

# WORLDS of SCIENCE FICTION

JANUARY 1955

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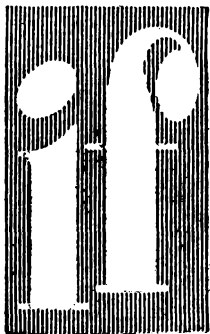
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Assist. Editors: ROBERT W. GREENE, EVE WULFF

Art. Editor: ED VALIGURSKY

Cover by Anton Kurka

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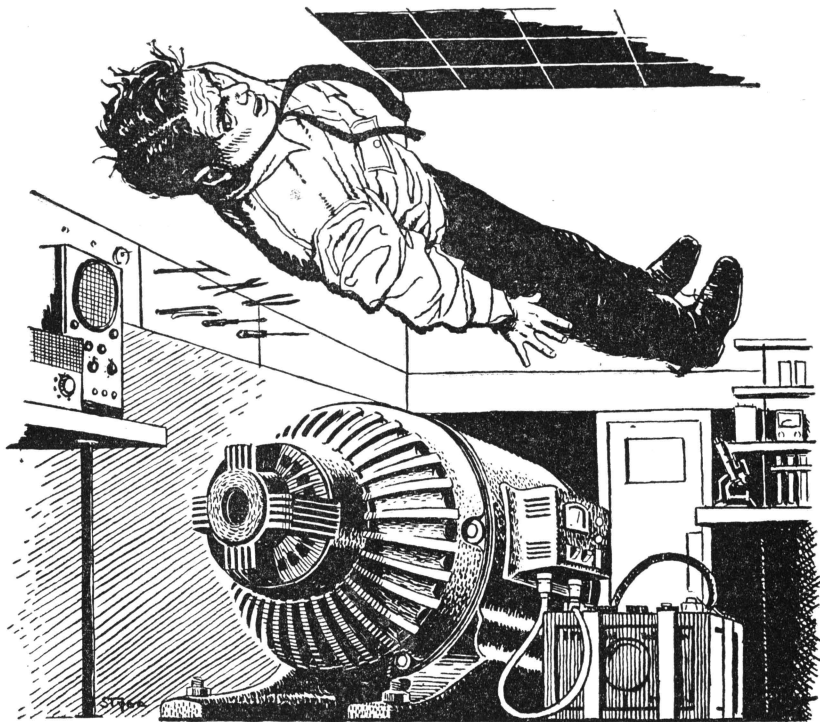
## COVER PICTORIAL:

Meteorological Survey of the Sun

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# TURNABOUT

BY GORDON R. DICKSON

*Eva was the emotional problem which, indirectly, quite possibly caused the second problem, a rather baffling field force trap, which was a scientific one. Now, sometimes, if you solve the second first, you get the first second . . .*

**P**AUL BARSTOW was saying, "And this is the gadget . . ."

His square bright face under its close-cropped blond hair was animated. He seemed on the verge of reaching up to hook a finger in the lapel buttonhole of Jack Hendrix's sportcoat to pull the taller man down into a position where he could shout into his ear.

"You aren't listening!" he protested now. "Buddy! Jack! Pay some attention. Or has that crumb teaching job got you to the point where money doesn't mean anything to you any more?"

Jack Hendrix's long, heavy-boned face almost blushed.

"I'm listening," he said.

He hadn't been, of course. This was merely one more piece of evidence to add to the mounting pile of proof that he was totally incapable of doing anything right. He had been mooning instead over Eva Guen, whom he had lost some months back. But they had passed her in the corridor on their way to this small, hidden workroom, and something in the way she had looked at him had set him spinning again. Peculiarly, there had been what Jack could have sworn was a hurt look in her eyes, in that brief moment that they looked at each other in passing. Why there should be a hurt look in *her* eyes, Jack could not understand. She was the one who had left him to come to work for Paul—and very sensibly, too, he told himself, self-righteously, but with the same old twinge of unhappiness.

Eva had been his graduate teaching assistant at the University where he taught physics. She was tall and quiet-faced, with startling wide blue

eyes under soft blonde hair. Quite naturally, he had fallen in love with her. And it was then the trouble started.

For from the moment Jack was forced to admit to himself that he was in love, he had to take an unbiased look at his chances of doing something about it. And that look was crushing in its effect. For in the process of assembling Jack Hendrix, a somewhat devastating oversight had occurred. Whatever minor god had been in the supervisory position that day had carefully mixed strength with intelligence, added just a pinch of genius and a sort of ugly-handsome good looks, but had totally forgotten at the last moment to install a governor on Jack's imagination. The result was that Jack was a dreamer.

And the result of that was that he, with three degrees to his name, and a couple of honoraries of various sorts lying around, continued to vegetate in his teaching job, while Paul, in his typical hyper-thyroid fashion, was already managing his own commercial research labs. Not that the comparison was strictly fair. Paul had always been more promoter than physicist. And Eva had gone out of Jack's life to a better job with Paul's outfit.

Not that that had anything to do with his accepting Paul's offer of a job as consultant on a little problem he claimed to have on hand at the moment.

"I'm listening," said Jack.

"Praise Allah," said Paul. "No one knows about this but you and me. It's top secret. *My* top secret."

Women, of course, thought Jack were naturally secretive. They looked at you with unfathomable

blue eyes and waited for you to make the proper move. But how could you make the proper move if you didn't know what they were thinking? That was why he had never gotten around to telling Eva how he felt about her. And then one day she was gone. He didn't blame her, even if without warning it had exploded—

“—Exploded?” stammered Jack, guiltily. “Well, er—when did that happen?”

“Are you sure you've been listening?” said Paul, suspiciously. “I just told you. A couple of weeks back.” He went on to explain the circumstances while Jack listened with one ear, the image of Eva flickering like a candle luring his moth-like powers of attention in the back of his mind.

He forced himself to concentrate.

“But what happened to the man you had working on it?” he asked. “And what is it, anyway? You still haven't told me that.”

“You mean Reppleman?” said Paul, quickly. “He had a nervous breakdown at the time of the explosion. Got a complete block on the whole thing, and now, they've got him in a nursing home.”

A flicker of genuine interest stirred for the first time in Jack.

“Oh?” he said. “How come?”

“Well, that's the thing,” said Paul. “I'm going to trust you, Jack. I've got something here that's worth more money than there is in the world today; and I'm willing to give you a slice of it if you can work this thing out for me. But we've got to have secrecy.

“Right at this moment, you and I are the only ones who even know this room has been entered since

the explosion. I rebuilt the generator myself from Reppleman's records. And nobody, but you and I, knows we're back here today. The rooms at the back of the building here are all storerooms except this one.”

“Generator?” said Jack, for a second momentary instant distracted from the lorelei mental image of Eva.

“A generator,” said Paul, slowly and impressively, “of an impenetrable, planar field of force. Come over here.”

The image of Eva went out as abruptly as if someone had dropped a candle-snuffer over it. Jack blinked and followed Paul, as he led him up to the equipment in question.

The small room which housed it was right at the bleak northern end of the labs and terminated one narrow wing of the building. It was L-shaped, with the generator in question tucked away in the narrow recess of the foot of the L. The length of the long part of the L, at right angles to this, was strewn with odds and ends of tools and equipment piled on two long benches fastened to the wall. Along the end away from the recess was the door that gave entrance to the room; and just to the left of this as you entered; at the end of the long part of the L, was the room's only window, open at the moment to the summer breeze and the gravel expanse of the parking lot behind the labs.

His mind for once wholly concentrating on the subject at hand, Jack followed Paul into the narrow cubbyhole that was the recess and listened to the other man's explana-

tion of what was before him. It was not true, that Jack could not focus on a problem. It was merely that a thing to hold his attention, must first arouse his interest. Once it had, he dealt with it with almost fantastic effectiveness.

"You see," Paul was explaining, "it's a very simple sort of circuit. It's easy enough to produce it. The question is to handle it, after you've produced it. The initial power to run it comes from this storage battery hookup. That's all we need."

"Then what's the catch?" asked Jack, his nose half-buried in the creation's innards.

"The trouble is that once it's turned on, there seems to be a sort of feedback effect. Well, no, that isn't quite right. What it seems to do once it's turned on is tap some other source of power that's too much for it. It overloads and you get the explosion."

"But while it's on you have a plane of force?"

"That's right."

"How long?" demanded Jack, his long fingers poking in the wiring.

"You mean from establishment of the field to explosion?" replied Paul. "About half a minute, as far as I can figure from Reppleman's notes and what I could reconstruct about what happened the day it blew up on him."

"You haven't tried it since you rebuilt it?" asked Jack.

"Do I look crazy?" demanded Paul. He put his hand on Jack's arm. "Listen buddy, remember me? The boy with the crib notes up his sleeve at exams?"

Half-lost in the machine before him as he was, Jack felt a sudden little stir of warning. Paul was any-

thing but stupid; and when he went into his dumb-bunny act, there was usually a joker somewhere in the deck. But before he could concentrate on the sudden small danger signal he ran across something that drove it out of his mind.

"What's this?" he demanded, pouncing on a part of the apparatus.

"Oh, that," said Paul. "Just a notion of my own. Obvious answer. A timer setup. You set it, say, to turn the field on for perhaps a ten-thousandth of a second, then turn it off again. I'll let you play with it."

Jack frowned.

"Where are the notes?" he asked. "I'd like to see just what—Reppleman, you said his name was?—had written down."

Paul grinned and shook his head.

"Not so fast. First I want an answer from you on whether you think you can tame this baby for me or not."

"But how can I tell without the background?" protested Jack.

"Won't cost you a cent to say no," replied Paul. "Don't look at me like that, Jack. Sure, I know I'm handing you a pig in a poke. But this thing is too big to take chances with. Do you want it or don't you?"

Jack hesitated. He was strongly tempted to tell Paul to take a running nosedive into the nearest lake, and walk out. Then he remembered the long life of financial ineptitude that had climaxed itself with losing Eva; and his good resolutions to mend his scatterbrained ways.

"All right," he said. "I'll have a shot at it, anyhow."

"Good boy," said Paul. He patted

Jack's arm, in a way which was somehow reminiscent of approving a large, shaggy dog. "I'll be in my office. You know where that is. If you want anything, just hustle me up."

He gave Jack's shoulder a final slap and strode out.

**L** EFT ALONE, Jack sat down on one of the long workbenches, filled his pipe and considered the problem. The situation was peculiar to say the least. Paul's odd insistence on secrecy; and Eva's strange look when she had passed him in the corridor. And this story about the man who had developed the generator. Typically, it did not occur to him to doubt the generator. Jack was one of those men who have entertained the impossible in their minds so often that there is little reality can do to surprise them.

So it blew up did it? Jack puffed on his pipe and stared at the generator. But—hold on a minute—if it blew up and when it blew up it sent a man named Reppleman to a rest home, could it have blown up more than once? And if it had blown up only once it must have been turned on only once, and if that was the case, how did Paul know that it had produced a plane of force? Of course he had probably known the theory Reppleman was working on. And what was his purpose in keeping that theory a secret from Jack?

In fact, if the dingus worked, how did it work? Jack returned to the mass of equipment and wiring and began to prowl through it. After a while he stopped and scowled.

Nine-tenths of the junk in the setup was mere window-dressing. The only thing about it that could possibly have any effect or function was an oddly wound coil of ordinary silver wire upon a core of some strange-looking silvery metal. Jack tapped this latter with a fingernail and it rang with a faint, light-sounding chime.

By the time this point was reached his interest had been captured. On a hunch he disconnected everything but the coil on its peculiar core. He disconnected the timer, Paul had attached to the apparatus, hesitated a second, then made contact by crossing the two lead-in wires.

Nothing happened.

He disconnected the wires and sat back to think.

After a moment, he reached out and felt the winding on the coil. It was metal-cool—air temperature. On second thought, he connected the timer and set it to allow a warm-up period of fifteen seconds. At the end of that time the timer should activate the coil for the period of a ten-thousandth of a second.

Nothing happened.

Jack chewed the stem of his pipe. Once more he disconnected and felt the winding. It was faintly warm—but barely so.

Now let me see, said Jack to himself. We run two sorts of power through this thing. One, low power and steady. To warm it up? That's what I assumed, but there's no indication of it. On the other hand this timer is definitely set to give a sudden short pulse of relatively high current. I tried the high current direct. No result. I tried a short

period of low current. What's next?

After he had smoked another pipeful of tobacco, all that occurred to him was to lengthen the warm-up period. Let's do it right, he said to himself. Let's give it a good five minutes.

He turned it on once more and set the timer for another ten-thousandths of a second jolt at the end of five minutes of low power. It occurred to him that the two upright metal poles, about two feet in length, between which the field was supposed to be generated might be too close to the coil, and he moved them out to the full length of their wiring, so that they were now actually in the long part of the room. He glanced at the timer. Almost four minutes yet to go.

He wandered down the long part of the room and stood gazing out the window. There was his car, sitting beside the row of others on the gravel of the parking lot. And there, farther down the row was Eva's. They were the two oldest cars on the lot. You'd almost think we had the same taste in automobiles, thought Jack, a trifle wistfully. Neither of them is worth much—

Abruptly, without warning, his traitorous imagination slipped its restraints and began to build a picture of Eva coming out on to the lot, seeing his old car not very distant from hers, and being overwhelmed by a flood of memories. He pictured her coming out the back entrance of the building as he stood here watching. She would walk across the lot with her smooth, lithe stride, toward her own old grey, four-door sedan. But partway there, her steps would falter as she caught sight of his equal-

ly ancient blue business coupe. She would not, of course, say anything, but she would stand there; and he, seizing the moment, would step from this window down onto the gravel only a few feet below and approach her.

The sound of his footsteps crunching the loose rock would warn her of his coming; and she would turn to look at him. She would neither move nor speak, but stand waiting as he came up to her and then—

He was just opening his mouth to speak to her in imagination, when unexpectedly from behind Jack there came the sound of a soft, insidious, click. . .

**F**OR A MOMENT he thought nothing had happened. The parking lot lay unchanged before him in the sunlight with its row of cars and the sky blue above them dotted with distant clouds. And then he tried to turn around and found he could not, with the slight movement of his effort the scene before him dissolved into a grey field streaked here and there by lines of various colors.

He froze, suddenly, and the scene came back to normal. He reached out to grab hold of the edge of the window to steady himself; but with the first movement he was plunged into greyness and his hands caught nothing. Once more he steeled himself into immobility, and for a moment he hung on the edge of panic. What had happened?

Slowly, he forced his mind back into control of his body and its emotions. Steady, he told himself, steady. Think it through.

As calmness returned he became suddenly and icily aware of two things. The first was that everything within his field of vision appeared somehow artificially frozen into immobility. Just what gave him this impression he was not able to understand. Part of it was the air. A small breeze had been bathing him as he stood in front of the open window. Now, there was nothing. The atmosphere around him was like intangible glass.

The second thing was the discovery that he was no longer standing with his feet on the floor, but lying crosswise athwart the window, in mid-air, at about the former level of his waist.

For a moment he was astounded that he had not realized this immediately. And then reasons began to appear to him. The first of these was the sudden realization that gravity appeared to have altered respective to his position. He felt not at all as if he were lying on his side, but as if he had remained quite normally upright. And another discovery following immediately on the heels of this was the sudden perception that while his body seemed to have moved, his point of view had not. He still looked out at the parking lot from the angle of vision of a man with both feet normally planted on the floor.

All of these, of course, were things that held true only as long as he remained perfectly still. The moment he attempted to move all his senses failed him and he seemed to swim in a grey mist. The conclusion was a very obvious one. Somehow, the generator had worked to produce its plane of force. And somehow he was caught in it.

The explosion should come at any moment now.

For one hideous moment he suffered death in imagination. Then reason returned to point out that the half minute Paul had mentioned as the time limit had undoubtedly been passed already. Still, it was a little while before he could completely fight off the tension of his body, bracing itself in expectation of the rending force that could strike at him from behind.

In the end it was his imagination that saved him. For long habit had made it independent of the rest of him; and it's first move, once the facts of the matter had been grasped and the immediate danger of explosion discounted, was to draw him a very clear and somewhat ridiculous mental picture of himself as he must appear to anyone who might enter the room, floating broadside as he was, in thin air. It reminded him suddenly that positions were no respecters of persons; and he remembered almost in the same instant of what the White Knight had had to say to Alice on the subject after resting head-downward in a ditch. And so, by way of the ludicrous, he scrambled back onto the firm ground of his everyday sanity..

He was caught in a force field. Very well. And what could he do about it? The obvious answer was to turn around, go back to the generator and turn it off. And the one flaw in this plan was that he couldn't apparently, for some reason, make the turn.

On the other hand, he was able to make some movements. He ex-



perimented, waving first an arm and then a leg, cautiously. Barring the fact that the slightest motion caused the room to appear a nightmare of streaks and lines in a grey field, there was nothing unusual about the effects of these motions. The room? He became suddenly aware that he seemed to have rotated around a center-point somewhere in the region of his belt buckle. He was now no longer looking out the window, but turned at a slight angle toward the bench on what had been the wall at his right hand. Filled with sudden hope, he closed his eyes firmly and took what should have been a long stride forward and up. When he opened them again he was staring back into the room, down the long length of the L.

For a long moment he hung, carefully motionless, considering the implications of what he had just done. It seemed apparent, he thought, that what he had actually accomplished was to turn himself about the way a paper figure would be turned on a turntable—the difference between this and ordinary methods being that as he was now facing in the opposite direction, his head was now where his feet had been and vice versa. Or, to orient more exactly by existing landmarks, where the force field had flipped him into position with his head toward the right wall, his rotation had changed him so that now his head was toward the opposite wall, the one originally on his left.

Conclusion?

Jack winced. The field itself appeared to be a two-dimensional phenomenon; and he, himself,

caught up in it, to be restricted to two-dimensional movement. For a second the thrill of panic came back, and he was forced to fight for a moment before he could go back to looking at the situation sensibly and calmly.

The field appeared to be on a level with his waist as it had been when he had been standing normally upright. That was, in effect, level with the tops of the upright rods that had been supposed to generate the field between them. Hah!—*between* them, thought Jack, bitterly—And a few inches above the level of the benches. As he looked down the length of the room he noticed that whatever had touched the plane of the field at any point seemed to have been, like himself, caught up in it. He noticed a hammer and a soldering iron, both of which had been hanging from hooks on the left wall, now floating stiffly at right angles to it. Furthermore, there seemed to have been some sort of polarity involved. In both cases the end which had been upright was at the left and the down end out at the right—that was, of course, from his present point of view—and corresponded exactly with the fact that his own head had gone to the right, and his feet to the left.

But that was enough observing. The thing to do now was to get to the generator and turn it off before something else happened. Jack closed his eyes and made three quick steps, right foot first left foot following, toe to heel. When he opened them again he was mildly surprised to discover that he was still a little short of the end of the room, but a couple more steps

solved that problem. He rotated himself through a ninety degree arc and stepped up into the narrow alcove that housed the generator and the timer on a bench at its far end.

He banged his head on the wall and blinked with the shock of it. He opened his eyes and looked down at the generator.

With a sudden, sickening sense of shock, he realized that it was below him, and therefore outside of the plane of the field. His desperation was strong enough to make him reach for it, anyway, and to his surprise it seemed almost to flow upward to reach his fingers and his fingertips pushed against a short length of wire, which bent before them.

As they did so, there was a sudden flare of red light, from the coil and he snatched his fingers away as he noticed that that part of the generator was apparently red hot, glowing into incandescence. The whole apparatus, in fact, seemed to quiver on the point of exploding into flame. Curiously, however, there was no sensation of heat emanating from the coil; and what was apparently a wisp of smoke, rising above the generator and out of the field, seemed frozen in mid-air.

Cautiously Jack retreated slightly from the generator. Two things were immediately apparent. One, that the generator was evidently a part of the field, and reachable, even though it had not been in the original plane as he had. Two, that he had better be careful how he went about shutting it off. It struck him somewhat belatedly that Repleman's explosion had probably

occurred through mishandling the generator when it was in its present state.

No, the way to turn the generator off was the way it had been turned on—through the timer. He looked at the portion of the generator and bench that lay below him but did not see the timer. Then he remembered that this was the left side of the bench at the alcove's extremity and that the timer was at the right. Carefully he rotated to the right as far as the narrow width of the alcove would allow him and out of the corner of his eye, caught a glimpse of the timer on the bench far to the right. The position was an awkward one, but he was in no mood to consider comfort. It might be interesting for a while to be the two-dimensional inmate of a single plane, but the novelty wore off quickly. He pushed his head into the right hand corner of the alcove and started to reach back past his hip to the timer.

It was impossible.

For a moment he hung still, stunned. Then as the truth penetrated, he had to restrain an urge to burst into hysterical laughter. Of course, being two-dimensional he could not move the line of his hand past the line of his body, any more than a normal three-dimensional person in a three-dimensional world can lie on his side on a flat floor and duplicate such an action without moving either floor or body. As long as he remained an inhabitant of the force field, he would never be able to reach behind his back. Around his feet or around the top of his head, yes, but behind his back—never.

For a moment he yielded again

to panic and scrambled around, trying to find a position from which he could reach the timer, but the alcove was too small to allow him his necessary two-dimensional turning radius. He stopped finally, and common sense came to his aid.

Of course, the thing to do was to back out where there was room and turn around, so that he could come in facing in the other direction.

He moved back out into the long part of the room, mentally berating himself for having lost his head. He closed his eyes and rotated. He was getting quite used to this business of blinding himself while moving and made a mental note that eventually he must get around to keeping his eyes open just to get a clearer picture of what happened, when he did move. Reversed, he stepped back *up* into the alcove.

He opened his eyes to find himself not in the alcove but against the wall of the long room opposite the alcove. For a moment he stared in puzzlement, then understanding came.

"Of course," he said. "I'm reversed. I'll have to step *down*."

He did so. Two steps down took him into the alcove. He opened his eyes to find himself finally facing the corner which housed the timer — *but his feet were the parts of him next to it, and his head and hands were away from it.*

This is ridiculous! he thought. One way it's behind my back and the other way it's down by my feet. He crouched down, trying to squeeze himself into the corner close enough so that he could reach the timer. But it was no use. The alcove was too narrow to allow him to put his feet in the opposite corner and

lean far enough over so that his hands could manipulate the timer. The sort of person who can bend over and put both hands flat on the floor could have done it easily, but Jack, like most males of more or less sedentary occupation, was not in that kind of shape. He tried kneeling, squeezing himself as tightly into the right hand corner as he could. But here the earlier prohibition of his two-dimensional existence came again into effect and he was blocked by his own knees. Not only did he have to reach around them, but they blocked off his view of the timer.

In a cold sweat, he finally gave up and backed out into the relatively open space of the long part of the room. It was fantastic. There was the timer directly in front of him. A touch of the finger would shut it off, for he could see its pointer frozen on the mark where it had turned the generator on. And it was a part of the field like the generator wire he had touched, so presumably he could move it. Yet, because of the restrictions of two-dimensional space, it was out of his reach.

To Jack, a born and native three-dimensioner, it seemed grossly unfair; and for one of the few times in his life he blew up.

After having cursed out force-fields, force-field inventors, all known physical laws, the generator, Paul, and himself for being a damn fool and daydreaming when he should have been watching the timer, he found himself feeling somewhat better. From being excited, he suffered a reaction to calmness. Let's look at this sensibly, he told himself.

He reminded himself that he'd been acting like a wild animal caught in a trap, rather than a thinking man. The thing to do was to make an effort to understand what it was that had hold of him rather than just fighting it blindly. If he could not reach the timer, he could not reach the timer. What other possibilities were there?

One—somebody, say perhaps Paul, would eventually come in and perhaps he could turn the timer off. Jack shook his head. No, whoever stepped through the door of the room would probably be caught up in the field the way he had been. If indeed, the field was limited only to the room and did not extend beyond its walls already. Jack brightened. If the field was bounded by the room, then all he had to do was get out of it—

Painfully he maneuvered himself around until he was facing the door. The doorknob was below the field, but he had hopes of hooking his fingers onto the door's loose edge and pulling it open. It was a hope that was doomed to disappointment. Jack discovered that in two dimensions you could push, with fingertips, but not grab. The door, presumably because it was hinged to the walls outside the scope of the field, was strictly immovable.

It appeared to be a rule that whatever was loose and touched by the field, was picked up by it, but whatever was attached to anything else beyond the limits of the field was not. It did not strictly make sense, because where do you draw the line of attachment? His body was attached to his limbs and his limbs had been outside the field. A matter of relative mass?

Concluding this to be an unrewarding field for speculation, Jack returned to the matter of field size, and at that moment it suddenly dawned on him that all this time the window at the end of the room had been open. If he could get out through that and beyond the limits of the field—

The wish was father to the act. Hardly had the thought occurred to him before he was jockeying for position in line with the window. He got it—back in the same position in which he had first found himself when the field caught him up—and simply walked out, presenting the unusual spectacle of a man strolling through mid-air while lying on his right side. It was all so easy that for the first time he found cause to wonder about the fact that the walking motion enabled him to progress when he was apparently doing nothing more than flailing the empty air. He experimented a little and discovered that he had the sensation of pressing back against something whenever he moved. Apparently the field had some kind of substance of its own, or a type of tension that reacted like an elastic skin when pressed longitudinally.

As soon as he was free of the building he rotated abruptly and *walked* sideways alongside it. His hope was that the field would be cut off by any solid obstacle. He traveled for some little distance before he admitted to himself that this hope was vain. Cheerfully, the field continued to buoy him up and imprison him, even when he reached the street in front of the labs.

The street was unusually silent

and deserted. For a moment he considered waiting until somebody came by to help. But his natural shyness and sensitivity to embarrassment overcame the idea, and he turned back to cruise once more along the side of the building peering in the windows, with the hope of locating Paul himself, or at least someone connected with the labs.

The windows on the back and the side he had been down were all closed and the door had taught him that there was no use dealing with any three-dimensional object unless it was, like him, caught up in the field. He crossed past his own open window and started down the far side of the building.

Here there were several open windows, but they all gave on empty offices. But toward the front he came to one through which he could glimpse figures, at the far end. Without hesitation, he closed his eyes and stepped through the opening.

When he opened his eyes inside the room, he was astonished to see a tableau that was more than even his overactive imagination had ever conceived. Before him were Paul and Eva. They stood facing each other in a small room that seemed to be a sort of combination office and laboratory. Paul was leaning forward and his hand was on the smock-sleeved arm of Eva, who was pulling away from him.

For a moment the implications of the scene did not penetrate. When they did, Jack went skidding through the air toward the two figures, too angry even to remember to close his eyes.

When the grey field winked away

to reveal the room in its proper dimensions again, he found himself floating in mid-air beside and a little above them. This room was evidently lower than the one from which he had started; and he glared down at the top of Paul's stubbled head and cut loose.

It was a fine exhibition of sizzling language, punctuated by flashes of streaky greyness, when in his excitement he forgot himself and moved or jerked his head. But when at last he began to run down, he was somewhat astonished to discover that neither of the people below had moved or shown any reaction to his presence. They had not even looked up.

In fact, Paul was still clutching Eva's arm and Eva was still leaning backward. They had not moved at all.

An awful suspicion struck Jack with the impact of a solid fist to the pit of the stomach. He had assumed until now that the timer had somehow stuck at the position in which it activated the generator, that no explosion had taken place because he had been careful after that first crimson flare not to monkey with the working parts of the generator. It had not occurred to him that the field in restricting him to two dimensions might *really* have restricted him to two dimensions.

Frantically he rotated until he was able to spot a large electric wall clock above the door of the room. Its hands were frozen at twelve minutes after two, and the long sweep-second hand stood motionless a little beyond the figure 12. He rotated back to where he could view the two people below. On the thick wrist above the hand that

held Eva's arm was a large gold wristwatch, and this also stood with its hands immovably at twelve minutes after two. Jack was caught, not merely in a single plane, but in a single instant of time.

Up until now he had not really despaired. Always in the back of his mind had been the notion that even if he failed completely, sooner or later someone would come to his rescue.

Now he realized that no rescue was possible.

**S**OMEHOW he survived that realization. Possibly because he was the kind of man who does survive, the sort of person who by birth and training has been educated to disbelieve in failure. It was just not in him to accept the fact that he was hopelessly trapped. And particularly in support of this was the discovery he had just made about Paul and Eva.

He looked down at them, with a sort of bleak clarity of understanding that he had never succeeded in obtaining before. He realized now that he had been—for all effective purposes—blind while Eva had been working with him at the University.

He had introduced Paul to Eva himself some six months back when the other man had dropped by to see him on one of his occasional forays into the academic area in search of likely hired help. Jack had not considered the introduction important. It had not occurred to him that Paul would find Eva the sort of woman he would want. In fact if anyone had asked him about such a combination, he would have

thought it rather funny. The two, by his standards, were opposite as the poles—Eva, with her cool depths, and Paul with his violent surface huckstering. It had not aroused Jack's suspicion that Paul should visit frequently during the months that followed, and that his visits should stop with Eva leaving the U.

No, Jack had been blind to the possibility of anyone else wanting Eva but himself, obsessed by the battle with his inner shyness that twiddled its thumbs and hoped vainly for a fortuitous set of circumstances that would do his wooing for him. Paul might not have the inner strength that had just brought Jack through where poor Reppleman had foundered, but he had push, and guts enough in his own way. While Jack dreamed, he had carried off Eva; and now, at this late date Jack was finally waking up to the fact that where the mating instinct is concerned we are still close enough to our animal forebears to have to fight for our partners on occasion.

He swung around and made his way once more out of the room. He needed space to think.

Once more in the bright sunlight outside, in the eternal out-of-doors of twelve minutes after two on a warm June afternoon, he continued his survey of the situation he was in. But he returned to it with the cold, dispassionate viewpoint of the trained mind. He marshalled the facts he had learned about his situation and considered them. They amounted to the following:

He was involuntarily imprisoned in what appeared to be a plane of two dimensions only and of un-

known extent.

He was kept prisoner by a device operating at this moment.

The natural restrictions of movement in two dimensions, plus a matter of his original position in the plane, prevented him from reaching the means by which he could shut off the device.

Problem: How to shut off the device?

He returned to the room housing the generator and examined it. He studied the objects that, like himself, had been caught up in the field. He could not grasp any of them, but he could push them around within the limits of the field. It would, he thought, probably be quite possible to push the hammer, say, into the core of the generator and short it out. Also, probably quite fatal, if Paul had been telling the truth about the explosion. Reppleman had probably done some such thing. But he was in a rest home now with, again according to Paul, a complete block on the whole business. Still, the hammer possibility might be considered as a last-ditch measure.

"I have only begun to fight," quoted Jack softly to himself.

He studied the two upright rods from the top ends of which the field was generated. A thought occurred to him and he measured the distance between them (about three feet as nearly as he could estimate by eye) and the length of the room to the window in front of which he had been standing. He remembered that it had taken him more steps than he had expected to reach the generator from the window. He checked this and discovered that the first step back from the window

was about the length of his normal stride, but that the second was only slightly more than half that, and the third diminished in proportion.

He returned to the window, went through it to the outside, and checked his stride in the opposite direction. His first step out from the window in a direct line away from the rods of the generator was not quite double his normal stride. With the next it doubled again, and half a dozen steps saw him sweeping over the countryside with giant's steps.

On impulse he closed his eyes and continued outward. After a few more steps he stopped and opened his eyes to look. Earth lay like an enormous, white-flecked disc below him. Space was around him. For a second, instinctively, he tried to gasp for air, then realized with a start that he was not breathing, nor had he been breathing for some time. Such things, evidently, were unnecessary in two dimensions.

He looked back down at Earth then ahead into space. Reppleman had gone mad at the end and wrecked the generator. But Reppleman was Reppleman; and he was — Jack. Moreover he had a score to settle back in his normal world. And he had every intention of getting back to settle it.

How far, he thought, had Reppleman wandered, before he had come back to destroy the thing that held him? The thought was morbid and he shook it from him. Firmly he faced away from the world and strode outward. For a moment he twinkled like a dot among the stars. And then he was gone, stepping into enormous distances with ever-increasing stride.

**J**ACK closed the door of the little workroom behind him and turned left in the corridor outside. He went down the corridor, counting doors. At best it would have to be a guess, but if his estimate was right the room he wanted should be—

*This one.*

He pushed open the door and stepped in, interrupting two people in the midst of an angry argument. For a moment they stood frozen, interrupted and staring at him, and then Eva literally flew into his arms, while Paul's astonishment faded to a bitter smile and he sat down on a corner of the desk beside him and crossed his arms.

"Oh, Jack!" choked Eva. "Jack!"

Jack folded her in his long arms almost automatically, with a feeling of bewilderment that gradually gave way to one of pleasure. He had never seen the calm, self-contained Eva moved like this before; and the corresponding role it demanded of him was rather attractive. He felt sort of contented and self-righteous; and at the same time as if he ought to do something dramatic, like, say, picking up Paul and breaking him in half, or some such thing.

At that, however, it was Paul who got in the first punch.

"She's worried about you," he said, dryly, jerking a thumb at Eva.

"You are?" demanded Jack, looking down at her.

"Oh Jack!" said Eva. "You mustn't do it. You don't know how dangerous it is!"

"What is?" asked Jack, becoming bewildered again.

"The field," put in Paul, as dryly as before.

"Oh that," said Jack. "Well—"

"You don't know what it's like," interrupted Eva. "I was here when they took Max Reppleman out after the explosion. Jack—"

"Never mind that," said Jack, strongly. "Paul said you were worried about me."

"Jack, please listen. That whole business is dangerous—"

"You wouldn't be worried about me unless you were—well worried about me," said Jack stubbornly. His blood was up now. He had almost lost this girl once to Paul through hesitation and delay. "Eva—" He tightened his grasp on her—"I love you."

"Jack, will you lis—" Eva stopped suddenly. Color flooded her face. She stared up at him in shocked speechlessness.

"Eva," said Jack, quickly, taking advantage of this golden opportunity and talking fast. "Eva, I fell in love with you back at the University, only I was always looking for the right chance to tell you and I didn't get around to it because I was afraid of making some mistake and losing you. And when you left and went to work for Paul I gave up, but I've changed my mind. Eva will you marry me right now, today?"

Eva tried to speak a couple of times but no sound came out.

"The whirlwind lover," said Paul somewhere in the background.

"Well?" demanded Jack.

"Jack, I—" trembled Eva.

"Never mind," said Jack, breaking in on her. "Because I won't take no for an answer. Do you hear me?" He paused for a second to be astonished at his own words. "You're going to marry me right away."



"Ye gods!" said Paul. He might have saved his breath. Neither one of the other two was paying attention to him.

Jack let her go, and looked at Paul.

"Paul—" he said.

"Yes *sir!*" responded Paul, getting up from the desk and popping exaggeratedly to attention.

Jack looked at him with the jaundiced eye of a conquering general for his defeated rival. Though temporarily vanquished, this man was still potentially dangerous. Proceed with plan B? asked the front part of his mind. Proceed with plan B, responded the back of his mind.

"Paul," he said. "I've got the answers for you on the field."

Paul's ironic pose slowly relaxed. A wary, calculating look came into his eye.

"What?" he said.

"I'll show you," Jack said. "Come on with me. You too, Eva."

And he turned on one heel and led the way out of the room.

"You see," said Jack, "you were wrong in your picture of what the generator does." They were all three standing in the little L-shaped room and Jack had just told them what had happened to him. "It doesn't produce a field at all. What it does is affect certain types of objects close to it so that they become restricted to a certain limited two-dimensional plane in a single moment of time. The generator itself tries to exist both in this and in normal space at the same time, with the result that it blows up—what you might call a paradox explosion—not after some seconds, but immediately. Of course, this doesn't

affect what's been caught up in the single moment-and-plane, because for them that single instant is eternity."

"But it didn't blow up on you," said Paul.

"I turned it off before it had a chance to," replied Jack, a little grimly.

"Now wait," said Paul. "Wait. You just finished telling us you couldn't reach the timer switch because of your position which was essentially unchangeable in two-dimensional space. How did you turn it off? In fact, how did you ever get back?"

Jack smiled coolly.

"What happens to a plane in curved space?"

Paul frowned.

"I don't get it," he said.

"It curves, of course," answered Jack. "And where it's dependent upon something like the generator, it curves back eventually to it."

Paul's eyes narrowed.

"Well—" he hesitated. "What good did knowing that do you, though? You could walk clear around the circle and still not change your position so as to reach the timer switch."

"Ah yes," said Jack. "If it was just a simple circle. But it was a Moebius strip."

"Now wait—" cried Paul.

"You wait," said Jack. "How many points determine a plane?"

"Three."

Jack turned and walked down the length of the room to where the two upright rods still stood connected to the generator. He touched their tips.

"And how many points do we have here?"

Paul looked bewildered.

"Two," he said. "But—"

"Then where's the third point we need? As a matter of fact you're standing right at it."

Paul started in spite of himself and moved slightly aside.

"What do you mean?" he asked.

"The third point," said Jack, "is the focal point of the two lines of force emanating from the two rod tips. They converge right in the middle of the window at the far end of the room there."

"But I still don't see!" said Paul.

"You will," said Jack. He turned and stepped into the alcove. There was a moment's silence, then the sound of tearing paper and he stepped back out holding a long thin strip of newspaper. He walked back to Paul.

"Let's see your thumb and forefinger," he said. "Now look here. This one end of the strip for the length of about an inch we'll say is the part of the plane in this room that's determined by the three points, the two rod tips and the focal point of their lines of force. Hold that."

He transferred one end of the strip to Paul's fingers. Paul held it pinched between thumb and forefinger and watched.

"Now," went on Jack, demonstrating, "the plane goes out like this and around like this and back like this in a big loop and the end approaches the generator between your fingers again. It comes in here and the last inch of it goes back between your fingers, and there you are, reversed and ready to shut off your timer."

"Wait," said Paul, now holding the two ends pinched between his

fingers together and the big loop of paper strip drooping in mid-air. "Why does the end come back in the same place? Why doesn't it just circle around behind and touch ends?"

"For two reasons," answered Jack. "The plane must end where it began. Right?"

"Yes."

"But," said Jack. "To remain the same plane it must have the same three points in common. And the plane takes its position from the focal point, not the two rod tips. The result is what you've got in your hand there, a loop with a little double tag end."

"But I don't—well, never mind," said Paul. "The important thing is that this is still a straight loop, with no twist in it at all. "You could never get reversed on this. This is no Moebius."

"Think again," said Jack. "With that tag end it is." He turned to Eva. "Come on, Eva. We'll leave Paul to figure this out while you and I go get our own affairs taken care of." He took her hand and opened the door.

"Hey!" cried Paul. "You can't—"

"Oh yes, I can," said Jack, turning in the open doorway. "I've answered all your questions. Just take an imaginary little two-dimensional figure and run him around that strip of newspaper. You'll see."

And he led Eva out the door, closing it behind them. Once in the corridor, however, he took her shoulders in his two big hands and backed her against the wall.

"Tell me," he said. "Just why did you quit me at the U. and come down here?"

Eva looked guilty.

"He—Paul said—"

"What did he say?"

"He said," hesitated Eva, "you'd always told him you never intended to marry anyone." A small note of defiance came into her voice. "What was I going to do? Every day I'd come to work and you'd be there, and you never said anything—" she broke off suddenly, eyeing him curiously. "Why did you ask me that now, Jack?"

"Because," said Jack. "For a minute I was tempted to save Paul a walk—a long, long walk."

She stared up at him.

"I don't understand."

He smiled and took her hand.

"Some day," he said tenderly, "some day when we are very old and married and well supplied with grandchildren, I'll tell you all about it. Okay?"

She was too much in love with him to protest—then.

"Okay," she smiled back.

They went down the corridor toward the door leading out to the parking lot behind the labs.

**I**N THE room Paul stood frowning at the strip of paper in his hand. It didn't seem possible, but it was. He had just finished walking, in imagination, a little two-dimensional man all the way around the

strip; and, sure enough, he had ended up facing in the opposite direction. It was simple enough. But it wasn't a Moebius. Or was it? If the two ends were one end—

Outside on the parking lot he heard the roar of a motor; and he looked up to see a battered old blue business coupe make its turn on the gravel expanse and head out the driveway. As it passed it stopped; and Jack stuck his head out the car window to shout something to him. Paul stepped to the window.

"What?" he yelled.

Jack's words came indistinctly to him over the distance and the racket of the ancient motor.

"—I said—stay right where you are—"

"What?" roared Paul.

But Jack had pulled in his head and the car pulled ahead out the driveway and into the street. Paul watched it merge with the traffic and get lost in the distance.

What had Jack said? Stay right where you are? *Why* should he stay right where he was?

Suddenly he felt the unexpected cold squeeze of suspicion. It couldn't be that Jack would—

—Behind him and from the direction of the timer, came the sound of a soft, insidious *click*. • • •

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I'm not sure that the mathematician really understands this world of ours better than the poet and the mystic. Perhaps it's only that he's better at sums.

—*Sir Arthur Eddington*

We ought to regard the present state of the universe as the effect of its antecedent state and as the cause of the state that is to follow.

—*Laplace*