, by their respect for Company property.

The substation door would open to a verbal signal. Mazda twisted her blast bracelet twice on her arm, inhaled, and swallowed. "Alameda, Alpine, Amador, Butte," she said carefully.

Nothing happened. She cleared her throat and began again, a couple of notes lower. "Alameda, Alpine, Amador, Butte." There was a faint click. "Calaveras, Colusa, Contra Costa, Del Norte, Fresno—"

The door swung wide. Mazda's enumeration of the counties of California had worked. She took the Reverend by the hand and led him through the opening. "Stanislaus, Sutter, Tulare, Tuolomne, Ventura, Yuba, Yolo," she said. The door closed.

It was much darker inside the substation than it had been outside on the white desert, and the air was filled with a high humming that sounded, and actually was exceedingly dangerous. Mazda put her arm around Clem's shoulders. "Don't move, baby," she said pleadingly. "Don't touch anything. Stay close to Mazda and be quiet."

The Reverend coughed. "Certainly, my dear," he said in quite a normal voice, "but would you mind telling me where we are? And what has been happening?"

MAZDA went as limp as if she had been coshed on the head. She clung to him and babbled with relief, while the Reverend stroked her soothingly on the hair

and tried to make sense out of her babbling.

"Yes, my dear," he said when she had finally finished. "Do you hear a noise outside?"

"What sort of a noise?"

"A sort of whoosh."

Mazda drew in her breath. "Shin up to the window and look out," she ordered. "Look out especially for birds."

He was at the high, narrow window only an instant before he let himself down. "There was only one raven," he reported, "but there were a number of birds like hawks, with short wings. There seemed to be humps on their backs."

Even in the poor light of the substation Mazda visibly turned green. "Goshawks!" she gasped. Then she began taking off her clothes.

Dress, slip, panties went on the floor. She stood on one foot and removed her sandals alternately. She began going through her hair and pulling out bobby pins. She took off her blast bracelet and added it to the heap.

"What are you doing that for?" the Reverend inquired. It seemed to him a singularly ill-chosen time.

"I'm trying to set up a countercharm, and I have to be naked to do it." Her voice was wobbling badly. "Those birds—those birds are goshawks. I've never known the Company to send them out but once before. Those lumps on their backs are portable nous projectors. They're trying to teleport us."

"Teleport us? Where to?"

"To—to the Company's cellars. Where—they attend to people who believe in public power. They—oh—I can't talk about it, Clem."

She crouched down at his feet and picked up a bobby pin. "Don't move," she said without looking up. "Try not to think."

SHE began to scratch a diagram around him on the floor with the pin. He coughed. "Don't cough," she cautioned him. "It might be better to hold your breath."

The Reverend's lungs were aching before she got the diagram done. She eyed it a moment and then spat carefully at four points within the hexagram. A faint bluish glow sprang up along the lines she had traced on the floor.

Mazda rose to her feet. "It'll hold them for a few minutes," she said. "After that . . ."

The Reverend raised his eyes to the rafters. "I'm going to pray," he announced. He filled his lungs.

"O Lord," he boomed powerfully, "we beg thy blessing to preserve me and Mazda from the power of the ravens. We beg thy blessing to help us stay here and not be transported to the PE&G's cellars. Bless us, O Lord. Preserve us. And help us to make thine old-fashioned Christmas a living reality. Amen, O Lord. Amen!"

Mazda, too, was praying. Hands clasped over her diaphragm, head bowed, lips moving silently, she besought her bright divinity. "Mithras, lord of the morning, slayer of the bull of darkness, preserve my love and me. Mithras, lord!"

Prayer is a force. So is magic. So is the energy from nous projectors. These varying forces met and collided in mid air.

The collision made a sort of vortex, a small but uncomfortable knot in the vast, conscious field potential that is the Infinite part of Nous. There was momently an intense, horrible sense of pressure and tension in the very air. The substation hummed ominously. Then, with a burst of energy that blew out every generator from Tacoma to San Diego, the roof came off.

(The PE&G crews worked overtime on the repairs, but there were too many wrecked generators. All along the Pacific slope, and as far inland as Provo, Utah, it was as dark a Christmas as even the Reverend would have wished.)

There was a pause. The noise of breaking timbers died away. The Reverend Adelburg and Mazda were looking upward frozenly, mouths open, necks outstretched. Then a gigantic hand reached in through the hole in the roof. A gigantic voice, even bigger than the hand, said in enormous and somehow Oxonian accents, "Very well. *Take* your old-fashioned Christmas, then."

IT was just before sunrise on December 21st. The Christians, who would be strangled at dawn the next day and then burned in honor of the solstice, were gibbering away in their wicker cages. There were three cages full of them. Great progress was being made in stamping out the new heresy. The Christians would make a fine bright blaze.

The druid looked up at the cages, which were hanging from the boughs of three enormous oak trees, and nodded with satisfaction. His consort, Mahurzda, would find it a hard job strangling so many people. He'd have to help her. It would be a pleasant task.

Once more he nodded. He tested the edge of the sickle he was carrying. Then the druid who had been—would be—would will have been—the Reverend Clem Adelburg hoisted up his long white robe and clambered up in the nearest of the oak trees to cut the sacred mistletoe.

— MARGARET ST. CLAIR

THE WATERY WONDERS OF CAPTAIN NEMO

By THEODORE L. THOMAS

This isn't fiction.

It concerns the legends all of us have heard about the uncanny predictions of J. Verne, Esq.

Most of them are!

Illustrated by BURNS

JULES VERNE'S *20,000 Leagues under the Sea* was published in 1869. Since then we have heard a great deal about the excellence of the science, speculation and prediction it contains. People seem to feel that Verne's sound scientific speculation makes the novel good science fiction, even though they may not care much for it as a straight story.

But these days the waters are full of SCUBA divers. (The word "SCUBA," as most people are beginning to know, is made by taking the first letter in each word of the phrase "Self-Contained Underwater Breathing Apparatus.") SCUBA divers carry their own air down into water as deep as three hundred feet in lakes, oceans, streams, rivers, bays, quarries and caves all over the world. There is a rash of books on the subject, and many SCUBA divers are fairly well-versed in the history of man's descent beneath the water. When a SCUBA diver takes a critical look at *20,000 Leagues under the Sea*, a new interpretation of the novel emerges.

The novel isn't at all what literary critics have said it is.

The diving gear and the diving scenes are technically pretty bad, behind the times even for 1869. The submarine *Nautilus* itself is out of date for 1869, with the sole exception that electricity is the source of power. In none of these technical situation did Verne take advantage of knowledge readily available to him at the time. It is as if he sat in his chair and dashed off his concepts without bothering to get up and check facts that must have been in books in the same room with him. He spun his yarn from the material in his head. And there you have a clue to the real value of the novel.

Verne was a mighty story-teller. His science was bad, his speculation absurd, and even his plot and his characters might be poor. No matter. Put them all together with the magic of Verne's story-telling ability, and something flames up. A story emerges that sweeps incredulity before it.

IT is a very difficult thing to read this novel in a hostile frame of mind, looking for the blunders, noting all the scientific misinformation. For one thing, Verne uses a nifty device for presenting much of the so-called scientific data in the novel. He will have one of the characters, say the narrator, Professor Aronnax, poised on the brink of some exciting event, and then he will ladle in the scientific nonsense. In this posture of the story, who stops to think about science? Verne can get away with almost anything, and he does.

The power of Verne's story-telling ability shows up in another odd way. After reading the novel, people remember things from it that are not there. The impression that the novel contains valid scientific prediction seems to grow as the years roll by. Recently, a United States Patent Office official received an interesting inquiry. Was it true that a patent examiner had rejected the patent application of an inventor of a new periscope because of the periscope described by Jules Verne in *20,000 Leagues under the Sea?* Well, the fact is that Verne is totally silent on the subject of periscopes in the novel. The *Nautilus* had no periscope.

Another mis-remembered description concerns the storage batteries used aboard the *Nautilus*. There are none. The only time Verne specifically mentions a battery is in connection with diving dress; Captain Nemo says the battery makes electricity out of sodium instead of the usual bichromate of potash. The novel leaves readers with the impression that it is a storehouse of advanced technology, and the impression grows as the reader ages. (It would be interesting to find out how many adults reread it after having read it in their teens. Libraries tend to carry it in the section for younger readers.)

Probably the best parts of the novel are those which describe the activities of the characters as they roam on the bottom of the sea in their SCUBA gear. Verne was not concerned with many of the dangers guarded against by modern SCUBA divers, things like air embolism, nitrogen narcosis and the bends. That's all right. Diving was not sufficiently far advanced for these things to be of concern. It wasn't until the 1870s that the Frenchman Paul Bert completed the 1660 work of the Englishman Robert Boyle. Bert put out a book on diving physiology describing how nitrogen can bubble out of a diver's blood when the diver comes up too fast. Bert was the man who pointed out the ways to avoid the bends. The diver could recompress in a chamber at the surface in order to relieve the pressure slowly and at will, or the diver could come up slowly and in stages. Both of these systems allowed the excess nitrogen in the blood to be thrown off in the exhaled air. Verne could not possibly know about such things, and the lack of discussion of such diving dangers in the novel cannot be held against him.

THE SCUBA used by Captain Nemo and his crew has long been held up as a good example of Verne's ability to forecast scientifically. Even Verne himself in his later years forgot that Captain Nemo says, when he first describes the diving apparatus to Professor Aronnax, "It is to use the Rouquayrol apparatus, invented by two of your own countrymen, which I have brought to perfection for my own use." The two "countrymen" are Rouquayrol, a mining engineer, and Denayrouze, a Navy officer. Their SCUBA gear was in use in 1865, four years before Verne published his novel. In the actual gear, an air hose ran from a compressor on the surface down to a tank carried on the driver's back. A second hose ran from the tank to a mouthpiece through which the diver breathed. Some kind of valve on the tank fed the compressed air to the mouthpiece at a pressure about equal to the pressure of the water at that depth. Once the diver's tank was charged, the diver could unplug the hose that ran to the surface and freely walk around a bit using the air in his tank. He could then return to the hose and plug in again for another charge of air.

Apparently Verne had heard about the gear, although toward the end of his life he insisted he had dreamed about it. For use in the novel, he made some changes in the gear without bothering to check the gear itself, or even to think much about it. For one thing, Captain Nemo says, "I, in encountering great pressures at the bottom of the sea, was obliged to shut my head, like that of a diver, in a ball of copper." This was nothing new, either. The closed-helmet diving dress had been in steady use since its invention by Augustus Siebe in 1840 . . . a diving dress so good that nothing more than refinements have been added to it to this very day. Verne adds an innovation to the helmet in the novel. "In the Rouquayrol apparatus such as we use, two india-rubber pipes leave this box and join a sort of tent which holds the nose and mouth; one is to introduce fresh air, and the other to let out the foul, and the tongue closes one or the other according to the wants of the respirator."

Apparently Verne was not aware of the existence of check valves, so he requires that the diver use his tongue to control the incoming and outgoing air. Yet check valves were in use in the Siebe diving helmet 29 years earlier, in 1840. Verne simply did not bother to get out of his chair and check. On top of that, he forgets that his SCUBA gear has no check valves. On that first walk on the bottom of the sea, Professor Aronnax, Captain Nemo, Conseil and one of the crew were out under the water for a total of ten hours. Toward the end of that walk they all get sleepy and take a little nap. Things have been

happening so fast and furiously that both Verne and the reader alike forget that Verne's SCUBA gear demands that the tongue alternately pop into and out of the two breathing tubes, a good trick when one is asleep.

THEN there is the matter of air consumption. The modern SCUBA diver exhausts each breath into the water, except in the rarely-used rebreather types of diving gear. Verne properly saw that air does not last very long when you breathe it once and blow it out into the water, so he said that his divers would breathe the same air over and over. Each diver would carry a tank of air charged by "the pumps of the *Nautilus*" to a pressure of "fifty atmospheres." The 71.2 cubic foot tank of a modern SCUBA diver is charged to a pressure of 153 atmospheres, and most of us run in a little more. Such a charge will last for 25 minutes at a depth of 100 feet. Verne needed to keep his divers going for ten hours.

Early in the novel Professor Aronnax points out that a man "consumes, in one hour, the oxygen contained in more than 176 pints of air, and this air, charged (as then) with a nearly equal quantity of carbonic acid, becomes unbreathable." (The French version of the novel states the quantity of air as 100 liters; this accounts for the odd precision of the equivalent in British pints.)

In ten hours, Verne's divers would each need 1760 pints of air. This converts into 0.71 cubic feet of air at the specified 50 atmospheres, assuming air to be a perfect gas, and is a nice convenient quantity to carry on one's back. It weighs about 2.59 pounds, and it contains only about 0.54 pounds of oxygen. Professor Aronnax also says about the air they will breathe during the dive, "when it only contains fifteen per cent of oxygen, it is no longer fit to breathe." This leaves a total of 0.15 pounds of consumable oxygen for each man for a ten-hour period, about one-tenth the oxygen needed by a 150-pound man engaged in very mild exercise at atmospheric pressure. This man would also generate 1.25 pounds of carbon dioxide in a ten-hour period, producing with the 1760 pints of air an atmosphere containing about 48.3 per cent carbon dioxide. This would swiftly kill him.

If the 0.54 pounds of oxygen available in the tank were converted to carbon dioxide, the diver's atmosphere would still contain 20.8 per cent carbon dioxide, enough to kill quickly. A carbon dioxide concentration of 6 per cent causes distress, and 10 per cent produces unconsciousness.

There are other interesting details about the breathing arrangements of Verne's divers. Exhaled air goes back into the portable tank on the diver's back so it can be used again. But the tank is stated to be maintained at a pressure of 50 atmospheres. We are not told how a human being could possibly exhale into a chamber maintained at such a high pressure. In any case, one passage of air through human lungs reduces the oxygen content to about 15 per cent, at which point Verne says, pretty correctly, it is no longer fit to breathe.

VERNE frequently mentions water pressure throughout the novel. If you look for it, it becomes apparent that Verne has no clear idea of the effects of water pressure on immersed objects, or even how diving gear of any kind works. The diving dress for his divers is "made of india-rubber without seam, and constructed expressly to resist considerable pressure. One would have thought it a suit of armor, both supple and resisting." Verne therefore does not know that the air pressure inside the suit balances the water pressure outside the suit, and that the suit does not have to resist "considerable pressure" at all. In fact, the suit is quite flexible, which Verne realizes in a vague sort of way. Not understanding this principle of the balancing of pressures, he feels compelled to offer some explanation of how a diver can exist under great water pressure in a flexible suit. So he talks about the suit's "resisting."

In one scene Professor Aronnax is looking out the great window in the saloon of the *Nautilus*. The *Nautilus* is deep, and the Professor sees a sunken ship suspended in mid-water. It had sunk to a depth where its density equaled the water density, and there it hung, according to Verne. The good Professor says, "we often saw the hulls of shipwrecked vessels that were rotting in the depths, and, deeper down, cannons, bullets, anchors, chains and a thousand other iron materials eaten up by rust." What he means is, heavier objects come to rest suspended in water at depths deeper than light objects. Verne believes that sinking objects all seek their own levels in the depths, each according to its density, and there they hover.

As a matter of fact, water is incompressible for all practical purposes; its density does not change much in the oceans. At the deepest parts of the oceans, at depths of some 36,000 feet—almost 1,100 atmospheres—the

enormous pressure increases the density only by some six per cent. Verne's false idea of the effect of the depth on the density of water shows up in the novel every so often. At one point Professor Aronnax notes that the trans-Atlantic cable rests on the bottom in deep water "without anchorage". Whenever the *Nautilus* is to make an unusually deep dive, "the screw set to work at its maximum speed" in order to drive the *Nautilus* down into that "dense" water. Once down, all the *Nautilus* has to do to reach the surface again is to shut off its screw and tip its vanes upwards. It shoots to the surface, squeezed up like a slug of toothpaste from a toothpaste tube. In describing the strength of any animals living in water strata miles beneath the surface, Professor Aronnax says, "it requires incalculable strength to keep one's self in these strata and resist their pressure." Scientists knew better in those days.

The *Nautilus* itself, as a submarine, does not represent anything new in the submarine art, with the exception of the idea of using electricity for power. Captain Nemo says that he extracts sodium from sea water and makes electricity out of it. Everything aboard is run by electricity. But even this speculation is not significant, since the work of men like Volta, Ampere, Cavendish, Henry, Joule, Ohm, Davy, Coulomb, Faraday, Watt and others was completed years before 1869. An American inventor, Thomas Davenport, patented the first electric motor. He ran a railroad car with it in 1839. So the use of electricity aboard the *Nautilus* did not call for the exercise of the imagination.

VERNE'S *Nautilus* was named after Robert Fulton's *Nautilus*, built in 1800 in France, and it was more than named after it. Fulton's *Nautilus* had an observation dome protruding from the upper deck, just like the one on Verne's *Nautilus* 69 years later. In 1855 a German named Wilhelm Bauer launched a submarine fifty-seven feet long. It was named the *Sea Devil*, and it carried a crew of thirteen. It was built to dive to 150 feet, and it had an oxygen-regenerating system, an observation dome at the bow, and an air lock so that a diver could enter and leave under water. All this was fourteen years before Verne's *Nautilus*. Once a day it was necessary for Verne's *Nautilus* to surface to replenish her air. She carried pressure tanks for air storage, but no air-regenerating system.

Early in the novel Captain Nemo takes Professor Aronnax on a tour of the *Nautilus*. At the end of this tour the reader supposes he has learned something about how the *Nautilus* operates. This isn't true. We learn, "This engine room, clearly lighted, did not measure less than sixty-five feet in length. It was divided into two parts; the first contained the materials for producing electricity, and the second the machinery that connected it with the screw." Then Captain Nemo tells us, "I use Bunsen's contributions, not Ruhmkorff's. Bunsen's are fewer in number, but strong and large, which experience proves to be best. The electricity produced passes forward, where it works by electro-magnets of great size, on a system of levers and cogwheels that transmit the movement to the axle of the screw." And we never again hear anything about the front part of the room where the electricity is produced. In fact, the only feature we learn about the back room is that the system of levers and cogwheels turns the screw a hundred and twenty revolutions in a *second*, which gives the *Nautilus* a speed of fifty miles per hour—as you might well imagine. This "Bunsen and Ruhmkorff" business seems to be thrown in for the distinction gained from the use of a couple of shining scientific names. Bunsen, among many other things, invented an electric cell that used plates of gas coke instead of platinum, but Captain Nemo does not seem to be talking about batteries here. Ruhmkorff invented an induction coil in 1851.

Anyhow, this is all we find out about the mechanism that drives this most famous of submarines. It isn't much. Yet, thinking back to the description after the lapse of a few years, it seems rosily complete.

WHEN the tour is over, Captain Nemo and Professor Aronnax sit down in the saloon while the captain describes more details of the *Nautilus's* construction. Most of these involve dimensions of the ship. It is here that we learn the secret of the enormous strength of the *Nautilus's* hull, a strength that allows the vessel to dive to depths of several miles once it gets up enough power. The hull is double. "Indeed, owing to this cellular arrangement it resists like a block, as if it were solid. Its side cannot yield; it coheres spontaneously, and not by the closeness of its rivets; and the homogeneity of its construction, due to the perfect union of the materials, enables it to defy the roughest seas." So, for those reasons, the double hull accounts for the great strength of the *Nautilus* . . . apparently on the theory that if one shell is good, two must be better.

Captain Nemo continues to give figures, physical dimensions

and properties of materials, which again seem to impart something scientific. Here there occurs the remark, "steel plates, whose density is from .7 to .8 that of water." One translation has ".07 to .08 that of water." A non-technical reader might see nothing wrong, and even a technical reader might slip over the grossly understated density of steel. Verne doesn't really mean it, either; he is not giving us a science-fiction description of lighter-than-water steel. In these paragraphs he also states the weight and dimension of the outer shell, so it is pretty easy to calculate the density of his steel for ourselves.

It works out to be the normal heavy steel we are used to, and not the light stuff he says it is.

While discussing the strength of the hull, Captain Nemo mentions that at a depth of 1,000 feet of water, the walls of the *Nautilus* bear a pressure of 100 atmospheres. But, as every SCUBA diver knows, water pressure increases an additional atmosphere for every 33 feet of depth, not every 10 feet. So at 1,000 feet of water the pressure on the hull of the *Nautilus* would be a total of 31.3 atmospheres, not 100. This same sort of mistake occurs during that first walk on the bottom of the ocean. Professor Aronnax tells us, "We were at a depth of a hundred and five yards and twenty inches, undergoing a pressure of six atmospheres." But this depth of 316 feet produces a total pressure of 10.6 atmospheres.

In this instance Verne thinks every 53 feet of depth produces an additional atmosphere of water pressure, while previously he thought every 10 feet did so. Yet in the opening pages of the novel Professor Aronnax explains to Ned Land, "the pressure of the atmosphere is represented by the weight of a column of water thirty-two feet high." This is just about right; Verne has the correct datum, but he doesn't bother to use it later.

The book frequently reports popular fallacy as if it were scientific fact. For instance, Professor Aronnax muses that the huge mass of wooden material, including wrecked ships, floating in the central point of the Sargasso Sea "will become petrified by the action of the water, and will then form inexhaustable coal mines." A clue as to why such nonsense should be in the novel can be found about halfway through. Professor Aronnax knocks on the door of Captain Nemo's room. He is invited in. He enters and "found Captain Nemo deep in algebraic calculations of *x* and other quantities." Now, nobody with even a smattering of mathematics would put it that way. People don't sit around calculating "*x* and other quantities" as an end in itself. Such a remark could only be made by a man with no mathematical background whatsoever. Verne trained as a lawyer, and then for awhile he thought about going into the banking business. Any knowledge of science he had must have rubbed off on him, and very thinly at that.

WE have been talking about Verne's physical science. There is good reason to suspect that his biological science is just as bad. It doesn't have the right flavor. The crew of the *Nautilus* throw out a net, say in the Indian Ocean, and haul it back loaded. Professor Aronnax looks in the net and says something like, "I saw in the net . . ." and there will follow a listing of the sea creatures in the net, anywhere from one paragraph to three pages long. It is as if Verne pulled toward him a text on marine biology, turned to the listing "Flora and Fauna of the Indian Ocean."

This sort of thing goes on frequently in various bodies of water. Verne has his man look in the net and rattle off what he sees there. Sometimes, as a variation, Professor Aronnax stands at the window while the *Nautilus* cruises beneath the surface, and calls off the contents of the sea they are passing through.

All through the novel occur remarks that show a lack of information on a particular subject—information, that is, which could have been obtained easily enough by asking or looking. One mile visibility under water. Good natural light at 150 fathoms. 7,000 fathom depth of water in the Indian Ocean. It goes on and on.

It is time to emphasize again that Verne is a great story-teller despite his scientific and speculative nonsense. The novel is sprinkled with arresting thoughts. Professor Aronnax wonders if some day there will be cities at the bottom of the oceans, cities that rise to the surface once a day to replenish their air as the *Nautilus* does. Later on, in a conversation between Captain Nemo and Professor Aronnax, they discuss the possibility of excavating the portion of the bottom of the Red Sea where the Pharaoh's army perished while pursuing Moses and the Israelites; such an excavation ought to "bring to light a large number of arms and instruments of Egyptian origin." What a lovely concept!

As a novel, *20,000 Leagues Under the Sea* is a good story. But there is not a single bit of valid speculation in it; none of its predictions has come true. The purported science in it is not semi-science or even pseudo-science. It is non-science.

— THEODORE L. THOMAS

By WILLIAM W. STUART Illustrated by WALKER

You could say Jonesey and/or I were not all there, but I don't see it that way. How much of Stanley was or wasn't there?

THE LITTLE MAN WHO WASN'T QUITE

HAVE you ever been clear down there on skid row? Oh, sure, every city has one and no doubt you have given it one of those look-away-quick side glances. That isn't what I mean.

What I mean is, have you ever been really *down* there?

Probably not. And, if you haven't, I could make a suggestion. Don't go.

Skid row is a far, remote way and there are all kinds of horrors down there, the seen and the unseen. To each his own, as they say, and everyone there has his own personal collection. All right. General opinion is to let them be there and the hell with them, people and horrors too, if there is a distinction. Unfortunate, but what can you do? Nothing. Look the other way. That's all right with me. I don't know anything better to do about the horrors that are, or that may be on skid row than to hope they will stay there where they belong—and let me forget them.

That's why I'm writing this. I want to do the story of what I saw, and what I think I saw or felt, and what I didn't see, to get it off my mind. Then I am going to do my damnedest not to think of the whole thing.

Me, I know about skid row because I was there. That's my personal problem and another story, before this one, and the hell with that, too. I once had a wife and a couple of kids. I had a lot of problems and then no wife and no kids and I made it to skid row. It was easy. For a while I was there, all the way down, where the gutter was something I could look up to. Well, turned out I had friends who wouldn't quit. By their efforts plus, as they say, the grace of God, I came off it; most of the way off it, at least. No credit to me, but not too many ever manage to make a round trip of it.

Who are the misfits and derelicts on skid row? Anybody; nobody. Individuals, if they are individuals, come and go. The group, with few exceptions, is always the same. It is built of the world's rejects — lost souls, bad dreams; shadowy, indistinct shapes, not a part of life nor yet quite altogether out of it, either.

I was down there. I left. But I kept passing by every once in a while to pay a little visit. For that I had two reasons. One, I could sometimes pick up a lead on something for a Sunday feature for my paper. The other — just taking another look now and then at where and what I had been was a sort of insurance for me.

SO, from time to time I would stop by The Yard for an evening. I would spring for a jug. I was welcome. Those in the regular group knew me and they held me in no more than the same contempt they had for each other and themselves. Being no stranger — or, perhaps, not too much less strange — I fitted well enough with the misfits of that half-world where the individual rarely stands out enough to be noticeable.

Wino Jones, though, and his friend Stanley were, each in his own way, quite noticeable.

I first ran across Wino Jones and Stanley one early spring evening. It was a Thursday. I was beat. It had been a tough week — a political scandal, a couple of fires and a big "Missing Kid—Fiend" scare. Turned out the kid had skipped school to catch a triple-feature horror show and was scared to go home when she came out late, so she went to hide out at Grandma's. The suspect fiend was a cockfight sportsman from the Caribbean colony smuggling home his loser under his leather jacket.

But it had been a rough week with a lot of chasing around and getting no place that left me in one of those hell-with-it moods. Like, maybe, I ought to take a week or so off and — and the hell with that. It was time for me to pay a little remembrance-of-things-not-so-far-past visit down on the row.

I left the city room, tired, dirty, needing a shave. Where I was headed, this would put me ahead of the fashion parade, but it would serve. I stopped for a

bowl of chili at Mad Miguel's and then wandered down to those four blocks on South River Street, known as Bug Alley, that make up the hard-core skid-row section of our city.

Across from St. Vincent's in Scott Square, called the Yard, by the old wall, there was a group of six or eight passing the time and a nearly dead jug. I shambled over and squatted down. Got a hard, bloodshot look or two, but not because the jug in the public park was against the law. Even if I was the law, so what? These, they made the jail now and then, if there were too many complaints, if they made a disturbance. But not even the jail wanted them. The hard looks wondered only if the jug should be passed to me or by me.

I lit a cigarette, took a couple of drags and handed it on. Bootnose Bailey, big, old, bald, with the cast-iron stomach and leather liver, settled the jug question by handing it to me. I lifted it, letting only the smallest trickle of the sticky sweet cheap wine past. It is not for me; no more. It is sickening stuff. But, as always, the effort of holding back left me shaking. All right; with shaking, I had plenty of company. The next man looked pleased at the two gulps left in the bottle and drained it.

"Ed?" Bootnose asked in his hoarse canned-heat whisper. "You gonna spring for a jug?"

I squatted a minute or so and then stood and started fumbling around through all my pockets. This is local protocol. Coin by coin, I spread a dollar and a half in silver out on the flat collection stone in front of me. A huge, powerful-looking colored man, new to me, hunkered down against the wall, smiled gently and added a quarter. Bootnose scooped it up and went to make the run for the jug.

I WAS, I guess, stretching the ground rules a little by the way I stared at the big fellow. But he surprised me mildly. For one thing, he looked in good shape; strong, no shakes, no fevered ghosts back of the bloodshot curtain of the eyes. And, apart from that, you don't find very many Negroes on skid row, at least in our area. I don't know why.

"Jones," he said, softly, politely, "Wino Jones. You're Ed? Ed, this here is my friend Stanley." He waved a big hand at a wispy little man beside him.

Funny I hadn't seen Stanley before, but there he was. That I want to make clear. Stanley was there; no question about it. Only he was such a totally remote, insignificant, unobtrusive little man, it is hard for me to remember him even now. Hard to remember what he *was* like, that is. He wasn't colored. He was small. His eyes, his hair, I don't know. He must have had some or I would have noticed. And he had a sort of sour, distant, hurt bitterness about him, I recall, and that is about all I can recall ever seeing in Stanley. Except for the last time I saw him — he looked mean then.

This time, I smiled and nodded. "Wino Jones, Stanley, welcome to our city, our little garden spot."

"There now, Stanley," Jones beamed, "he can see you well enough. You're doing fine, Stanley, getting better all the time. You *do* see him plain, don't you, Ed?"

"Huh? Yeah, sure I see him. Why not? Does he think he's invi — "

Jones interrupted me, "Look, there comes Mr. Bailey back already."

Well, it was a little odd. But then, down there the odd is normal, the normal odd. I didn't think anything of it.

I sat a couple of hours. One jug went and then another. It did seem to me that Wino Jones missed by a lot on proving out his nickname. At least he didn't love up the passing bottle as though it might be the last one in the world — which, as every skid-row pro desperately fears, it might very well turn out to be.

Stanley's drinking? I didn't notice.

After a while I wandered off. My appreciation of the fact that I was able to wander off was shored up again and I was glad enough to get back to work the next day without thinking anything much more about it.

I didn't think about Wino Jones or Stanley again till the first of the next week. Then I was on early shift at the paper, due in at six A.M. At quarter to, I yawned my way out of Mad Miguel's after coffee, an egg and hotcakes. Mig's hotcakes were hot, too; made them with chili. Hard on the stomach, but they popped the old eyelids open in the morning. As I stood a minute in the doorway, my watering eyes spotted Wino Jones coming out of the alley that led around to Mig's kitchen side. He saw me but, thoughtfully, didn't crack till I gave him a, considering the time, reasonably bright hello.

"How's it, Ed? You going on early, uh?"

"Yeah, Wino — ah — Jonesy. Mind if I call you Jonesy?" He didn't. "What's with you? Been washing a dish for the Mig?"

He nodded. Some of the upper-level boys from the row

worked off and on at odd jobs like that. It didn't make Jones unique, but it made him stand out a little.

"Me and Stanley, we like a little change in our pockets. Right, Stanley?"

He looked down and a little to one side, just as though he were asking agreement from someone. Only there wasn't anyone there. There wasn't anyone in sight on the block but Jones and me.

BUT Jones smiled and nodded warmly at the short vacancy beside him and then looked back at me. "Stanley here, he come by to meet me after work. Mr. Mig, he let me fix us a bite of breakfast when I finish up the night."

I looked again at where Stanley was supposed to be standing and then, blankly, back at Jones. He shrugged almost unnoticeably and, I thought, barely shook his head.

"Well-l — " he said, "I expect me and Stanley better drift back on down to the Yard before some fuzz comes along and fans us down."

"Yeah?" I said. "Yeah. So long, Jonesy — Stanley."

I don't know why I added the "Stanley" but, obscurely, it seemed to please Jones. He gave me a big smile and then walked off down the street, chatting companionably to — no one. I didn't get it. Well, Stanley present or absent rated very low on the list of the problems I was going to worry about. I went to work.

I ran into Jones every morning during the week I was on early; Jones, coming off work, with Stanley — who wasn't there. Odd, sure. But if Jones was stringing a way-out gag or playing with a mild hallucination, still it was nothing to me.

I did mention it to Mig, who only said, "Si, these one big hombre eat big. He like two plate eat for breakfast, plate he wash, bueno, what for I complain?"

So that was all. Nothing.

Toward the end of the next week, I wandered down to the Yard again and joined the little group of exponents of gracious almost-living by the wall. Jones wasn't there. But as I was settling down I glanced over at the Broad Street side of the square and I saw him strolling along toward us. He was smiling, talking, gesturing. He was alone. I looked twice. There was no one with Jones.

I settled down, took a drag or two on a smoke and passed it along. Lifted a jug. Got back the old lost, gone, miserable feel of the thing again. I looked up then at Jones who was just coming

around the mangy clump of bushes by the path. With him was a sour, whispy, scarcely noticeable little man. Stanley.

"Evening, Jonesy," I said, "and Stanley. Good to see you again." I meant it even though, come to think, it didn't really clear anything up. Jones gave me his smile and Stanley nodded suspiciously.

They moved in and joined the group. Somebody made a run; a couple. The talk staggered around as usual. Topics: booze; money, yesterday's and tomorrow's; booze; women — only occasionally and with mild, decayed interest; booze.

Jones put in a soft word or two from time to time until he finally stood up, stretched and said he was going up to Mig's. Stanley stayed. I know he did. I watched him. Afterward, I tried to remember if he said anything, but that I couldn't recall.

I went on home myself a while after Jones left. Stanley was still there, though, when I glanced back from Broad Street, I couldn't pick him out in the dim moon and street light.

Still nothing much, eh?

THE NEXT week I came on work at ten and I didn't see Jones — or not see Stanley — all week. Friday, I was back down at the Yard. That was out of my pattern. Usually one visit in a month or so was plenty. But now, for whatever reason, I was getting kind of interested in Jones — and Stanley.

This time Jones was there hunkered down against the wall when I wandered up. Coaster Joe squatted on one side of him. On the other side, no one. I looked; I looked close. There was no one there. Still, when I nodded around, I nodded at the empty space. Noticed that Bootnose Bailey was missing. A mild surprise. Bootnose and a bottle were nearly as much Yard fixtures as Gen. Scott in bronze and pigeons. I settled in. A little time and a jug went by. I still didn't see Stanley.

My curiosity finally insisted on a remark. "Jonesy, I — haven't seen Stanley tonight."

Jones smiled, not quite as easy and relaxed as usual. "Stanley isn't around tonight. He went someplace."

"Oh? Well, that's good." It seemed a safe statement. If Stanley had been in jail, Jones would have said so. Any other place was bound to be better. I was being unjustifiably nosy, but curiosity wouldn't let me drop it. "Where did he go?"

Jones shrugged. Then, seriously, "To tell the truth, Ed, I don't rightly know. Fact is, I

been a mite worried about old Stanley lately."

No one else was paying any attention to us. "So? How's that?"

"Well — " He shrugged again and then made a decision. "You know, Ed, it's a sort of a odd thing about Stanley. If you have a little time . . . ?"

"Time is what I have."

Jones sighed. "It might turn out to be a problem, I think. Bothers me some. It would be a kindness if you would let me talk to you about it."

I stood up. Jones, making a gesture that clearly set him apart, put a quarter on the flat collection stone as he got up to join me. We strolled off through the dusk in the park, quietly. Jones, even in a state of some unease, was a comfortable presence. Over on the Broad Street side of the Yard, we sat down on a bench.

"Don't rightly know how to begin," Jones said, scratching his head with a fielder's-mitt-sized hand, "but — Ed, I expect you noticed something funny about Stanley? Or maybe about me?"

"I noticed that sometimes I see Stanley and sometimes I don't. And that sometimes you act as though you see him when he positively is not there."

"Um, yes. Makes you kind of unusual too, Ed. Because with Stanley it is mostly like this — when he is around, I mean. There are people who see him; a few. But most people, they can't see Stanley at all. With you, seems like it changes. Uptown you can't see him; down here you can."

"What?"

"Now me, I see him most all the time. All the time when he's around, that is; when he hasn't gone off someplace, like tonight. But most people, what you might call really normal people — no offense, Ed — they can't ever see Stanley."

IT SOUNDED silly. But Jones said it with a calm conviction that carried weight. If I couldn't believe it exactly, I didn't disbelieve him either. You hear plenty of queer stories on skid row — dreams, nightmares, nonsense. There used to be one crummy, rummy old bum around called Gov'nor who used to claim he really had been a governor. He drank down some office duplicator fluid and died. Police routine checked. He was an ex-governor. Probabilities eliminate no remote possibilities; if you flip a coin long enough, someday it will stand on edge.

"How do you figure that?" I asked Jones.

"I don't want to sound like I think I am a brain," Jones said.

"I only read some. But these men down here — you might say, couldn't you, that they are maybe men who don't have much of a hold on the world any more?"

"True."

"And the world holds them mighty lightly. They are nothing. Nobody pays them attention. They are outside of everything. They are pretty much outside the world, even. Now you, Ed — you are mostly a part of the normal world. But one time you were all the way on down here, right? So you — "

"I have a feeling for it? Something like that?"

"Something like that. And so down here you are like the others; you can see Stanley. Uptown, you couldn't see him."

"Sounds nuts. But how? Why?"

"That goes back, way back. Stanley and me, we were kids together. Stanley, his people were what down there they call 'trash.' Fourteen, fifteen kids. Who was whose pa, who would know? Or care? And Stanley, he was kind of the runt of the whole litter. Nobody paid him any mind. He never talked much 'cause nobody listened. Got to be a real dopy, dreamy, moody kid. Not ever sick, but sickly. He was more like nothing than any kid I ever did see.

"Me, I lived down the road a piece from Stanley. I don't know why, but he took to following me around. Mostly because everyone else ran him off, I expect. I don't guess I was real good to poor Stanley, but I let him tag along. You would hardly know he was there; no trouble. And he struck me so sort of lost and pitiful, you know? I never had the heart to chase him. After a while, it got to where he even took to trailing along after me to school.

"Now that was a funny thing; kind of got me to wondering. There was a white kid down in that part of the country, running along after a colored boy to a colored school. You would expect that to attract a good deal of attention, wouldn't you? Maybe stir up a big storm in the county. But nobody ever hardly seemed to notice Stanley at all. There wasn't anything ever said about it.

"Well, you know, Ed, any kid, even Stanley, he wants some attention, some affection from someone. Stanley, all he ever had was me and I never more than about put up with him when we were kids. And any kid likes to feel kind of important sometime. Be noticed. Be king of the hill at recess. Win a spelling bee. Whup somebody, or even be the kid that gets made to stay

after school the most. He wants to feel like he is somebody. Only Stanley, he never could. Seemed like the more he wanted to push out into things, the more he would get shy and not able to, and he would pull away back inside even more. He never could talk much hardly, even to me. Got so I would scarcely know he was around myself."

"HE LOST touch with the world?" I put in. "Well, that happens. There are oddballs all over, you know."

"Oh, sure — sure there are, Ed," said Jones. "But Stanley wasn't like that, not exactly; or only. Seemed like it was as much the world lost touch with Stanley as it was the other way. He always did feel a resentment about it, too, and I believe it turned him pretty bitter way down someplace. 'Course he never did say much, but I could tell. I got the feeling."

"So? How did you come here?"

"Well, my mammy, she passed on and there wasn't anything to hold me back there around home, so I left. Stanley, he tagged right along after me. Like a shadow. You might say he was a sort of a shadow's shadow, huh? We bummed around. I worked here and there. Then I found out — we found out — that most people couldn't even see Stanley at all any more."

"He got so far out he was really gone?"

"Only it was kind of pitiful the way it made Stanley mad. Me, I got vagged a few times. Only Stanley, he could be right beside me and spit in the sheriff's face and they wouldn't touch him. They wouldn't even know he was there. When I was locked up, he could walk in and out to visit me. Nobody ever stopped him. Nobody saw him — except, we found out then, that some of the prisoners could see Stanley plain enough."

"Oh?" I said.

"Yes. And that's the way it has been. Seems like the only people who can see Stanley are people like, well, like the ones down here around the Yard. The ones who are — how would you say it? — in the world but not of it, huh? I read that somewhere. People who are far enough out can see Stanley; only he is farther out than any of them."

"Hm-m. Well, the world being what it is, maybe Stanley is lucky."

"Ed, you don't really mean that."

He was right, of course. This world positively was not built according to any specifications of mine, but still it is my world

and I guess I am pretty fond of it at that. Couldn't ever have managed to leave skid row if I weren't.

"So," Jones said, "poor Stanley, he always has been mighty dependent on me; more, maybe, since we been moving around. Until just lately."

"Kind of a damn nuisance, huh?"

"It never bothered me too much. Of course it keeps me down around this part of every town we make and maybe this isn't the kind of life I would have picked for myself. But Stanley has made me feel sort of responsible. And some kind of responsibility is good for a man, wouldn't you say?"

I couldn't argue with it; not me. Anyway, it proved what I had felt from the start—Wino Jones wasn't a real or a natural skid-row type; he was forcing himself.

"Well, Ed, Stanley has been trailing me around all the years — only somehow I don't believe Stanley ever did really like me much. He followed me because he couldn't do anything else, but he never took to me. I guess maybe I couldn't ever quite look up to him the way he wanted. So I suppose he has always been looking for something else. Well, before we came here, we were stopping in a mission one evening and I looked around when I finished my soup and I couldn't see Stanley. It gave me a turn. But after a little while, there he was again. I asked him where he went. He couldn't or wouldn't ever tell me much, only that there was someplace he was trying to get to and friends he wanted to meet.

"'I can almost get there,' Stanley told me. 'There's the border and over there on the other side, they want me. I can feel they want me. They understand that I am important to them. They want me to come. If I could just find the way across to—'

"He never told me who it was wanted him, or where, or what for. But ever since then, every once in a while I would look around and Stanley would be gone. First part of this last week he was gone again — and when he came back, he was changed. He was kind of superior-acting. Not pleasant. Wherever he was trying to get, he had got there. 'Now,' he told me, 'I have friends who know I am somebody.' He was real set up over it. Tonight he went back again."

"Where?" I wanted to know.

JONES SHOOK his head. "I told him, 'Stanley, we been together a long time. You got friends besides me, I'm glad

Only, you know, I kind of feel responsible. Maybe I ought to meet your friends, huh? Why don't you take me to meet them?'

" 'No,' says Stanley. 'Oh, no.' He wouldn't hear of it. I got to stay here and wait for him, he tells me."

"Well, sure," I told Jones. "How could you go with a man into his dream?"

"Yeah — only Stanley did take old Mr. Bootnose Bailey with him."

"*What?*" I exclaimed.

"Uh-huh. Stanley said he was going to prove it to me. He said he would take somebody along with him to this place and then he would bring one of his friends back here to visit. He said that would show me, would show everybody. And you know, Ed, I don't believe I much liked the way poor Stanley looked when he said that. He looked kind of mean."

"But they went? Both of them? And that's why old Bootnose isn't around?"

Jones nodded. "Yeah. Stanley promised Mr. Bootnose something would give him a real boot. They went. Stanley, last thing he said before I watched the two of them just sort of fade out, he said he would be back tomorrow evening. He wanted me to be sure to wait for him in the Yard. And fact is, Ed, I'm kind of uneasy about it all," he added.

There it was, Jonesy's story. A nonsense story? Sure. But it left me feeling a little uneasy too. We talked it back and forth a while longer, Jones and me, and the more we talked the more uneasy I got. Foolish or not, Jones himself believed it. He wasn't trying to con me into anything. There was no other point to it. And — well, maybe it was simply the fact that Jones was a good deal of man. What he said had a real conviction to it. Even if the story was hard to believe, still there was what I had seen — and not seen — of Stanley. And even if there was nothing that seemed particularly threatening about the business, it made the two of us uneasy.

There was nothing for us to do about it, though. I went on home to my apartment after I promised Jones I would be around the next night when Stanley, alone or with company, was due back. I don't know what Jones expected. I don't know what I expected. But Stanley's friend, no; we didn't expect that.

The next day I was filling in on the desk, but my mind must have been fumbling around with Stanley's other world. I fumbled all day and finished by crossing up a couple of headlines. So I left the office with the managing editor's curses ringing in my

ears, even though he had to admit that the "Present Stench — Future Disaster" line from the sewer gas story did fit very nicely over the item on the mayoralty campaign.

I was down at the Yard a little after five. Jones came along a few minutes later. The group was there. It always is, except when there is a city clean-up. Then it moves over behind the church. Today there was a tension. Jones was smiling, gentle and friendly as always, but there were nerves back of it. Probably the others were mostly just suffering dry nerves. But I was rattled enough so I fumbled a five out and put it on the rock. That, naturally, meant that Coaster Joe and Feeny, who moved the quickest, went to make a run and didn't come back. With the right change for the jug, the wino never skips; with change to bring back, always.

WELL, some more silver was painfully dredged up, mostly by Jones, and somebody else went. The wine went around and I admit that this time I took a swallow or two on my turn. I noticed Jones did too. Not much; a little. We were cold sober. Too cold, actually. I needed the little wine I had in me and a lot more.

That bottle and another went around. So did the talk. I was leaning on the wall next to Jones. Neither of us had much to say. Finally, it was just coming on dusk, I asked him, "You're sure he'll come here? Are you sure he'll show at all?"

"He'll be here. Most any time now, Ed. I can feel it. Can't you?"

I could feel something, but it was only a contagion of tension, I told myself.

Then Jones said, "Look there," and pointed.

I followed the line of his big, pink-nailed, black finger off along the path through the park from Broad Street, a little hazy in the summer evening. There was nothing. Then there was a darker spot in the haze and then, not more than about twenty feet away, just about to pass back of the row of bushes along the path, I saw Stanley. Tonight he seemed, somehow, a more positive presence, even at that distance. There was a cocky bounce in his walk and a tilt to his chin that announced "Here is someone to reckon with." Other eyes in our little circle turned his way as he passed behind the bushes. A couple of seconds more and he came around the near side and moved in to join us.

"Hello there, Wino," he said

to Jones and there was condescension in it. "Fellows, I want" — proudly — "you should meet a friend of mine."

Around the bushes came a shape, a dark shape; Stanley's friend, from some other place or world. In our group, Saint Betty, a retired queen, choked on the jug and handed it to me. I shoved it along to Jones. The paralyzing effect of Stanley's friend can be measured in the fact that the jug went three times around that thirsty circle — and no one even lifted it to his lips till it fell in the dust at my feet.

Stanley's friend was there all right; really there. What did I say he was like? A dark shape? Yes. But that dark shape and the detail of that shape came through as clear as a hot blue flame to me.

You weren't ever down that way, right? Not to stay, at least. Well, one thing people there have in common is the horrors. Not just the ordinary day-to-day horrors of a hard life but the big horrors. The D.T.s. How do they go? The detail varies. With everyone, there is something that really panics him, gives him that sense of unreasoning, helpless, screaming fear. With a lot of people it is snakes. That's the traditional. With others, it can be heights, or closed rooms; rats, maybe. With me, it has always been spiders, ugly, hairy-legged, bloat-bellied.

The horrors. The height man, when he gets them, will have the sensation of falling, helplessly, endlessly. Once I had spiders. There were hordes, millions of great, stickily scrabbling, poisonous spiders crawling, crawling all over me, over everything — until I woke wrapped up like an iced tamale in the cold wet sheet that is called "calming restraint" in psycho wards.

Stanley's friend? Well, it's an ugly thought, but consider those spiders of mine. And consider people. People, mostly, have religion. "God made man in his image," they say, except God, of course, is the infinitely greater. Now suppose that spiders had a god. A spider god. "God made spiders in his image," the spiders might say, right? So such a spider god, that almighty apotheosis of spiderdom — *that* was Stanley's friend as I saw him.

I DON'T KNOW how I could see a thing like that. Maybe I didn't see it, exactly. But absolutely, in some way, by whatever means, the positive perception of such a thing burned itself into my eyes and mind.

The other fellows? No one screamed aloud, although my mind was screaming. Horrors

were not less horrible to us, only less unfamiliar than to other people. One by one, the others quivered to shaky feet and they stumbled off through the evening. The jug, three-quarters full yet, stayed there in the dust of the Yard, forgotten.

How long it was, I don't know. Not long — and then only Jones and I were left with Stanley and Stanley's friend. The rest of the park was empty. Across Bug Alley in front of the church an old woman carrying a sack of rubbish was impelled to look our way. She screeched in a high, disappearing pitch and crumpled to the walk. The church was dark and silent.

Jones stood there, big, powerful, leaning against the wall. He smiled at Stanley, but it was a weak, sick smile. How he managed that much, I'll never know. Weak, trembling, stomach churning, I dragged myself up.

"Uh — well," I mumbled, "f'you fellows will excuse me — guess I better be moving along."

Stanley's lip curled. He was irritated. I couldn't help that.

"You see?" It wasn't speech, but the thought came plainly from Stanley's friend, out of a churning of black, hungry thoughts, "You see how it is? Even now, not even such as these will welcome us as friends and equals."

"Yes," snapped Stanley, "I see. I should have known. All right then, we'll do it your way. We will show them all."

I stumbled a step or two toward the path.

"Wino," said Stanley, "Wino Jones. We are going over to the other side now. But we will be back, you hear me? You just wait."

"Sure, Stanley," said Jones, still gentle, kind. "Only, Stanley, are you sure?"

"I'm sure," said Stanley. He turned to his friend. "Come on. Let's go."

They moved together toward the bushes.

Stanley looked back over his shoulder at Jones. "We'll be back," he said, "we'll be back, Wino. You be looking for us."

Then they were gone. Thank the good Lord, they were gone.

"Well," I quavered at Jones, "you did say you were kind of uneasy about him, didn't you?"

"Yes," said Jones, "that's right. You going on home now, Ed?"

"You bet!"

"I don't like to impose, but would you mind if I kind of tagged along? I don't feel too good — after that thing with Stanley, built of all those thousands of hissing, wiggling snakes."

With Jones, it had been snakes, not spiders. The others

— to each his own? Somehow that made it seem even worse. Jones wanted to come along with me? I was glad and grateful. I don't know that I could have stood being alone that night.

UP IN MY apartment, we turned on all the lights. Had a couple of nightcaps. Sat up all night in my luxurious eight-by-ten living-dining-kitchen area for modern living. We talked a little, but not about Stanley and his friend. It was too fresh and we were too shaken. It seemed safer not to mention it.

I suppose we must have dozed off and on. In the morning, I woke up. I still had the shakes. No hangover, but the shakes.

"Jonesy," I said. "Jonesy, I guess maybe I ought to be getting along to work. What are you going to do?"

He woke up, full awake, like that. "I'm not going back," he said. "You know?"

"Yeah."

"I got a feeling. I got kind of a feeling that maybe I am sort of Stanley's doorway or gate back here, if you know what I mean. He was always nearer to me than anyone. You notice he kept telling me to wait for him? I think maybe he needs to feel around and find me to make his way back across from wherever he went. So, if I'm not there, if he can't locate me, could be he won't be able to make his way back — with his friends. I think I better stay as far away from down there as I can get. You reckon there might be some kind of job I could do on that paper you work for?"

"Sure," I said. I knew they needed some men in the circulation department. "That isn't so very far away, though, is it?" I had a sense that he was right about Stanley.

"Not miles. Distance, like that, I don't think it makes much difference where Stanley is. It's the Yard and all that, huh? Seems to be like if I get a steady job, get to be a real, steady, normal citizen, that's what would make me hard for Stanley to find."

"Yes," I said, "I see. The more you are a full part of this world, the farther away you will be from that other one — and Stanley."

"That's it."

"I hope so. Lord, I hope so. You come along down with me this morning. We'll get you a job if we have to kill someone to make a vacancy . . . Jonesy, that — that thing, spiders, snakes — you are sure it was real? It was actually here, I mean? And might come back if Stanley can make the way — in force?"

"Yes, Ed. You didn't really have to ask, did you?"

"No," I said.

And that's it and that's all.

SINCE THEN — well, Jones is working for the paper. He got to be assistant circulation manager in less than a year. He is as respectable and non-skid-row a citizen as there is in town. Has a girl; getting married next month.

Me? I'm the same, maybe a little better. I go every other week to visit my kids and Jennie, my ex, has taken to staying around now. We even talk a little bit and, last time, I took her some flowers and she blushed like a bride. Something might even come of it — given enough time.

I have checked back on the Yard a few times but so far, at least, nothing more than the standard rack-up of ordinary horrors. I am not going to check any more. What for? Such a thing as Stanley's friend, you couldn't fight, and I wouldn't know what direction to run. If those things ever find a way over here, where would they be coming from? I don't know. From inside, maybe, Jones says. How do you run from that?

Best, I think, forget it. I intend to try. And, so help me, I am through with skid row. Who wouldn't be?

— WILLIAM W. STUART

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FORECAST

We begin the new year for *Galaxy* with the end of an old tradition. The first time the Frederik Pohl-C.M. Kornbluth byline appeared it was in *Galaxy*, on the famous *Gravy Planet* (which as *The Space Merchants* has been republished in one form or another every year since, somewhere in the world — this year in Brazil, Japan and Czechoslovakia.) The last time will be in our next issue, with a complete novella called *Critical Mass*. Since Kornbluth's untimely death a few years ago, Pohl has completed several projects then unfinished; this is the last of them.

Naturally we'll also have Poul Anderson, completing his *The Day After Doomsday* which begins so brilliantly this month. There will be at least one novelette, shorts to fit . . . and another item worth mentioning. It is called *The Martian Star-Gazers* — not a story but an article — and it will be the subject of our February cover.

YOURS!

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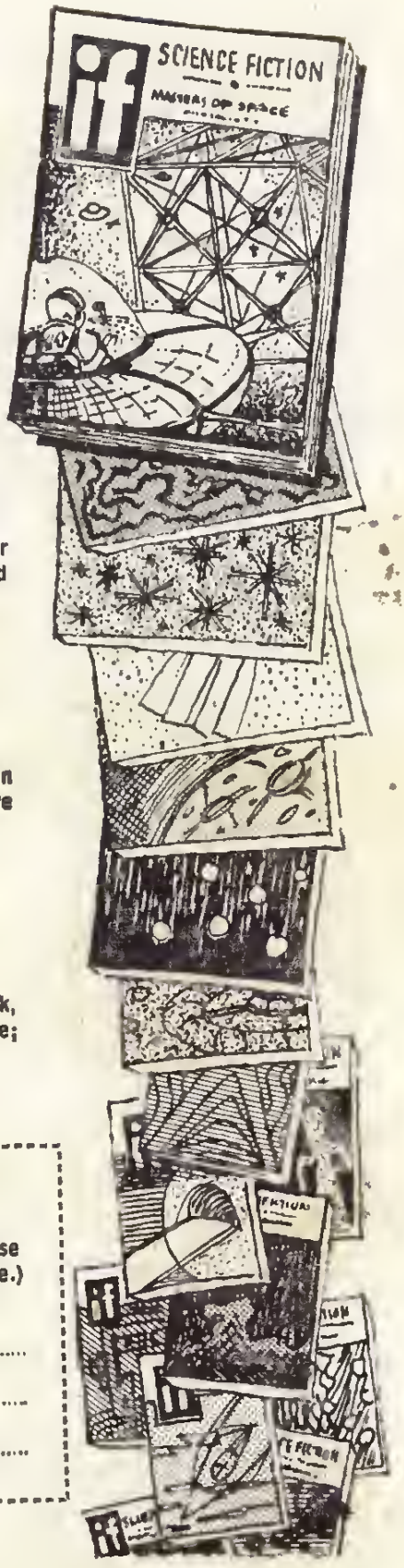

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