The R. Underwood of this story (and, we trust, of forthcoming stories) is the R. S. Underwood of technical articles such as Are We Alone In The Universe (*in* The Navigator, *official Air Force Quarterly*) *and a number of textbooks; he is also the same Dr. Underwood of Lubbock, Texas, who has taught math and physics on the university level. We decided to leave this story's slightly old-fashioned title unchanged, partly because the subject matter is—in its technical aspect—one perhaps more favored in the Old Days of SF than presently. None of the older authors who used the theme, however, dealt with its human aspects with quite so much insight, warmth, and sheer good humor. We incline to think (and always have, from a boy) that* all *mathematicians are crazy; but, be that as it may . . .*

The Crazy Mathematician

by R. Underwood

THE FANTASTIC EVENTS OF the inner generationss started with a telephone call in the shank of the evening. Though groggy with sleep when I unhooked the receiver, having flopped into bed before 10 P. M. after a grueling day, I was wide awake in a minute flat. In another minute I was outside Mrs. Jenrod's Boarding House and inside my little bug of a car, headed for 2057 Plymouth Street.

Something big, of course. Even if I did have barely six months of seasoning and sophistication as a reporter for the Willowby *Enterprise,* my job was supposed to be on the day shift. After all, I had an almost new diploma from the Journalism Department of State University, and if Harry Parks should prove too demanding, hordes of other editors would be interested in Calvin P. Wilkins, B.A., twenty-two years old, a trim six-one of muscle, dark, good-looking, and competent. So when Boss Harry said that someone wanted to see me at the address noted above, my tone at first might have carried a hint of reproach, and properly so. Then I caught the name. Professor Rumpel, did

he say? Yes, the great E. P. himself, and get busy.

Well, if the late Albert Einstein had once summoned me for an interview, you can well imagine how exciting it would have been, although naturally nothing like this. Albert in his day was a genius too, of course, but definitely a sane one. Here, on the other hand, was a genius touched by madness—a world sensation in the fields of mathematics, physics, astronomy—you name it. Less than a year ago he had arrived mysteriously from some distant place and had calmly unriddled the universe, so to speak, before some thirty different groups of pop-eyed professors. When a fellow like him calls for a small time reporter at an unearthly hour, something ought to break.

How, I reflected, as I drove in a dangerous trance toward the general area of Plymouth Street, would he know or bother about me? Me, a scribbler who usually turned in unsigned stuff. It must be—it had to be—those two feature articles. The last one had come out only three days ago and was quite impressive, come to think of it, with my name smack under the title. It had a science angle to it, and that was probably what got the man. As a matter of fact, though I had majored in journalism at the university, I had always liked mathematics and had sailed through several courses, including a tough one in calculus. It takes a certain talent, of course. Maybe the science article showed flashes of what might be called genius. I was perking up as I turned into Plymouth Street.

A porch light cast a dim glow at about the right place, so I parked my car and got out to investigate. As well as I could judge in the half light the neighborhood was not too imposing. The cement of the walk was uneven, and the board floor of the porch sagged and creaked as I stepped upon it gingerly. Yes, the number was 2057 all right, but maybe the street was wrong. As I hesitated the door opened silently, and a tall foreground figure darkened the gloom inside.

"In."

The voice was low-pitched, guttural, strange. Somehow, all at once, I didn't want in. But this was silly; reporters always want in. Gulping, I entered. The door clicked shut, and sudden light blinded me. Maybe ten seconds had passed, with me standing there blinking, scared, and somewhat addled, before I could begin to take in the amazing scene.

The room was large and almost empty, except for a shimmering closet-sized box which sat incongruously in the middle. An elegant carved chair was before me, and I had a fleeting impression of a heavy carpet and black

drapes over the windows. But mostly I saw the giant. He was about seven feet tall, and his suit was all in one piece, like a corduroy coverall. His head was pear-shaped and bald, and a massive cliff of a forehead was punctuated below by two caverns for the eyes. Huge eyes! Black they looked, shadowed as they were by the overhanging, with maybe a touch of purple when you looked again. Compelling, hypnotic eyes, but, glory be, not cruel. All by themselves they directed me to the chair, and I sat down limply, feeling somewhat relieved.

"Your name?"

So he didn't know it after all.

"W—Wilkins, sir. Cal Wilkins. I'm a reporter."

"Naturally. That's what I asked for. I told your editor I had to have a writer in a hurry, and I preferred one who had an inkling of knowledge of mathematics. He said he could furnish a beginner who had maybe a trace of such knowledge, and I suppose you're the one."

Sometimes a fellow has to come down in the world. The science feature article must have been completely over Harry's head. But I decided I'd better not play it up too big in this case.

"Well, I *have* had some math. —more than most fellows in my type of job."

"Good. Then maybe you know the most ridiculous, the most asinine, the most illogical and completely indefensible phrase used in what is sometimes called 'the scientific world.' But excuse me —you wouldn't, of course."

"Well, I—I guess I don't."

"What—". The deep eyes came closer to mine. "What is the smallest positive number?"

Shucks, this was old stuff. My confidence returned.

"There isn't any such thing, sir. Because if it existed, we could call it epsilon, say, and then epsilon divided by two would be smaller, so we have a contradiction."

"My—just like that. Then what is that senseless phrase I mentioned? Never mind, I'll tell you." He seemed to draw in a long breath, and then spat out the words as if the affront to his intelligence was almost more than he could bear.

"The ultimate particle."

For a moment he could say no more, and then he went on more calmly.

"They once said that the atom might be it, and then they began to talk about its component parts —protons and neutrons and electrons and mesons. All well enough, until some moron remarked that the search must still go on for the ultimate particle. Any half-mathematician, even you, should be able to tell him how futile that search has to be. But probably the full significance of

those words you parroted from some class-room has not really sunk in. Suppose—"

He turned toward the closet-sized box. A queer feeling came over me as I looked at it also. Could it be *actually* shimmering —swelling just a little and then contracting—or was this a trick of those hypnotic eyes?

"Today I broke the last barrier." The purple wells of light turned to me again. "There is not much time. It has to be tried within an hour, or the field forces will lose alignment."

I pinched myself, hard. The deep eyes did not waver or disappear.

"Suppose we could make a diminishing machine. This would be incomparably more important than the 'time machine' of science fiction, because we have at least some faint idea of what would happen if we could go backward or forward in time. True, our imaginations can likewise sweep outward, in a feeble way, through the endless galaxies of space; but in the other, or *inward,* direction, they haven't made even a try.

"Now let us suppose that we get inside the machine and then, when the fraction one over ten appears on a sensitive surface, we and the box shrink instantly to one tenth of our former dimensions. That means that the volumes would be reduced to one part in ten cubed. An electric tape takes over, adding zero after zero to the denominator, and at each click we become one thousandth as large as before. In approximately ten clicks we become as small as the average atom, and in a few more we are in virgin territory, *whose nature no one has even tried to guess.* And after merely twenty-six clicks, as compared with normal man, we would be like that man standing before the universe of the radio telescope, assuming that universe to be some ten billion light years in diameter. All the time inside the box everything seems perfectly normal."

Crazy he was, for sure. But I could go along with him, in a way.

"That would be quite a trick. It sure would make a fellow feel queer."

"Why should it? Other things just as queer are happening all the time, as you well know. Right now you are traveling eighteen-plus miles a second around the sun on this ball of earth, and you and the earth and the sun are whizzing around the center of the Milky Way galaxy at ten times that speed. Yet everything seems quiet and normal. What was it that Shakespeare said about more things?"

"More things in heaven and earth," I quoted, "than this world dreams of."

"Precisely. And now we come to a genuine problem of science

which is quite apart from my own pretensions, if such they are. Suppose the machine has clicked off one million zeros, and its size, along with yours, is reduced accordingly. You step outside. The particular atom which surrounded you at one stage has swelled to a mountain, a sun, a galaxy, and then to something unknowably vast. What, I ask you, could you reach out and *touch?*"

I had an inspiration. "The ultimate particle?"

"Of course not, you idiot. For the process continues endlessly; there is nothing in nature or logic to stop it. This is just the first generation inward, and another million zeros brings us to the next, and another—"

"Enough," I cried. "I get your point, I think."

"Then get in."

A hand of steel closed on my arm. I struggled vainly as the door of the diminishing machine snapped tight in the rear, and I moaned when a tiny light flashed over a string of zeros. They moved leftward, slowly at first, then faster, until finally the blur of them faded into blankness, and the great eyes of E. P. Rumpel stared steadily into mine.

"Outside!"

The words had a pleasant, insouciant ring. Distantly I heard them as my mind and I groped together in a fog, and then I realized that the door was open and that Rumpel's voice sounded warm and human.

He strapped a contrivance onto my back, and then brought a flexible, transparent tube around under my left armpit and into my mouth.

"Condensed air," he said. The man thought of everything. A glance into the mirror I happened to have in my pocket showed only a slight puckering of the mouth, as through the almost invisible tube I sucked in air which was sweet and normal, with maybe a slight tang as of new-mown hay. It was nice not to be strapped in an ugly suit because, as I hate to mention again, I'm fairly pleasant on the eyes. It was rather difficult to say what might come up in a situation like this.

"Station One Million and Sixty-three. Watch your step."

I went out into a suffused glow and found that I wasn't standing on anything. All around me floated grotesque chunks of a yellow material full of holes, like sponges or pieces of cheese. About a hundred feet down a flat brown surface stretched toward a green horizon.

"As you will note," said Professor Rumpel, clearing his throat, "we seem to be weightless. Oh, we're being pulled down just a little by the tiny flake from a proton which looks like land below, so that we get the feeling of

up and down. But notice the red ceiling above which practically balances the two pulls. The miasma rising from brown to red holds us stationary and carries the sound of my voice. Had you wondered about that?

I had to confess that I hadn't. There were several other things to wonder about, including the wet feel of the giant sponges. We rocketed playfully from piece to piece, splashing the juice on each other. But all of a sudden Professor Rumpel, who had been upside down, righted himself and grabbed me by the collar, pointing toward a golden blob.

"It's quivering," he yelled. "We've got about two minutes."

His strength was almost super human. Together we kicked on a yellow boulder, and it was a good thing that Professor Isaac Newton's law of action and reaction was still on duty. Grabbing the chunks on all sides, we swam and floundered toward the shimmering goal. I've seldom seen anything that looked as good as that rectangular piece of remarkable material into which we climbed, panting. The door clicked shut, the light over the tape blinked, and the left-marching zeros blurred again.

"Careless of me," said Rumpel. "If I don't set the timer it takes off again in five minutes. The very longest stay I'll be able to manage is a little more than an hour. It sure needs a lot of tinkering."

I was too winded to comment, but I still had a feeling that the work done up to date was not altogether wasted.

So we zoomed again and again, and stopped just as often, on our way to Station Three Billion, which, as it came out later, was the highlight of the whole trip. Part of the stops were on exotic planet-like balls, with different sorts of life, some almost human. Once I got interested in a charming creature who seemed to like me too. Professor Rumpel had to drag me away when the machine started to blink. I let go of a warm hand with some reluctance, noticing at the same time that it felt a little odd.

"Six fingers and no thumb," the professor pointed out. "Didn't you notice from the signboards that they use the base twelve, instead of ten like humans? It should be obvious why. Didn't you notice?"

I sighed. There was so much to learn, and Rumpel didn't miss a trick. He was what I would call an able individual.

On one neo-planet the suns were swarming in the sky, and the professor mentioned that this was a region like those in globular clusters outside our galaxy in the super-universe of man. Space ships were coursing in and out, some, oddly enough, shaped like

flying saucers. I watched a variety of creatures, both attractive and otherwise, converging on a giant ramp. It was probably one of the most cosmopolitan gatherings I have ever seen.

I forgot to mention that at this very time I was holding a hand, I think, which had perhaps seven fingers and was attached becomingly to what I felt was maybe a girl, who in turn was in the crook of my arm. I knew that in like circumstances Professor Rumpel would have been calculating with the bases seven and fourteen, just for practice and possible communication, but I think he overdid it. Back at the university I had been known as a fast worker, decent but not shy, and now I was finding that the technique had what you might call some universal aspects.

Well, be that as it may, we had to leave and go back to the old routine. I found pretty soon that I no longer blacked out during the squeeze runs, and then Rumpel showed me how, by reversing the switch, we could back up at any time. It occurred to me right then that this could well be one of the most useful features of the gadget. Anyway, I was having a great time jiggling the switch on my own, fascinated by the thought of how we were shrinking or swelling according to my whim. I noticed between shifts that Professor Rumpel was paying no attention to my fun, and was reading his book. (Once I had picked up this tome from a shelf under the light, only to find that it was in hieroglyphics, I think.) But suddenly he looked up, glanced at the dial with a startled expression, and then, seemingly satisfied, took out his watch and held it for about ten seconds.

"Cut," he yelled. "Station Three Billion. Out."

Oh, what a beautiful world, this one! Trees and grass and wind, almost like on earth, but better. And there, walking past with a grace no woman on our planet could ever match, was a creature who was like an incredibly lovely human reared in another age, and utterly purged of all earthly flaws.

Who was I, Calvin P. Wilkins, B. A., educated, sophisticated, flippant, and in somewhat peculiar circumstances, to be thinking of love at first sight? The machine was honed up, and Rumpel had warned me that this was only a half-hour stop. But clearly something had to be done. I had no idea of what would happen if I hid out and forced the pilot to go on alone, and I doubt that anyone else would in a like situation. On top of that worry, a new and unusual one cropped up at the worst possible moment. My confidence in my technique had de-

serted me for the first time in my life.

Here was disaster indeed. It came to me that a half hour would simply not be enough. A full hour at least was needed just to get this glorious creature's address, if they had such things in this heavenly place. And all the while I was following at a discrete distance—a fact which in itself showed my distraught state.

She walked on, serene, majestic, and totally unaware of me. At a small building she sat down on a bench, much as people on earth do when they wait for a bus.

It was now or never. Luckily, I am resourceful. Screwing up my courage, I walked the necessary distance, picked up a handy club, swung it lustily, and knocked Professor Rumpel unconscious. I regretted the necessity, of course, but it gave me time to do what had to be done.

I dragged the big fellow into the diminishing machine, where he would be less likely to attract attention, and then by main strength forced the indicator to the one-hour position. On a stopover the track was irreversible, so Rumpel would be frustrated, when he came to his senses, if he tried to take off before the hour was up. Then I walked back and sat down beside the goddess, trembling inwardly but determined. Right away I noticed that she was one of the rare creatures I had met on this trip who had four fingers and one thumb per hand.

The situation was ticklish, what with my confidence shattered and the stakes so high. The goddess looked straight ahead, and her profile was shattering. The desperation-delay number seemed to be indicated, so I went into it: casual glances, eyes meeting, eyes lowered, watch examined, imperceptible shift—the whole routine. Once I thought the time had come for the "Haven't I met you before?" part, and then I realized how silly this was. Speaking was out, naturally.

And yet, in the billions upon billions of chances, couldn't it just happen that you might run across near repetitions, even in the matter of language? Wildly improbable, of course, but—

"Haven't I met you before?"

You'll probably find this hard to believe, but *she* was the one who said it. When a thing like that happens you just have to give up and go on from there. So I did.

As it happened, her English was as good as mine—maybe better. I was somewhat confused anyway, what with being more smitten all the time. But I did gather that her opening remark was completely proper. She was in a country with friendly customs, and she was simply mis-

taken about having met me before.

At that, there was considerable explaining to do. I don't think she fully and completely accepted my account of the diminishing machine, but she was polite about it. And she was sorry when I had to leave; of that I'm pretty sure. From her purse she took out a sheet of paper, scrawled something on the upper and lower halves, tore it into two parts, and handed one to me.

"If you ever come back," she whispered, "we can match the pieces. Good bye and good luck."

Not even a kiss. And me with my technique!

Sadly I crammed the broken sheet into my pocket and raced toward the machine. This I knew for sure: I *would* come back, if there was a way. I wouldn't even have left if I hadn't felt a certain loyalty to Professor Rumpel, who after all had helped in this romance, though in a sort of devious way.

There he was, the poor man, still unconscious. In any case I knew how to take off. I felt guilty, yet somehow noble, competent, and almost unbearably sentimental, as I fingered the switch and waited for the moment.

Some lines of poetry came to me. Once, in an attic hunt, I had copy of a defunct magazine called *The Literary Digest,* dated November 3, 1923. I remembered the date because the poet had "sent" me, as they said in those days, in spite of my blase sophistication. I had learned it by heart. Never had the lines seemed so appropriate and so poignant:

Just for a fragment of morning we two were together.
Trail joined trail in the hills, and we rode to the west.

Yes, our trails had joined—for good, I hoped—in a trysting place new to the age-old universe.

Chance-met comrades in youth and the upland weather,
Wasting our priceless moments in banter and jest.

Ah, but in our case there would be no waste. I would go back.

How could I know that the hills would grow dark with her going?
Laughing, I watched her ride into the south, and away.

The south? In Generation Three Billion?

I should have put aside all things, and made her road my road;
I should have followed her down to the ends of the earth.

And I would, too. Farther than that.

On the way upward to our generation, I implored the great man to give me the secret of the diminishing machine, so that I could go back to my wonderful and hard-to-reach love. But Professor Rumpel was out of sorts, and perhaps this was understandable, considering the bump on his head.

"You and your love at first sight," he scoffed. "Yes, I've forgiven you, I guess, but I am not sure I would explain this gadget to you if I could. You're not reliable enough. Holding up the timer for an hour, when it was set for just half of that, naturally warped the machinery and started the Shrink-Swell Alternator, so I hardly know where I'm at. What am I saying—where I'm at? See—you've ruined my diction, among other things."

"Now professor, you're upset. Please, sir. Don't you see what it means to me?"

But it was useless. Edwin Percival Rumpel was adamant.

As the machine bumped lightly he stepped out, still pouting a little, and then said something puzzling.

"Here you are— G. One. Your girl is in the generation represented by one over ten with the exponent three billion. Of course, you messed up the machine so that the precise figure is somewhat uncertain, but in any case the young lady is badly misplaced. My own generation is three billion too, but you leave off the one in the numerator. I am going in the *other* direction."

The great eyes looked at me affectionately, I thought, from inside the box. Then it was not there. In the dawning light I made out the tar paper over the windows which I had taken to be dark drapes, a broken-arm chair which had seemed elegantly carved, and crumbling yellow dust in place of the thick carpet.

Outside, and in a despondent mood, I slumped into my car and left for good the empty house at 2057 Plymouth Street.

Time is a queer thing too, the way it can stretch. When I woke up at Mrs. Jenrod's place I felt that I had been away for a year. What a crazy dream! Or was it? How come I could remember so clearly every single one of those breath-taking items such as the eyes, and the mouth, and the ears, and the walk, and—oh yes, come to think of it, the machine.

Outside, a newsboy was bellowing something.

"Extra! Extra! Great man vanishes during night. Heavy baggage gone too. Extra! Professor Rumpel, greatest—" The hoarse yells garbled off in the distance.

I jumped out of bed. How come I was dressed? The pocket of my coat felt bulgy, and I fumbled around in it. Out came a sheet of paper, torn in the middle, along with a comb and a small mirror. There was a girl's name in it, and an address. But look where it was!

Could it be that I had maneuvered the machine inward and then *back outward* so that Station Three Billion was really only the old planet Earth hit at a different angle? Rumpel had admitted that my amateur navigation meth-

ods, what with jamming and excursions both ways, had badly gummed up his calculations. That long haul back to Plymouth Street might have been a second round trip with an especially lucky landing.

And that, in case you have wondered, is how I came to meet Norma, my wife. She says she *thought* I was a bit touched when I sat down on that bench and told that preposterous story, but—well—I did something to her at that. Of course, a lot of correspondence and persuasion was necessary because she thought if I was such a liar and all—and besides it was in perfectly respectable daylight when I edged up looking so calf-eyed. It wasn't late *at all.* So I had to send her books explaining about time zones and astronomy and stuff—and how I had set out long *after* dark and got to her place even *before* supper time at the end of my first round trip back to earth, which we hit at a different place because I had naturally snapped back into place while I was fiddling so that next time we hit Plymouth Street on the nose—and how I happened to know that the universe in the astronomy books, like as not, was nearly lost in a special tiny part of one of the so-called atoms in one of the nails in maybe the left shoe of Professor Rumpel, who had disappeared so suddenly.

Norma just looks at me in a funny but rather pretty way. After all, people where she lives are always a bit uppity and skeptical toward the innocents who live in Florida; so I had to move clear out to her precious California to go on with the explaining. I haven't finished it yet.