DOUGLAS HOFSTADTER

The Tale of Happiton

Happiton was a happy little town. It had 20,000 inhabitants, give or take seven, and they were productive citizens who mowed their lawns quite regularly. Folks in Happiton were pretty healthy. They had a life expectancy of seventy-five years or so, and lots of them lived to ripe old ages. Down at the town square, there was a nice big courthouse with all sorts of relics from WW II and monuments to various heroes and whatnot. People were proud, and had the right to be proud, of Happiton.

On the top of the courthouse, there was a big bell that boomed every hour on the hour, and you could hear it far and wide—even as far out as Shady Oaks Drive, way out nearly in the countryside.

One day at noon, a few people standing near the courthouse noticed that right after the noon bell rang, there was a funny little sound coming from up in the belfry. And for the next few days, folks noticed that this scratching sound was occurring after every hour. So on Wednesday, Curt Dempster climbed up into the belfry and took a look. To his surprise, he found a crazy kind of contraption rigged up to the bell. There was this mechanical hand, sort of a robot arm, and next to it were five weird-looking dice that it could throw into a little pan. They all had twenty sides on them, but instead of being numbered one through twenty, they were just numbered zero through nine, but with each digit appearing on two opposite sides. There was also a TV camera that pointed at the pan and it seemed to be attached to a microcomputer or something. That's all Curt could figure out. But then he noticed that on top of the computer, there was a neat little envelope marked "To the

friendly folks of Happiton." Curt decided that he'd take it downstairs and open it in the presence of his friend the mayor, Janice Fleener. He found Janice easily enough, told her about what he'd found, and then they opened the envelope. How neatly it was written! It said this:

Grotto 19, Hades
June 20, 1983

Dear folks of Happiton,

I've got some bad news and some good news for you. The bad first. You know your bell that rings every hour on the hour? Well, I've set it up so that each time it rings, there is exactly one chance in a hundred thousand—that is, 1/100,000—that a Very Bad Thing will occur. The way I determine if that Bad Thing will occur is, I have this robot arm fling its five dice and see if they all land with "7" on top. Most of the time, they won't. But if they do—and the odds are exactly 1 in 100,000—then great clouds of an unimaginably revolting-smelling yellow-green gas called "Retchgoo" will come oozing up from a dense network of underground pipes that I've recently installed underneath Happiton, and everyone will die an awful, writhing, agonizing death. Well, that's the bad news.

Now the good news! You all can prevent the Bad Thing from happening, if you send me a bunch of postcards. You see, I happen to like postcards a whole lot (especially postcards of Happiton), but to tell the truth, it doesn't really much matter what they're of. I just *love* postcards! Thing is, they have to be written personally—not typed, and especially not computer-printed or anything phony like that. The more cards, the better. So how about sending me some postcards—batches, bunches, boxes of them?

Here's the deal. I reckon a typical postcard takes you about 4 minutes to write. Now suppose just one person in all of Happiton spends 4 minutes one day writing me, so the next day, I get one postcard. Well, then, I'll do you all a favor: I'll slow the courthouse clock down a bit, for a day. (I realize this is an inconvenience, since a lot of you tell time by the clock, but believe me, it's a lot more inconvenient to die an agonizing, writhing death from the evil-smelling, yellow-green Retchgoo.) As I was saying, I'll slow the clock down for *one day,* and by how much? By a

factor of 1.00001. Okay, I know that doesn't sound too exciting, but just think if all 20,000 of you send me a card! For *each* card I get that day, I'll toss in a slow-up factor of 1.00001, the next day. That means that by sending me 20,000 postcards a day, you all, working together, can get the clock to slow down by a factor of *1.00001 to the 20,000th power,* which is just a shade over 1.2, meaning it will ring every 72 minutes.

All right, I hear you saying, "72 minutes is just barely over an hour!" So I offer you more! Say that one day I get 160,000 postcards (heavenly!). Well then, the very next day I'll show my gratitude by slowing your clock down, all day long, midnight to midnight, by 1.00001 to the 160,000th power, and that ain't chickenfeed. In fact, it's about 5, and that means the clock will ring only every 5 hours, meaning those sinister dice will only get rolled about 5 times (instead of the usual 24). Obviously, it's better for both of us that way. You have to bear in mind that I don't have any personal interest in seeing that awful Retchgoo come rushing and gushing up out of those pipes and causing every last one of you to perish in grotesque, mouth-foaming, twitching convulsions. All I care about is getting postcards! And to send me 160,000 a day wouldn't cost you folks that much effort, being that it's just 8 postcards a day—just about a half hour a day for each of you, the way I reckon it.

So my deal is pretty simple. On any given day, I'll make the clock go off once every X hours, where X is given by this simple formula:

$$X = 1.00001^N$$

Here, N is the number of postcards I received the previous day. If N is 20,000, then X will be 1.2, so the bell would ring 20 times per day, instead of 24. If N is 160,000, then X jumps way up to about 5, so the clock would slow way down—just under 5 rings per day. If I get *no* postcards, then the clock will ring once an hour, just as it does now. The formula reflects that, since if N is 0, X will be 1. You can work out other figures yourself. Just think how much safer and securer you'd all feel knowing that your courthouse clock was ticking away so slowly!

I'm looking forward with great enthusiasm to hearing from you all.

Sincerely yours,
Demon #3127

The letter was signed with beautiful medieval-looking flourishes, in an unusual shade of deep red . . . ink?

"Bunch of hogwash!" spluttered Curt. "Let's go up there and chuck the whole mess down onto the street and see how far it bounces." While he was saying this, Janice noticed that there was a smaller note clipped onto the back of the last sheet, and turned it over to read it. It said this:

> *P.S.*—It's really not advisable to try to dismantle my little setup up there in the belfry: I've got a hair trigger linked to the gas pipes, and if anyone tries to dismantle it, pssssst! Sorry.

Janice Fleener and Curt Dempster could hardly believe their eyes. What gall! They got straight on the phone to the police department, and talked to Officer Curran. He sounded poppin' mad when they told him what they'd found, and said he'd do something about it right quick. So he hightailed it over to the courthouse and ran up those stairs two at a time, and when he reached the top, a-huffin' and a-puffin', he swung open the belfry door and took a look. To tell the truth, he was a bit ginger in his inspection, because one thing Officer Curran had learned in his many years of police experience is that an ounce of prevention is worth a pound of cure. So he cautiously looked over the strange contraption, and then he turned around and quite carefully shut the door behind him and went down. He called up the town sewer department and asked them if they could check out whether there was anything funny going on with the pipes underground.

Well, the long and the short of it is that they verified everything in the Demon's letter, and by the time they had done so, the clock had struck five more times and those five dice had rolled five more times. Janice Fleener had in fact had her thirteen-year-old daughter Samantha go up and sit in a wicker chair right next to the microcomputer and watch the robot arm throw those dice. According to Samantha, an occasional seven had turned up now and then, but never had two sevens shown up together, let alone sevens on all five of the weird-looking dice!

The next day, the *Happiton Eagle-Telephone* came out with a front-page story telling all about the peculiar goings-on. This

caused quite a commotion. People *everywhere* were talking about it, from Lidden's Burger Stop to Bixbee's Druggery. It was truly the talk of the town.

When Doc Hazelthorn, the best pediatrician this side of the Cornyawl River, walked into Ernie's Barbershop, corner of Cherry and Second, the atmosphere was more somber than usual. "Whatcha gonna do, Doc?" said Big Ernie, the jovial barber, as he was clipping the few remaining hairs on old Doc's pate. Doc (who was also head of the Happiton City Council) said the news had come as quite a shock to him and his family. Red Dulkins, sitting in the next chair over from Doc, said he felt the same way. And then the two gentlemen waiting to get their hair cut both added their words of agreement. Ernie, summing it up, said the whole town seemed quite upset. As Ernie removed the white smock from Doc's lap and shook the hairs off it, Doc said that he had just decided to bring the matter up first thing at the next City Council meeting, Tuesday evening. "Sounds like a good idea, Doc!" said Ernie. Then Doc told Ernie he couldn't make the usual golf date this weekend because some friends of his had invited him to go fishing out at Lazy Lake, and Doc just couldn't resist.

Two days after the Demon's note, the *Eagle-Telephone* ran a feature article in which many residents of Happiton, some prominent, some not so prominent, voiced their opinions. For instance, eleven-year-old Wally Thurston said he'd gone out and bought up the whole supply of picture postcards at the 88-Cent Store, $14.22 worth of postcards, and he'd already started writing a few. Andrea McKenzie, sophomore at Happiton High, said she was really worried and had had nightmares about the gas, but her parents told her not to worry, things had a way of working out. Andrea said maybe her parents weren't taking it so seriously because they were a generation older and didn't have as long to look forward to anyway. She said she was spending an hour each day writing postcards. That came to fifteen or sixteen cards each day. Hank Hoople, a janitor at Happiton High, sounded rather glum: "It's all fate. If the bullet has your name on it, it's going to happen, whether you like it or not." Many other citizens voiced concern and even alarm about the recent developments.

But some voiced rather different feelings. Ned Furdy, who as far as anyone could tell didn't do much other than hang around Simpson's bar all day (and most of the night) and buttonhole anyone he could, said, "Yeah, it's a problem, all right, but I don't know nothin' about gas and statistics and such. It should all be left to the mayor and the Town Council, to take care of. They know what they're doin'. Meanwhile, eat, drink, and be merry!" And Lulu Smythi, seventy-seven-year-old proprietor of Lulu's Thread 'N' Needles Shop, said "I think it's all a ruckus in a teapot, in my opinion. Far as I'm concerned, I'm gonna keep on sellin' thread 'n' needles, and playin' gin rummy every third Wednesday."

When Doc Hazelthorn came back from his fishing weekend at Lazy Lake, he had some surprising news to report. "Seems there's a demon left a similar setup in the church steeple down in Dwaynesville," he said. (Dwaynesville was the next town down the road, and the arch-rival of Happiton High in football.) "The Dwaynesville demon isn't threatening them with gas, but with radioactive water. Takes a little longer to die, but it's just as bad. And I hear tell there's a demon with a subterranean volcano up at New Athens." (New Athens was the larger town twenty miles up the Cornyawl from Dwaynesville, and the regional center of commerce.)

A lot of people were clearly quite alarmed by all this, and there was plenty of arguing on the streets about how it had all happened without anyone knowing. One thing that was pretty universally agreed on was that a commission should be set up as soon as possible, charged from here on out with keeping close tabs on all subterranean activity within the city limits, so that this sort of outrage could never happen again. It appeared probable that Curt Dempster, who was the moving force behind this idea, would be appointed its first head.

Ed Thurston (Wally's father) proposed to the Jaycees (of which he was a member in good standing) that they donate $1,000 to support a postcard-writing campaign by town kids. But Enoch Swale, owner of Swale's Pharmacy and the Sleepgood Motel, protested. He had never liked Ed much, and said Ed was proposing it simply because his son would gain status that way. (It was true that Wally had recruited a few kids and that they spent an hour each afternoon after school writing cards. There had been a small article in the paper about it once.) After considerable debate, Ed's motion was narrowly defeated. Enoch had a lot of friends on the City Council.

Nellie Doobar, the math teacher at High, was about the only one

who checked out the Demon's math. "Seems right to me," she said to the reporter who called her about it. But this set her to thinking about a few things. In an hour or two, she called back the paper and said, "I figured something out. Right now, the clock is still ringing very close to once every hour. Now there are 720 hours per month, and so that means there are 720 chances each month for the gas to get out. Since each chance is 1 in 100,000, it turns out that each month, there's a bit less than a 1-in-100 chance that Happiton will get gassed. At that rate, there's about eleven chances in twelve that Happiton will make it through each year. That may sound pretty good, but the chances we'll make it through any eight-year period are almost exactly fifty-fifty, exactly the same as tossing a coin. So we can't really count on very many years . . ."

This made big headlines in the next afternoon's *Eagle-Telephone*—in fact, even bigger than the plans for the County Fair! Some folks started calling up Mrs. Doobar anonymously and telling her she'd better watch out what she was saying if she didn't want to wind up with a puffy face or a fat lip. Seems like they couldn't quite keep it straight that Mrs. Doobar wasn't the one who'd set the thing up in the first place.

After a few days, though, the nasty calls died down pretty much. Then Mrs. Doobar called up the paper again and told the reporter, "I've been calculating a bit more here, and I've come up with the following, and they're facts every last one of them. If all 20,000 of us were to spend half an hour a day writing postcards to the Demon, that would amount to 160,000 postcards a day, and just as the Demon said, the bell would ring pretty near every *five* hours instead of every hour, and that would mean that the chances of us getting wiped out each month would go down considerable. In fact, there would only be about one chance in 700 that we'd go down the tubes in any given month, and only about a chance in 60 that we'd get zapped each year. Now I'd say that's a darn sight better than one chance in twelve per year, which is what it is if we don't write any postcards (as is more or less the case now, except for Wally Thurston and Andrea McKenzie and a few other kids I heard of). And for every eight-year period, we'd only be running a 13 percent risk instead of a 50 percent risk."

"That sounds pretty good," said the reporter cheerfully.

"Well," replied Mrs. Doobar, "it's not too bad, but we can get a whole lot better by doublin' the number of postcards."

"How's that, Mrs. Doobar?" asked the reporter. "Wouldn't it just get twice as good?"

"No, you see, it's an exponential curve," said Mrs. Doobar, "which means that if you *double N*, you *square X*."

"That's Greek to me," quipped the reporter.

"*N* is the number of postcards and *X* is the time between rings," she replied quite patiently. "If we all write a half hour a day, *X* is five hours. But that means that if we all write a whole *hour* a day, like Andrea McKenzie in my algebra class, *X* jumps up to twenty-five hours, meaning that the clock would ring only about once a day, and obviously that would reduce the danger a *lot*. Chances are, hundreds of years would pass before five sevens would turn up together on those infernal dice. Seems to me that under those circumstances, we could pretty much live our lives without worrying about the gas at all. And that's for writing about an hour a day, each one of us."

The reporter wanted some more figures detailing how much different amounts of postcard writing by the populace would pay off, so Mrs. Doobar obliged by going back and doing some more figuring. She figured out that if 10,000 people—half the population of Happiton—did two hours a day for the year, they could get the same result—one ring every twenty-five hours. If only 5,000 people spent two hours a day, or if 10,000 people spent one hour a day, then it would go back to one ring every five hours (still a lot safer than one every hour). Or, still another way of looking at it, if just 1,250 of them worked *full-time* eight hours a day), they could achieve the same thing.

"What about if we all pitch in and do four minutes a day, Mrs. Doobar?" asked the reporter.

"Fact is, 'twouldn't be worth a damn thing! (Pardon my French.)" she replied. "*N* is 20,000 that way, and even though that sounds pretty big, *X* works out to be just 1.2, meaning one ring every 1.2 hours, or 72 minutes. That way, we still have about a chance of 1 in 166 every month of getting wiped out, and 1 in 14 every year of getting it. Now that's real scary, in my book. Writing cards only starts making a noticeable difference at about fifteen minutes a day per person."

By this time, several weeks had passed, and summer was getting into full swing. The County Fair was buzzing with activity, and

each evening after folks came home, they could see loads of fireflies flickering around the trees in their yards. Evenings were peaceful and relaxed. Doc Hazelthorn was playing golf every weekend, and his scores were getting down into the low nineties. He was feeling pretty good. Once in a while he remembered the Demon, especially when he walked downtown and passed the courthouse tower, and every so often he would shudder. But he wasn't sure what he and the City Council could do about it.

The Demon and the gas still made for interesting talk, but were no longer such big news. Mrs. Doobar's latest revelations made the paper, but were relegated this time to the second section, two pages before the comics, right next to the daily horoscope column. Andrea McKenzie read the article avidly and showed it to a lot of her school friends, but to her surprise it didn't seem to stir up much interest in them. At first, her best friend, Kathi Hamilton, a very bright girl who had plans to go to State and major in history, enthusiastically joined Andrea and wrote quite a few cards each day. But after a few days Kathi's enthusiasm began to wane.

"What's the point, Andrea?" Kathi asked. "A handful of postcards from me isn't going to make the slightest bit of difference. Didn't you read Mrs. Doobar's article? There have got to be 160,000 a day to make a big difference."

"That's just the point, Kath!" replied Andrea exasperatedly. "If you and everyone else will just do your part, we'll *reach* that number—but you can't cop out!" Kathi didn't see the logic, and spent most of her time doing her homework for the summer school course in world history she was taking. After all, how could she get into State if she flunked world history?

Andrea just couldn't figure out how come Kathi, of all people, so interested in history and the flow of time and world events, could not see her *own* life being touched by such factors, so she asked Kathi, "How do you know there will be any *you* left to *go* to State, if you don't write postcards? Each year, there's a one-in-twelve chance of you and me and all of us being wiped out! Don't you even want to work against that? If people would just *care,* they could *change* things! An hour a day! Half an hour a day! Fifteen minutes a day!"

"Oh, come *on,* Andrea!" said Kathi annoyedly. "Be realistic."

"Darn it all, *I'm* the one who's *being* realistic," said Andrea. "If you don't help out, you're adding to the burden of someone else."

"For Pete's sake, Andrea," Kathi protested angrily, "I'm *not* adding to anyone else's burden. Everyone can help out as much as they want, and no one's obliged to do anything at all. Sure, I'd like it if everyone were helping, but you can see for yourself, practically nobody is. So I'm not going to waste my time. I need to pass world history."

And sure enough, Andrea had to do no more than listen each hour, right on the hour, to hear that bell ring to realize that nobody was doing much. It once had sounded so pleasant and reassuring, and now it sounded creepy and ominous to her, just like the fireflies and the barbecues. Those fireflies and barbecues really bugged Andrea, because they seemed so *normal,* so much like any *other* summer—only *this* summer was *not* like any other summer. Yet nobody seemed to realize that. Or rather, there was an undercurrent that things were not quite as they should be, but nothing was being done . . .

One Saturday, Mr. Hobbs, the electrician, came around to fix a broken refrigerator at the McKenzies' house. Andrea talked to him about writing postcards to the Demon. Mr. Hobbs said to her, "No time, no time! Too busy fixin' air conditioners! In this heat wave, they been breakin' down all over town. I work a ten-hour day as it is, and now it's up to eleven, twelve hours a day, includin' weekends. I got no time for postcards, Andrea." And Andrea saw that for Mr. Hobbs it was true. He had a big family and his children went to parochial school, and he had to pay for them all, and . . .

Andrea's older sister's boyfriend, Wayne, was a star halfback at Happiton High. One evening he was over and teased Andrea about her postcards. She asked him, "Why don't you write any, Wayne?"

"I'm out lifeguardin' every day, and the rest of the time I got scrimmages for the fall season."

"But you could take some time out—just fifteen minutes a day—and write a few postcards!" she argued. He just laughed and looked a little fidgety. "I don't know, Andrea," he said. "Anyway, me 'n' Ellen have got better things to do—huh, Ellen?" Ellen giggled and blushed a little. Then they ran out of the house and jumped into Wayne's sports car to go bowling at the Happi-Bowl.

* * *

Andrea was puzzled by all her friends' attitudes. She couldn't understand why everyone had started out so concerned but then their concern had fizzled, as if the problem had gone away. One day when she was walking home from school, she saw old Granny Sparks out watering her garden. Granny, as everyone called her, lived kitty-corner from the McKenzies and was always chatty, so Andrea stopped and asked Granny Sparks what she thought of all this. "Pshaw! Fiddlesticks!" said Granny indignantly. "Now Andrea, don't you go around believin' all that malarkey they print in the newspapers! Things are the same here as they always been. I oughta know—I've been livin' here nigh on eighty-five years!"

Indeed, that was what bothered Andrea. *Every*thing seemed so annoyingly *normal*. The teenagers with their cruising cars and loud motorcycles. The usual boring horror movies at the Key Theater down on the square across from the courthouse. The band in the park. The parades. And especially, the damn fireflies! Practically nobody seemed moved or affected by what to her seemed the most overwhelming news she'd ever heard. The only other truly sane person she could think of was little Wally Thurston, that eleven-year-old from across town. What a ridiculous irony, that an eleven-year-old was saner than all the adults!

Long about August 1, there was an editorial in the paper that gave Andrea a real lift. It came from out of the blue. It was written by the paper's chief editor, "Buttons" Brown. He was an old-time journalist from St. Joe. Missouri. His editorial was real short. It went like this:

The Disobedi-Ant

> The story of the Disobedi-Ant is very short. It refused to believe that its powerful impulses to play instead of work were anything but unique expressions of its very unique self, and it went its merry way, singing, "What I choose to do has nothing to do with what any-ant else chooses to do! What could be more self-evident?"
>
> Coincidentally enough, so went the reasoning of all its colony-mates. In fact, the same refrain was independently invented by every last ant in the colony, and each ant thought it original. It echoed throughout the colony, even with the same melody.
>
> The colony perished.

Andrea thought this was a terrific allegory, and showed it to all her friends. They mostly liked it, but to her surprise not one of them started writing postcards.

All in all, folks were pretty much back to daily life. After all, nothing much seemed really to have changed. The weather had turned real hot, and folks congregated around the various swimming pools in town. There were lots of barbecues in the evenings, and every once in a while somebody'd make a joke or two about the Demon and the postcards. Folks would chuckle and then change the topic. Mostly, people spent their time doing what they'd always done, and enjoying the blue skies. And mowing their lawns regularly, since they wanted the town to look nice.