

## Beep

JOSEF PABER lowered his newspaper slightly. Finding the girl on the park bench looking his way, he smiled the agonizingly embarrassed smile of the thoroughly married nobody caught bird-watching, and ducked back into the paper again.

He was reasonably certain that he looked the part of a middle-aged, steadily employed, harmless citizen enjoying a Sunday break in the bookkeeping and family routines. He was also quite certain, despite his official instructions, that it wouldn't make the slightest bit of difference if he didn't. These boy-meets-girl assignments always came off. Jo had never tackled a single one that had required him.

As a matter of fact, the newspaper, which he was supposed to be using only as a blind, interested him a good deal more than his job did. He had only barely begun to suspect the obvious ten years ago when the Service had snapped him up; now, after a decade as an agent, he was still fascinated to see how smoothly the really important situations came off. The *dangerous* situations not boy-meets-girl.

This affair of the Black Horse Nebula, for instance. Some days ago the papers and the commentators had begun to mention reports of disturbances in that area, and Jo's practiced eye had picked up the mention. Something big was cooking.

Today it had boiled over the Black Horse Nebula had suddenly spewed ships by the hundreds, a massed armada that must have taken more than a century of effort on the part of a whole star cluster, a production drive conducted in the strictest and most fanatical kind of secrecy. . . .

And, of course, the Service had been on the spot in plenty of time. With three times as many ships, disposed with mathematical precision so as to enfilade the entire armada the moment it broke from the nebula. The battle had been a massacre, the attack smashed before the average citizen could even begin to figure out what it had been aimed at and good had triumphed over evil once more.

Of course.

Furtive scuffings on the gravel drew his attention briefly. He looked at his watch, which said 14:58:03. That was the time, according to his instructions, when boy had to meet girl.

He had been given the strictest kind of orders to let nothing interfere with this meeting the orders always issued on boy-meets-girl assignments. But, as usual, he had nothing to do but observe. The meeting was coming off on the dot, without any prodding from Jo. They always did.

Of course.

With a sigh, he folded his newspaper, smiling again at the couple, it was the right man, too and moved away, as if reluctantly. He wondered what would happen were he to pull away the false mustache, pitch the newspaper on the grass, and bound away with a joyous whoop. He suspected that the course of history would not be deflected by even a second of arc, but he was not minded to try the experiment.

The park was pleasant. The twin suns warmed the path and the greenery without any of the blasting heat which they would bring to bear later in the summer. Randolph was altogether the most comfortable planet he had visited in years. A little backward, perhaps, but restful, too.

It was also slightly over a hundred light-years away from

Earth. It would be interesting to know how Service headquarters on Earth could have known in advance that boy would meet girl at a certain spot on Randolph, precisely at 14:58:03.

Or how Service headquarters could have ambushed with micrometric precision a major interstellar fleet, with no more preparation than a few days' buildup in the newspapers and video could evidence.

The press was free, on Randolph as everywhere. It reported the news it got. Any emergency concentration of Service ships in the Black Horse area, or anywhere else, would have been noticed and reported on. The Service did not forbid such reports for "security" reasons or for any other reasons. Yet there had been nothing to report but that (a) an armada of staggering size had erupted with no real warning from the Black Horse Nebula, and that (b) the Service had been ready.

By now, it was a commonplace that the Service was always ready. It had not had a defect or a failure in well over two centuries. It had not even had a fiasco, the alarming-sounding technical word by which it referred to the possibility that a boy-meets-girl assignment might not come off.

Jo hailed a hopper. Once inside he stripped himself of the mustache, the bald spot, the forehead creases all the make-up which had given him his mask of friendly innocuousness.

The hoppy watched the whole process in the rear-view mirror. Jo glanced up and met his eyes.

"Pardon me, mister, but I figured you didn't care if I saw you. You must be a Service man."

"That's right. Take me to Service HQ, will you?"

"Sure enough." The hoppy gunned his machine. It rose smoothly to the express level. "First time I ever got close to a Service man. Didn't hardly believe it at first when I saw you taking your face off. You sure looked different."

"Have to, sometimes," Jo said, preoccupied.

"I'll bet. No wonder you know all about everything before it breaks. You must have a thousand faces each, your own mother wouldn't know you, eh? Don't you care if I know about your snooping around in disguise?"

Jo grinned. The grin created a tiny pulling sensation across one curve of his cheek, just next to his nose. He stripped away the overlooked bit of tissue and examined it critically.

"Of course not. Disguise is an elementary part of Service work. Anyone could guess that. We don't use it often, as a matter of fact only on very simple assignments."

"Oh." The hoppy sounded slightly disappointed, as melodrama faded. He drove silently for about a minute. Then, speculatively: "Sometimes I think the Service must have time-travel, the things they pull. . . . Well, here you are. Good luck, mister."

"Thanks."

Jo went directly to Krasna's office. Krasna was a Randolpher. Earth-trained, and answerable to the Earth office, but otherwise pretty much on his own. His heavy, muscular face wore the same expression of serene confidence that was characteristic of Service officials everywhere even some that, technically speaking, had no faces to wear it.

"Boy meets girl," Jo said briefly. "On the nose and on the spot."

"Good work, Jo. Cigarette?" Krasna pushed the box across his desk.

"Nope, not now. Like to talk to you, if you've got time."

Krasna pushed a button, and a toadstool-like chair rose out

of the floor behind Jo. "What's on your mind?"

"Well," Jo said carefully. "I'm wondering why you patted me on the back just now for not doing a job."  
"You did a job."

"I did not," Jo said flatly. "Boy would have met girl, whether I'd been here on Randolph or back on Earth. The course of true love always runs smooth. It has in all my boy-meets-girl cases, and it has in the boy-meets-girl cases of every other agent with whom I've compared notes."

"Well, good," Krasna said, smiling. "That's the way we like to have it run. And that's the way we expect it to run. But, Jo, we like to have somebody on the spot, somebody with a reputation for resourcefulness, just in case there's a snag. There almost never is, as you've observed. But if there were?"

Jo snorted. "If what you're trying to do is to establish preconditions for the future, any interference by a Service agent would throw the eventual result farther *off* the track. I know that much about probability."

"And what makes you think that we're trying to set up the future?"

"It's obvious even to the hoppers on your own planet; the one that brought me here told me he thought the Service had time-travel. It's especially obvious to all the individuals and governments and entire populations that the Service has bailed out of serious messes for centuries, with never a single failure." Jo shrugged. "A man can be asked to safeguard only a small number of boy-meets-girl cases before he realizes, as an agent, that what the Service is safeguarding is the future children of those meetings. Ergo the Service *knows* what those children are to be like, and has reason to want their future existence guaranteed. What other conclusion is possible?"

Krasna took out a cigarette and lit it deliberately; it was obvious that he was using the maneuver to cloak his response.

"None," he admitted at last. "We have some foreknowledge, of course. We couldn't have made our reputation with espionage alone. But we have obvious other advantages: genetics, for instance, and operations research, the theory of games, the Dirac transmitter's quite an arsenal, and of course there's a good deal of prediction involved in all those things."

"I see that," Jo said. He shifted in his chair, formulating all he wanted to say. He changed his mind about the cigarette and helped himself to one. "But these things don't add up to infallibility and that's a qualitative difference, Kras. Take this affair of the Black Horse armada. The moment the armada appeared, we'll assume, Earth heard about it by Dirac, and started to assemble a counterarmada. But it takes *finite time* to bring together a concentration of ships and men, even if your message system is instantaneous.

"The Service's counterarmada was *already on hand*. It had been building there for so long and with so little fuss that nobody even noticed it concentrating until a day or so before the battle. Then planets in the area began to sit up and take notice, and be uneasy about what was going to break. But not very uneasy; the Service always wins that's been a statistical fact for centuries. *Centuries*, Kras. Good Lord, it takes almost as long as that, in straight preparation, to pull some of the tricks we've pulled! The Dirac gives us an advantage of ten to twenty-five years in really extreme cases out on the rim of the Galaxy, but no more than that."

He realized that he had been fuming away on the cigarette until the roof of his mouth was scorched, and snubbed it out angrily. "That's a very different thing," he said, "than knowing in a general way how an enemy is likely to behave, or what kind of children the Mendelian laws say a given couple should have. It means that we've some way of reading the future in minute detail. That's in flat contradiction to everything I've been taught about probability, but I have to believe what I see."

Krasna laughed. "That's a very able presentation," he said. He seemed genuinely pleased. "I think you'll remember that you were first impressed into the Service when you began to wonder why the news was always good. Fewer and fewer people wonder about that nowadays; it's become a part of their expected environment." He stood up and ran a hand through his hair. "Now you've carried yourself through the next stage. Congratulations, Jo. You've just been promoted!"

"I have?" Jo said incredulously. "I came in here with the notion that I might get myself fired."

"No. Come around to this side of the desk, Jo, and I'll play you a little history." Krasna unfolded the desktop to expose a small visor screen. Obediently Jo rose and went around the desk to where he could see the blank surface. "I had a standard indoctrination tape sent up to me a week ago, in the expectation that you'd be ready to see it. Watch."

Krasna touched the board. A small dot of light appeared in the center of the screen and went out again. At the same time, there was a small *beep* of sound. Then the tape began to unroll and a picture clarified on the screen.

"As you suspected," Krasna said conversationally, "the Service is infallible. How it got that way is a story that started several centuries back.

Dana Ljeher father had been a Hollander, her mother born in the Celebessat down in the chair which Captain Robin Weinbaum had indicated, crossed her legs, and waited, her blue-black hair shining under the lights.

Weinbaum eyed her quizzically. The conqueror Resident who had given the girl her entirely European name had been paid in kind, for his daughter's beauty had nothing fair and Dutch about it. To the eye of the beholder, Dana Lje seemed a particularly delicate virgin of Bali, despite her Western name, clothing and assurance. The combination had already proven piquant for the millions who watched her television column, and Weinbaum found it no less charming at first hand.

"As one of your most recent victims," he said, "I'm not sure that I'm honored, Miss Lje. A few of my wounds are still bleeding. But I am a good deal puzzled as to why you're visiting me now. Aren't you afraid that I'll bite back?"

"I had no intention of attacking you personally, and I don't think I did," the video columnist said seriously. "It was just pretty plain that our intelligence had slipped badly in the Erskine affair. It was my job to say so. Obviously you were going to get hurt, since you're head of the bureau but there was no malice in it."

"Cold comfort," Weinbaum said dryly. "But thank you, nevertheless."

The Eurasian girl shrugged. "That isn't what I came here about, anyway. Tell me, Captain Weinbaum have you ever heard of an outfit calling itself Interstellar Information?"

Weinbaum shook his head. "Sounds like a skip-tracing

firm. Not an easy business, these days."

"That's just what I thought when I first saw their letter-head," Dana said. "But the letter under it wasn't one that a private-eye outfit would write. Let me read part of it to you."

Her slim fingers burrowed in her inside jacket pocket and emerged again with a single sheet of paper. It was plain typewriter bond, Weinbaum noted automatically: she had brought only a copy with her, and had left the original of the letter at home. The copy, then, would be incomplete probably seriously.

"It goes like this: 'Dear Miss Lje: As a syndicated video commentator with a wide audience and heavy responsibilities, you need the best sources of information available. We would like you to test our service, free of charge, in the hope of proving to you that it is superior to any other source of news on Earth. Therefore, we offer below several predictions concerning events to come in the Hercules and the so-called "Three Ghosts" areas. If these predictions are fulfilled 100 per cent no less we ask that you take us on as your correspondents for those areas, at rates to be agreed upon later. If the predictions are wrong in *any* respect, you need not consider us further.' "

"H'm," Weinbaum said slowly. "They're confident cusses and that's an odd juxtaposition. The Three Ghosts make up only a little solar system, while the Hercules area could include the entire star cluster or maybe even the whole constellation, which is a hell of a lot of sky. This outfit seems to be trying to tell you that it has thousands of field correspondents of its own, maybe as many as the government itself. If so, I'll guarantee that they're bragging."

"That may well be so. But before you make up your mind, let me read you one of the two predictions." The letter rustled in Dana Lje's hand. "'At 03:16:10, on Year Day, 2090, the Hess-type interstellar liner *Brindisi* will be attacked in the neighborhood of the Three Ghosts system by four' "

Weinbaum sat bolt upright in his swivel chair. "Let me see that letter!" he said, his voice harsh with repressed alarm.

"In a moment," the girl said, adjusting her skirt composedly. "Evidently I was right in riding my hunch. Let me go on reading: 'by four heavily armed vessels flying the lights of the navy of Hammersmith II. The position of the liner at that time will be at coded co-ordinates 88-A-theta-88-aleph-D and-per-se-and. It will' "

"Miss Lje," Weinbaum said. "I'm sorry to interrupt you again, but what you've said already would justify me in jailing you at once, no matter how loudly your sponsors might scream. I don't know about this Interstellar Information outfit, or whether or not you did receive any such letter as the one you pretend to be quoting. But I can tell you that you've shown yourself to be in possession of information that only yours truly and four other men are supposed to know. It's already too late to tell you that everything you say may be held against you; all I can say now is, it's high time you clammed up!"

"I thought so," she said, apparently not disturbed in the least. "Then that liner *is* scheduled to hit those co-ordinates, and the coded time co-ordinate corresponds with the predicted Universal Time. Is it also true that the *Brindisi* will be carrying a top-secret communication device?"

"Are you deliberately trying to make me imprison you?"

Weinbaum said, gritting his teeth. "Or is this just a stunt, designed to show me that my own bureau is full of leaks?"

"It could turn into that," Dana admitted. "But it hasn't, yet. Robin, I've been as honest with you as I'm able to be. You've had nothing but square deals from me up to now. I wouldn't yellow-screen you, and you know it. If this unknown outfit has this information, it might easily have gotten it from where it hints that it got it: from the field."

"Impossible."

"Why?"

"Because the information in question hasn't even reached my *own* agents in the field yet it couldn't possibly have leaked as far as Hammersmith II or anywhere else, let alone to the Three Ghosts system! Letters have to be carried on ships, you know that. If I were to send orders by ultrawave to my Three Ghosts agent, he'd have to wait three hundred and twenty-four years to get them. By ship, he can get them in a little over two months. These particular orders have only been under way to him five days. Even if somebody has read them on board the ship that's carrying them, they couldn't possibly be sent on to the Three Ghosts any faster than they're traveling now."

Dana nodded her dark head. "All right. Then what are we left with but a leak in your headquarters here?"

"What, indeed," Weinbaum said grimly. "You'd better tell me who signed this letter of yours."

"The signature is J. Shelby Stevens."

Weinbaum switched on the intercom. "Margaret, look in the business register for an outfit called Interstellar Information and find out who owns it."

Dana Lje said, "Aren't you interested in the rest of the prediction?"

"You bet I am. Does it tell you the name of this communications device?"

"Yes," Dana said.

"What is it?"

"The Dirac communicator."

Weinbaum groaned and turned on the intercom again. "Margaret, send in Dr. Wald. Tell him to drop everything and gallop. Any luck with the other thing?"

"Yes, sir," the intercom said. "It's a one-man outfit, wholly owned by a J. Shelby Stevens, in Rico City. It was first registered this year."

"Arrest him, on suspicion of espionage."

The door swung open and Dr. Wald came in, all six and a half feet of him. He was extremely blond, and looked awkward, gentle, and not very intelligent.

"Thor, this young lady is our press nemesis, Dana Lje. Dana, Dr. Wald is the inventor of the Dirac communicator, about which you have so damnably much information."

"It's out *already*?" Dr. Wald said, scanning the girl with grave deliberation.

"It is, and lots more *lots* more. Dana, you're a good girl at heart, and for some reason I trust you, stupid though it is to trust anybody in this job. I should detain you until Year Day, videocasts or no videocasts. Instead, I'm just going to ask you to sit on what you've got, and I'm going to explain why."

"Shoot."

"I've already mentioned how slow communication is between star and star. We have to carry all our letters on ships, just as we did locally before the invention of the telegraph. The overdrive lets us beat the speed of light, but

not by much of a margin over really long distances. Do you understand that?"

"Certainly," Dana said. She appeared a bit nettled, and Weinbaum decided to give her the full dose at a more rapid pace. After all, she could be assumed to be better informed than the average layman.

"What we've needed for a long time, then," he said, "is some virtually instantaneous method of getting a message from somewhere to anywhere. Any time lag, no matter how small it seems at first, has a way of becoming major as longer and longer distances are involved. Sooner or later we must have this instantaneous method, or we won't be able to get messages from one system to another fast enough to hold our jurisdiction over outlying regions of space."

"Wait a minute," Dana said. "I'd always understood that ultrawave is faster than light."

"Effectively it is; physically it isn't. You don't understand that?"

She shook her dark head.

"In a nutshell," Weinbaum said, "ultrawave is radiation, and all radiation in free space is limited to the speed of light. The way we hype up ultrawave is to use an old application of wave-guide theory, whereby the real transmission of energy is at light speed, but an imaginary thing called "phase velocity" is going faster. But the gain in speed of transmission isn't large by ultrawave, for instance, we get a message to Alpha Centauri in one year instead of nearly four. Over long distances, that's not nearly enough extra speed."

"Can't it be speeded further?" she said, frowning.

"No. Think of the ultrawave beam between here and Centaurus III as a caterpillar. The caterpillar himself is moving quite slowly, just at the speed of light. But the pulses which pass along his body are going forward faster than he is and if you've ever watched a caterpillar, you'll know that that's true. But there's a physical limit to the number of pulses you can travel along that caterpillar, and we've already reached that limit. We've taken phase velocity as far as it will go.

"That's why we need something faster. For a long time our relativity theories discouraged hope of anything faster even the high-phase velocity of a guided wave didn't contradict those theories; it just found a limited, mathematically imaginary loophole in them. But when Thor here began looking into the question of the velocity of propagation of a Dirac pulse, he found the answer. The communicator he developed does seem to act over long distances, *any* distance, instantaneously and it may wind up knocking relativity into a cocked hat."

The girl's face was a study in stunned realization. "I'm not sure I've taken in all the technical angles," she said. "But if I'd had any notion of the political dynamite in this thing"

"you'd have kept out of my office," Weinbaum said grimly. "A good thing you didn't. The *Brindisi* is carrying a model of the Dirac communicator out to the periphery for a final test; the ship is supposed to get in touch with me from out there at a given Earth time, which we've calculated very elaborately to account for the residual Lorentz and Milne transformations involved in overdrive flight, and for a lot of other time phenomena that wouldn't mean anything at all to you.

"If that signal arrives here at the given Earth time, then

aside from the havoc it will create among the theoretical physicists whom we decide to let in on it we will really have our instant communicator, and can include all of occupied space in the same time zone. And we'll have a terrific advantage over any lawbreaker who has to resort to ultra-wave locally and to letters carried by ships over the long haul."

"Not," Dr. Wald said sourly, "if it's already leaked out."

"It remains to be seen how much of it has leaked,"

Weinbaum said. "The principle is rather esoteric, Thor, and the name of the thing alone wouldn't mean much even to a trained scientist. I gather that Dana's mysterious informant didn't go into technical details . . . or did he?"

"No," Dana said.

"Tell the truth, Dana. I know that you're suppressing some of that letter."

The girl started slightly. "All right yes, I am. But nothing technical. There's another part of the prediction that lists the number and class of ships you will send to protect the *Brindisi* the prediction says they'll be sufficient, by the way and I'm keeping that to myself, to see whether or not it comes true along with the rest. If it does, I think I've hired myself a correspondent."

"If it does," Weinbaum said, "you've hired yourself a jailbird. Let's see how much mind reading J. Whatsit Stevens can do from the subcellar of Fort Yaphank."

### 3

Weinbaum let himself into Stevens's cell, locking the door behind him and passing the keys out to the guard. He sat down heavily on the nearest stool.

Stevens smiled the weak benevolent smile of the very old, and laid his book aside on the bunk. The book, Weinbaum knew since his office had cleared it was only a volume of pleasant, harmless lyrics by a New Dynasty poet named Nims.

"Were our predictions correct, Captain?" Stevens said. His voice was high and musical, rather like that of a boy soprano.

Weinbaum nodded. "You still won't tell us how you did it?" "But I already have," Stevens protested. "Our intelligence network is the best in the Universe, Captain. It is superior even to your own excellent organization, as events have shown."

"Its results are superior, that I'll grant," Weinbaum said glumly. "If Dana Lje had thrown your letter down her disposal chute, we would have lost the *Brindisi* and our Dirac transmitter both. Incidentally, did your original letter predict accurately the number of ships we would send?"

Stevens nodded pleasantly, his neatly trimmed white beard thrusting forward slightly as he smiled.

"I was afraid so," Weinbaum leaned forward. "Do you have the Dirac transmitter, Stevens?"

"Of course, Captain. How else could my correspondents report to me with the efficiency you have observed?"

"Then why don't our receivers pick up the broadcasts of your agents? Dr. Wald says it's inherent in the principle that Dirac 'casts are picked up by *all* instruments tuned to receive them, bar none. And at this stage of the game there are so few such broadcasts being made that we'd be almost certain to detect any that weren't coming from our own operatives."

"I decline to answer that question, if you'll excuse the impoliteness," Stevens said, his voice quavering slightly. "I am an old man, Captain, and this intelligence agency is my sole



source of income. If I told you how we operated, we would no longer have any advantage over your own service, except for the limited freedom from secrecy which we have. I have been assured by competent lawyers that I have every right to operate a private investigation bureau, properly licensed, upon any scale that I may choose; and that I have the right to keep my methods secret, as the so-called 'intellectual assets' of my firm. If you wish to use our services, well and good. We will provide them, with absolute guarantees on all information we furnish you, for an appropriate fee. But our methods are our own property."

Robin Weinbaum smiled twistedly. "I'm not a naive man, Mr. Stevens," he said. "My service is hard on naivete. You know as well as I do that the government can't allow you to operate on a free-lance basis, supplying top-secret information to anyone who can pay the price, or even free of charge to video columnists on a 'test' basis, even though you arrive at every jot of that information independently of espionage which I still haven't entirely ruled out, by the way. If you can duplicate this *Brindisi* performance at will, we will have to have your services exclusively. In short, you become a hired civilian arm of my own bureau."

"Quite," Stevens said, returning the smile in a fatherly way. "We anticipated that, of course. However, we have contracts with other governments to consider; Erskine, in particular. If we are to work exclusively for Earth, necessarily our price will include compensation for renouncing our other accounts."

"Why should it? Patriotic public servants work for their government at a loss, if they can't work for it any other way."

"I am quite aware of that. I am quite prepared to renounce my other interests. But I do require to be paid."

"How much?" Weinbaum said, suddenly aware that his fists were clenched so tightly that they hurt.

Stevens appeared to consider, nodding his flowery white poll in senile deliberation. "My associates would have to be consulted. Tentatively, however, a sum equal to the present appropriation of your bureau would do, pending further negotiations."

Weinbaum shot to his feet, eyes wide. "You old buccaneer! You know damned well that I can't spend my entire appropriation on a single civilian service! Did it ever occur to you that most of the civilian outfits working for us are on cost-plus contracts, and that our civilian executives are being paid just a credit a year, by their own choice? You're demanding nearly two thousand credits an hour from your own government, and claiming the legal protection that the government affords you at the same time, in order to let those fanatics on Erskine run up a higher bid!"

"The price is not unreasonable," Stevens said. "The service is worth the price."

"That's where you're wrong! We have the discoverer of the machine working for us. For less than half the sum you're asking, we can find the application of the device that you're trading on of that you can be damned sure."

"A dangerous gamble. Captain."

"Perhaps. We'll soon see!" Weinbaum glared at the placid face. "I'm forced to tell you that you're a free man, Mr. Stevens. We've been unable to show that you came by your information by any illegal method. You had classified facts in your possession, but no classified documents, and it's your privilege as a citizen to make guesses, no matter how

educated.

"But we'll catch up with you sooner or later. Had you been reasonable, you might have found yourself in a very good position with us, your income as assured as any political income can be, and your person respected to the hilt. Now, however, you're subject to censorship you have no idea how humiliating that can be, but I'm going to see to it that you find out. There'll be no more newsbeats for Dana Lje, or for anyone else. I want to see every word of copy that you file with any client outside the bureau. Every word that is of use to me will be used, and you'll be paid the statutory one cent a word for it the same rate that the FBI pays for anonymous gossip. Everything I don't find useful will be killed without clearance. Eventually we'll have the modification of the Dirac that you're using, and when that happens, you'll be so flat broke that a pancake with a harelip could spit right over you."

Weinbaum paused for a moment, astonished at his own fury.

Stevens's clarinetlike voice began to sound in the windowless cavity. "Captain, I have no doubt that you can do this to me, at least incompletely. But it will prove fruitless. I will give you a prediction, at no charge. It is guaranteed, as are all our predictions. It is this: *You will never find that modification*. Eventually, I will give it to you, on my own terms, but you will never find it for yourself, nor will you force it out of me. In the meantime, not a word of copy will be filed with you; for, despite the fact that you are an arm of the government, I can well afford to wait you out."

"Bluster," Weinbaum said.

"Fact. Yours is the blusterloud talk based on nothing more than a hope. I, however, *know* whereof I speak. . . . But let us conclude this discussion. It serves no purpose; you will need to see my points made the hard way. Thank you for giving me my freedom. We will talk again under different circumstances let me see; ah, yes, on June 9 of the year 2091. That year is, I believe, almost upon us."

Stevens picked up his book again, nodding at Weinbaum, his expression harmless and kindly, his hands showing the marked tremor of *paralysis agitans*. Weinbaum moved helplessly to the door and flagged the turnkey. As the bars closed behind him, Stevens's voice called out: "Oh, yes; and a Happy New Year, Captain."

Weinbaum blasted his way back into his own office, at least twice as mad as the proverbial nest of hornets, and at the same time rather dismally aware of his own probable future. If Stevens's second prediction turned out to be as phenomenally accurate as his first had been, Capt. Robin Weinbaum would soon be peddling a natty set of second-hand uniforms.

He glared down at Margaret Soames, his receptionist. She glared right back; she had known him too long to be intimidated.

"Anything?" he said.

"Dr. Wald's waiting for you in your office. There are some field reports, and a couple of Diracs on your private tape. Any luck with the old codger?"

"That," he said crushingly, "is Top Secret."

"Poof. That means that nobody still knows the answer but J. Shelby Stevens."

He collapsed suddenly. "You're so right. That's just what it does mean. But we'll bust him wide open sooner or later.

We've *got* to."

"You'll do it," Margaret said. "Anything else for me?"

"No. Tip off the clerical staff that there's a half holiday today, then go take in a stereo or a steak or something yourself. Dr. Wald and I have a few private wires to pull . . . and unless I'm sadly mistaken, a private bottle of aquavit to empty."

"Right," the receptionist said. "Tie one on for me, Chief. I understand that beer is the best chaser for aquavit! I'll have some sent up."

"If you should return after I am suitably squiffed," Weinbaum said, feeling a little better already, "I will kiss you for your thoughtfulness. *That* should keep you at your stereo at least twice through the third feature."

As he went on through the door of his own office, she said demurely behind him, "It certainly should."

As soon as the door closed, however, his mood became abruptly almost as black as before. Despite his comparative youth he was now only fifty-five he had been in the service a long time, and he needed no one to tell him the possible consequences which might flow from possession by a private citizen of the Dirac communicator. If there was ever to be a Federation of Man in the Galaxy, it was within the power of J. Shelby Stevens to ruin it before it had fairly gotten started. And there seemed to be nothing at all that could be done about it.

"Hello, Thor," he said glumly. "Pass the bottle."

"Hello, Robin. I gather things went badly. Tell me about it."

Briefly, Weinbaum told him. "And the worst of it," he finished, "is that Stevens himself predicts that we won't find the application of the Dirac that he's using, and that eventually we'll have to buy it at his price. Somehow I believe him but I can't see how it's possible. If I were to tell Congress that I was going to spend my entire appropriation for a single civilian service, I'd be out on my ear within the next three sessions."

"Perhaps that isn't his real price," the scientist suggested. "If he wants to barter, he'd naturally begin with a demand miles above what he actually wants."

"Sure, sure . . . but frankly, Thor, I'd hate to give the old reprobate even a single credit if I could get out of it." Weinbaum sighed. "Well, let's see what's come in from the field."

Thor Wald moved silently away from Weinbaum's desk while the officer unfolded it and set up the Dirac screen. Stacked neatly next to the ultraphonea device Weinbaum had been thinking of, only a few days ago, as permanently outmoded were the tapes Margaret had mentioned. He fed the first one into the Dirac and turned the main toggle to the position labeled START.

Immediately the whole screen went pure white and the audio speakers emitted an almost instantly end-stopped blare of sound a *beep* which, as Weinbaum already knew, made up a continuous spectrum from about 30 cycles per second to well above 18,000 cps. Then both the light and the noise were gone as if they had never been, and were replaced by the familiar face and voice of Weinbaum's local ops chief in Rico City.

"There's nothing unusual in the way of transmitters in Stevens's offices here," the operative said without preamble. "And there isn't any local Interstellar Information staff,

except for one stenographer, and she's as dumb as they come. About all we could get from her is that Stevens is 'such a sweet old man.' No possibility that she's faking it; she's genuinely stupid, the kind that thinks Betelgeuse is something Indians use to darken their skins. We looked for some sort of list or code table that would give us a line on Stevens's field staff, but that was another dead end. Now we're maintaining a twenty-four-hour Dinwiddie watch on the place from a joint across the street. Orders?"

Weinbaum dictated to the blank stretch of tape which followed: "Margaret, next time you send any Dirac tapes in here, cut that damnable *beep* off them first. Tell the boys in Rico City that Stevens has been released, and that I'm proceeding for an Order In Security to tap his ultraphone and his local linesthis is one case where I'm sure we can persuade the court that tapping's necessary. Alsoand be damned sure you code thistoll them to proceed with the tap immediately and to maintain it regardless of whether or not the court O.K.s it. I'll thumbprint a Full Responsibility Confession for them. We can't afford to play pat-a-cake with Stevensthe potential is just too damned big. And oh, yes, Margaret, send the message by carrier, and send out general orders to everybody concerned not to use the Dirac again except when distance and time rule every other medium out. Stevens has already admitted that he can receive Dirac 'casts."

He put down the mike and stared morosely for a moment at the beautiful Eridanean scrollwood of his desktop. Wald coughed inquiringly and retrieved the aquavit.

"Excuse me, Robin," he said, "but I should think that would work both ways."

"So should I. And yet the fact is that we've never picked up so much as a whisper from either Stevens or his agents. I can't think of any way that could be pulled, but evidently it can."

"Well, let's rethink the problem, and see what we get," Wald said. "I didn't want to say so in front of the young lady, for obvious reasonsI mean Miss Lje, of course, not Margaretbut the truth is that the Dirac is essentially a simple mechanism in principle. I seriously doubt that there's any way to transmit a message from it which can't be detectedand an examination of the theory with that proviso in mind might give us something new."

"What proviso?" Weinbaum said. Thor Wald left him behind rather often these days.

"Why, that a Dirac transmission doesn't *necessarily* go to all communicators capable of receiving it. If that's true, then the reasons why it is true should emerge from the theory."

"I see. O.K., proceed on that line. I've been looking at Stevens's dossier while you were talking, and it's an absolute desert. Prior to the opening of the office in Rico City, there's no dope whatever on J. Shelby Stevens. The man as good as rubbed my nose in the fact that he's using a pseud when I first talked to him. I asked him what the T in his name stood for, and he said, 'Oh, let's make it Jerome.' But who the man behind the pseud *is* . . ."

"Is it possible that he's using his own initials?"

"No," Weinbaum said. "Only the dumbest ever do that, or transpose syllables, or retain any connection at all with their real names. Those are the people who are in serious emotional trouble, people who drive themselves into an-

onymity, but leave clues strewn all around the landscape those clues are really a cry for help, for discovery. Of course we're working on that angle we can't neglect anything but J. Shelby Stevens isn't that kind of case, I'm sure." Weinbaum stood up abruptly. "O.K., Thor what's first on your technical program?"

"Well . . . I suppose we'll have to start with checking the frequencies we use. We're going on Dirac's assumption and it works very well, and always has that a positron in motion through a crystal lattice is accompanied by de Broglie waves which are transforms of the waves of an electron in motion somewhere else in the Universe. Thus if we control the frequency and path of the positron, we control the placement of the electron we cause it to appear, so to speak, in the circuits of a communicator somewhere else. After that, reception is just a matter of amplifying the bursts and reading the signal."

Wald scowled and shook his blond head. "If Stevens is getting out messages which we don't pick up, my first assumption would be that he's worked out a fine-tuning circuit that's more delicate than ours, and is more or less sneaking his messages under ours. The only way that could be done, as far as I can see at the moment, is by something really fantastic in the way of exact frequency control of his positron gun. If so, the logical step for us is to go back to the beginning of our tests and rerun our diffractions to see if we can refine our measurements of positron frequencies."

The scientist looked so inexpressibly gloomy as he offered this conclusion that a pall of hopelessness settled over Weinbaum in sheer sympathy. "You don't look as if you expected that to uncover anything new."

"I don't. You see, Robin, things are different in physics now than they used to be in the twentieth century. In those days, it was always presupposed that physics was limitless the classic statement was made by Weyl, who said that 'It is the nature of a real thing to be inexhaustible in content.\* We know now that that's not so, except in a remote, as-sociational sort of way. Nowadays, physics is a defined and self-limited science; its scope is still prodigious, but we can no longer think of it as endless."

"This is better established in particle physics than in any other branch of the science. Half of the trouble physicists of the last century had with Euclidean geometry and hence the reason why they evolved so many re-complicated theories of relativity is that it's a geometry of lines, and thus can be subdivided infinitely. When Cantor proved that there really is an infinity, at least mathematically speaking, that seemed to clinch the case for the possibility of a really infinite physical universe, too."

Wald's eyes grew vague, and he paused to gulp down a slug of the licorice-flavored aquavit which would have made Weinbaum's every hair stand on end.

"I remember," Wald said, "the man who taught me theory of sets at Princeton, many years ago. He used to say: 'Cantor teaches us that there are many kinds of infinities. *There* was a crazy old man!'"

Weinbaum rescued the bottle hastily. "So go on, Thor."

"Oh." Wald blinked. "Yes. Well, what we know now is that the geometry which applies to ultimate particles, like the positron, isn't Euclidean at all. It's Pythagorean geometry of points, not lines. Once you've measured one of those points, and it doesn't matter what kind of quantity

you're measuring, you're down as far as you can go. At that point, the Universe becomes discontinuous, and no further refinement is possible.

"And I'd say that our positron-frequency measurements have already gotten that far down. There isn't another element in the Universe denser than plutonium, yet we get the same frequency values by diffraction through plutonium crystals that we get through osmium crystals there's not the slightest difference. If J. Shelby Stevens is operating in terms of fractions of those values, then he's doing what an organist would call 'playing in the cracks' which is certainly something you can *think* about doing, but something that's in actuality impossible to do. *Hoop.*"

"Hoop?" Weinbaum said.

"Sorry. A hiccup only."

"Oh. Well, maybe Stevens has rebuilt the organ?"

"If he has rebuilt the metrical frame of the Universe to accommodate a private skip-tracing firm," Wald said firmly, "I for one see no reason why we can't countercheck him *hoop* by declaring the whole cosmos null and void."

"All right, all right," Weinbaum said, grinning. "I didn't mean to push your analogy right over the edge I was just asking. But let's get to work on it anyhow. We can't just sit here and let Stevens get away with it. If this frequency angle turns out to be as hopeless as it seems, we'll try something else."

Wald eyed the aquavit bottle owlishly. "It's a very pretty problem," he said. "Have I ever sung you the song we have in Sweden called 'Nat-og-Dag?'"

"*Hoop,*" Weinbaum said, to his own surprise, in a high falsetto. "Excuse me. No. Let's hear it."

The computer occupied an entire floor of the Security building, its seemingly identical banks laid out side by side on the floor along an advanced pathological state of Peano's "space-filling curve." At the current business end of the line was a master control board with a large television screen at its center, at which Dr. Wald was stationed, with Weinbaum looking, silently but anxiously, over his shoulder.

The screen itself showed a pattern which, except that it was drawn in green light against a dark gray background, strongly resembled the grain in a piece of highly polished mahogany. Photographs of similar patterns were stacked on a small table to Dr. Wald's right; several had spilled over onto the floor.

"Well, there it is," Wald sighed at length. "And I won't struggle to keep myself from saying I told you so.' What you've had me do here, Robin, is to reconfirm about half the basic postulates of particle physics which is why it took so long, even though it was the first project we started." He snapped off the screen. "There are no cracks for J. Shelby to play in. That's definite."

"If you'd said 'That's flat,' you would have made a joke," Weinbaum said sourly. "Look . . . isn't there still a chance of error? If not on your part, Thor, then in the computer? After all, it's set up to work only with the unit charges of modern physics; mightn't we have to disconnect the banks that contain that bias before the machine will follow the fractional-charge instructions we give it?"

"Disconnect,' he says," Wald groaned, mopping his brow reflectively. "The bias exists everywhere in the machine, my friend, because it functions everywhere on those same unit charges. It wasn't a matter of subtracting banks; we had to

add one with a bias all its own, to counteract the corrections the computer would otherwise apply to the instructions. The technicians thought I was crazy. Now, five months later, I've proved it."

Weinbaum grinned in spite of himself. "What about the other projects?"

"All done some time back, as a matter of fact. The staff and I checked every single Dirac tape we've received since you released J. Shelby from Yaphank, for any sign of intermodulation, marginal signals, or anything else of the kind. There's nothing. Robin, absolutely nothing. That's our net result, all around."

"Which leaves us just where we started," Weinbaum said. "All the monitoring projects came to the same dead end; I strongly suspect that Stevens hasn't risked any further calls from his home office to his field staff, even though he seemed confident that we'd never intercept such calls as we haven't. Even our local wire tapping hasn't turned up anything but calls by Stevens's secretary, making appointments for him with various clients, actual and potential. Any information he's selling these days he's passing on in person and not in his office, either, because we've got bugs planted all over that and haven't heard a thing."

"That must limit his range of operation enormously," Wald objected.

Weinbaum nodded. "Without a doubt but he shows no signs of being bothered by it. He can't have sent any tips to Erskine recently, for instance, because our last tangle with that crew came out very well for us, even though we had to use the Dirac to send the orders to our squadron out there. If he overheard us, he didn't even try to pass the word. Just as he said, he's sweating us out" Weinbaum paused. "Wait a minute, here comes Margaret. And by the length of her stride, I'd say she's got something particularly nasty on her mind."

"You bet I do," Margaret Soames said vindictively. "And it'll blow plenty of lids around here, or I miss my guess. The I. D. squad has finally pinned down J. Shelby Stevens. They did it with the voice-comparator alone."

"How does that work?" Wald said interestedly.

"Blink microphone," Weinbaum said impatiently. "Isolates inflections on single, normally stressed syllables and matches them. Standard I. D. searching technique, on a case of this kind, but it takes so long that we usually get the quarry by other means before it pays off. Well, don't stand there like a dummy, Margaret. Who is he?"

"He," Margaret said, "is your sweetheart of the video waves, Miss Dana Lje."

"They're crazy!" Wald said, staring at her.

Weinbaum came slowly out of his first shock of stunned disbelief. "No, Thor," he said finally. "No, it figures. If a woman is going to go in for disguises, there are always two she can assume outside her own sex: a young boy, and a very old man. And Dana's an actress; that's no news to us."

"But why did she do it, Robin?"

"That's what we're going to find out right now. So we wouldn't get the Dirac modification by ourselves, eh! Well, there are other ways of getting answers besides particle physics. Margaret, do you have a pick-up order out for that girl?"

"No," the receptionist said. "This is one chestnut I wanted to see you pull out for yourself. You give me the authority,

and I send the order not before."

"Spiteful child. Send it, then, and glory in my gritted teeth. Come on, Thorlet's put the nutcracker on this chestnut."

As they were leaving the computer floor, Weinbaum stopped suddenly in his tracks and began to mutter in an almost inaudible voice.

Wald said, "What's the matter, Robin?"

"Nothing. I keep being brought up short by those predictions. What's the date?"

"M'm . . . June 9. Why?"

"It's the exact date that 'Stevens' predicted we'd meet again, damn it! Something tells me that this isn't going to be as simple as it looks."

If Dana L'e had any idea of what she was in for and considering the fact that she was 'J. Shelby Stevens' it had to be assumed that she did the knowledge seemed not to make her at all fearful. She sat as composedly as ever before Weinbaum's desk, smoking her eternal cigarette, and waited, one dimpled knee pointed directly at the bridge of the officer's nose.

"Dana," Weinbaum said, "this time we're going to get all the answers, and we're not going to be gentle about it. Just in case you're not aware of the fact, there are certain laws relating to giving false information to a security officer, under which we could have you in prison for a minimum of fifteen years. By application of the statutes on using communications to defraud, plus various local laws against transvestism, pseudonymity and so on, we could probably pile up enough additional short sentences to keep you in Yaphank until you really *do* grow a beard. So I'd advise you to open up."

"I have every intention of opening up," Dana said. "I know, practically word for word, how this interview is going to proceed, what information I'm going to give you, just when I'm going to give it to you and what you're going to pay me for it. I knew all that many months ago. So there would be no point in my holding out on you."

"What you're saying, Miss Lje," Thor Wald said in a resigned voice, "is that the future is fixed, and that you can read it, in every essential detail."

"Quite right. Dr. Wald. Both those things are true."

There was a brief silence.

"All right," Weinbaum said grimly. "Talk."

"All right, Captain Weinbaum, pay me," Dana said calmly. Weinbaum snorted.

"But I'm quite serious," she said. "You still don't know what I know about the Dirac communicator. I won't be forced to tell it, by threat of prison or by any other threat. You see, I know for a fact that you aren't going to send me to prison, or give me drugs, or do anything else of that kind. I know for a fact, instead, that you are going to pay me so I'd be very foolish to say a word until you do. After all, it's quite a secret you're buying. Once I tell you what it is, you and the entire service will be able to read the future as I do, and then the information will be valueless to me."

Weinbaum was completely speechless for a moment. Finally he said, "Dana, you have a heart of purest brass, as well as a knee with an invisible gunsight on it. I say that I'm *not* going to give you my appropriation, regardless of what the future may or may not say about it. I'm not going to give it to you because the way my government and yours runs things makes such a price impossible. Or is that really



your price?"

"It's my real price . . . but it's also an alternative. Call it my second choice. My first choice, which means the price I'd settle for, comes in two parts: (a) to be taken into your service as a responsible officer; and, (b) to be married to Captain Robin Weinbaum."

Weinbaum sailed up out of his chair. He felt as though copper-colored flames a foot long were shooting out of each of his ears.

"Of all the" he began. There his voice failed completely.

From behind him, where Wald was standing, came something like a large, Scandinavian-model guffaw being choked into insensibility.

Dana herself seemed to be smiling a little.

"You see," she said, "I don't point my best and most accurate knee at every man I meet."

Weinbaum sat down again, slowly and carefully. "Walk, do not run, to nearest exit," he said. "Women and childlike security officers first. Miss L]e, are you trying to sell me the notion that you went through this elaborate hanky-panky beard and allout of a burning passion for my dumpy and underpaid person?"

"Not entirely," Dana L]e said. "I want to be in the bureau, too, as I said. Let me confront you, though. Captain, with a fact of life that doesn't seem to have occurred to you at all. Do you accept as a fact that I can read the future in detail, and that that, to be possible at all, means that the future is fixed?"

"Since Thor seems able to accept it, I suppose I can too provisionally."

"There's nothing provisional about it," Dana said firmly. "Now, when I first came upon thisuh, this gimmickquite a while back, one of the first things that I found out was that I was going to go through the 'J. Shelby Stevens' masquerade, force myself onto the staff of the bureau, and marry you, Robin. At the time, I was both astonished and completely rebellious. I didn't want to be on the bureau staff; I liked my free-lance life as a video commentator. I didn't want to marry you, though I wouldn't have been averse to living with you for a whilesay a month or so. And above all, the masquerade struck me as ridiculous.

"But the facts kept staring me in the face. I *was* going to do all those things. There were no alternatives, no fanciful 'branches of time,' no decision-points that might be altered to make the future change. My future, like yours, Dr. Wald's, and everyone else's, was fixed. It didn't matter a snap whether or not I had a decent motive for what I was going to do; I was going to do it anyhow. Cause and effect, as I could see for myself, just don't exist. One event follows another because events are just as indestructible in space-time as matter and energy are.

"It was the bitterest of all pills. It will take me many years to swallow it completely, and you too. Dr. Wald will come around a little sooner, I think. At any rate, once I was intellectually convinced that all this was so, I had to protect my own sanity. I knew that I couldn't alter what I was going to do, but the least I could do to protect myself was to supply myself with motives. Or, in other words, just plain rationalizations. That much, it seems, we're free to do; the consciousness of the observer is just along for the ride through time, and can't alter eventsbut it can comment, explain, invent. That's fortunate, for none of us could stand going through

motions which were truly free of what we think of as personal significances.

"So I supplied myself with the obvious motives. Since I was going to be married to you and couldn't get out of it, I set out to convince myself that I loved you. Now I do. Since I was going to join the bureau staff, I thought over all the advantages that it might have over video commentating, and found that they made a respectable list. Those are my motives.

"But I had no such motives at the beginning. Actually, there are never motives behind actions. All actions are fixed. What we called motives evidently are rationalizations by the helpless observing consciousness, which is intelligent enough to smell an event coming and, since it cannot avert the event, instead cooks up reasons for wanting it to happen."

"Wow," Dr. Wald said, inelegantly but with considerable force.

"Either 'wow' or 'balderdash' seems to be called for I can't quite decide which," Weinbaum agreed. "We know that Dana is an actress, Thor, so let's not fall off the apple tree quite yet. Dana, I've been saving the *really* hard question for the last. That question is: *How?* How did you arrive at this modification of the Dirac transmitter? Remember, we know your background, where we didn't know that of \*J. Shelby Stevens.' You're not a scientist. There were some fairly high-powered intellects among your distant relatives, but that's as close as you come."

"I'm going to give you several answers to that question," Dana Lje said. "Pick the one you like best. They're all true, but they tend to contradict each other here and there. To begin with, you're right about my relatives, of course. If you'll check your dossier again, though, you'll discover that those so-called 'distant' relatives were the last surviving members of my family besides myself. When they died, second and fourth and ninth cousins though they were, then-estates reverted to me, and among their effects I found a sketch of a possible instantaneous communicator based on de Broglie-wave inversion. The material was in very rough form, and mostly beyond my comprehension, because I am, as you say, no scientist myself. But I was interested; I could see, dimly, what such a thing might be worth and not only in money.

"My interest was fanned by two coincidences of the kind of coincidences that cause-and-effect just can't allow, but which seem to happen all the same in the world of unchangeable events. For most of my adult life, I've been in communications industries of one kind or another, mostly branches of video. I had communications equipment around me constantly, and I had coffee and doughnuts with communications engineers every day. First I picked up the jargon; then, some of the procedures; and eventually a little real knowledge. Some of the things I learned can't be gotten any other way. Some other things are ordinarily available only to highly educated people like Dr. Wald here, and came to me by accident, in horseplay, between kisses, and a hundred other ways all natural to the environment of a video network."

Weinbaum found, to his own astonishment, that the "between kisses" clause did not sit very well in his chest. He said, with unintentional brusqueness: "What's the other coincidence?"

"A leak in your own staff."

"Dana, you ought to have that set to music."

"Suit yourself."

"I can't suit myself," Weinbaum said petulantly. "I work for the government. Was this leak direct to you?"

"Not at first. That was why I kept insisting to you in person that there might be such a leak, and why I finally began to hint about it in public, on my program. I was hoping that you'd be able to seal it up inside the bureau before my first rather tenuous contact with it got lost. When I didn't succeed in provoking you into protecting yourself, I took the risk of making direct contact with the leak myself and the first piece of secret information that came to me through it was the final point I needed to put my Dirac communicator together. When it was all assembled, it did more than just communicate. It predicted. And I can tell you why."

Weinbaum said thoughtfully, "I don't find this very hard to accept, so far. Pruned of the philosophy, it even makes some sense of the 'J. Shelby Stevens' affair. I assume that by letting the old gentleman become known as somebody who knew more about the Dirac transmitter than I did, and who wasn't averse to negotiating with anybody who had money, you kept the leak working through you rather than transmitting data directly to unfriendly governments."

"It did work out that way," Dana said. "But that wasn't the genesis or the purpose of the Stevens masquerade. I've already given you the whole explanation of how that came about."

"Well, you'd better name me that leak, before the man gets away."

"When the price is paid, not before. It's too late to prevent a getaway, anyhow. In the meantime, Robin, I want to go on and tell you the other answer to your question about how I was able to find this particular Dirac secret, and you didn't. What answers I've given you up to now have been cause-and-effect answers, with which we're all more comfortable. But I want to impress on you that all apparent cause-and-effect relationships are accidents. There is no such thing as a cause, and no such thing as an effect. I found the secret because I found it; that event was fixed; that certain circumstances seem to explain why I found it, in the old cause-and-effect terms, is irrelevant. Similarly, with all your superior equipment and brains, you didn't find it for one reason, and one reason alone: because you didn't find it. The history of the future says you didn't."

"I pays my money and I takes no choice, eh?" Weinbaum said ruefully.

"I'm afraid so and I don't like it any better than you do."

"Thor, what's your opinion of all this?"

"It's just faintly flabbergasting," Wald said soberly. "However, it hangs together. The deterministic universe which Miss Lje paints was a common feature of the old relativity theories, and as sheer speculation has an even longer history. I would say that, in the long run, how much credence we place in the story as a whole will rest upon her method of, as she calls it, reading the future. If it is demonstrable beyond any doubt, then the rest becomes perfectly credible philosophy and all. If it doesn't, then what remains is an admirable job of acting, plus some metaphysics which, while self-consistent, is not original with Miss Lje."

"That sums up the case as well as if I'd coached you, Dr. Wald," Dana said. "I'd like to point out one more thing. If I can read the future, then 'J. Shelby Stevens' never had any

need for a staff of field operatives, and he never needed to send a single Dirac message which you might intercept. All he needed to do was to make predictions from his readings, which he knew to be infallible; no private espionage network had to be involved."

"I see that," Weinbaum said dryly. "All right, Dana, let's put the proposition this way: / *do not believe you*. Much of what you say is probably true, but in totality I believe it to be false. On the other hand, if you're telling the whole truth, you certainly deserve a place on the bureau staffit would be dangerous as hell *not* to have you with usand the marriage is a more or less minor matter, except to you and me. You can have that with no strings attached; I don't want to be bought, any more than you would.

"So: if you will tell me where the leak is, we will consider that part of the question closed. I make that condition not as a price, but because I don't want to get myself engaged to somebody who might be shot as a spy within a month."

"Fair enough," Dana said. "Robin, your leak is Margaret Soames. She is an Erskine operative, and nobody's bubble-brain. She's a highly trained technician."

"Well, I'll be damned," Weinbaum said in astonishment. "Then she's already flown the coopshe was the one who first told me we'd identified you. She must have taken on that job in order to hold up delivery long enough to stage an exit."

"That's right. But you'll catch her, day after tomorrow. And you are now a hooked fish, Robin."

There was another suppressed burble from Thor Wald.

"I accept the fate happily," Weinbaum said, eyeing the gunsight knee. "Now, if you will tell me how you work your swami trick, and if it backs up everything you've said to the letter, as you claim, I'll see to it that you're also taken into the bureau and that all charges against you are quashed. Otherwise, I'll probably have to kiss the bride between the bars of a cell."

Dana smiled. "The secret is very simple. It's in the beep."

Weinbaum's jaw dropped. "The beep? The Dirac noise?"

"That's right. You didn't find it out because you considered the beep to be just a nuisance, and ordered Miss Soames to cut it off all tapes before sending them in to you. Miss Soames, who had some inkling of what the beep meant, was more than happy to do so, leaving the reading of the beep exclusively to 'J. Shelby Stevens'who she thought was going to take on Erskine as a client."

"Explain," Thor Wald said, looking intense.

"Just as you assumed, every Dirac message that is sent is picked up by every receiver that is capable of detecting it *Every* receiverincluding the first one ever built, which is yours, Dr. Wald, through the hundreds of thousands of them which will exist throughout the Galaxy in the twenty-fourth century, to the untold millions which will exist in the thirtieth century, and so on. The Dirac beep is the simultaneous reception of *every one of the Dirac messages which have ever been sent, or ever will be sent*. Incidentally, the cardinal number of the total of those messages is a relatively small and of course finite number; it's far below really large finite numbers such as the number of electrons in the universe, even when you break each and every message down into individual 'bits' and count those."

"Of course," Dr. Wald said softly. "Of course! But, Miss Lje . . . how do you tune for an individual message? We tried fractional positron frequencies, and got nowhere."

"I didn't even know fractional positron frequencies existed," Dana confessed. "No, it's simple simple that a lucky layman like me could arrive at it. You tune individual messages out of the beep by time lag, nothing more. All the messages arrive at the same instant, in the smallest fraction of time that exists, something called a 'chronon.' "

"Yes," Wald said. "The time it takes one electron to move from one quantum-level to another. That's the Pythagorean point of time measurement."

"Thank you. Obviously no gross physical receiver can respond to a message that brief, or at least that's what I thought at first. But because there are relay and switching delays, various forms of feedback and so on, in the apparatus itself, the beep arrives at the output end as a complex pulse which has been 'splattered' along the time axis for a full second or more. That's an effect which you can exaggerate by recording the 'splattered' beep on a high-speed tape, the same way you would record any event that you wanted to study in slow motion. Then you tune up the various failure-points in your receiver, to exaggerate one failure, minimize the others, and use noise-suppressing techniques to cut out the background."

Thor Wald frowned. "You'd still have a considerable garble when you were through. You'd have to sample the messages"

"Which is just what I did; Robin's little lecture to me about the ultrawave gave me that hint. I set myself to find out how the ultrawave channel carries so many messages at once, and I discovered that you people sample the incoming pulses every thousandth of a second and pass on one pip only when the wave deviates in a certain way from the mean. I didn't really believe it would work on the Dirac beep, but it turned out just as well: 90 percent as intelligible as the original transmission after it came through the smearing device. I'd already got enough from the beep to put my plan in motion, of course but now every voice message in it was available, and crystal-clear: If you select three pips every thousandth of second, you can even pick up an intelligible transmission of music a little razzzy, but good enough to identify the instruments that are playing and that's a very close test of any communications device."

"There's a question of detail here that doesn't quite follow," said Weinbaum, for whom the technical talk was becoming a little too thick to fight through. "Dana, you say that you knew the course this conversation was going to take yet it isn't being Dirac-recorded, nor can I see any reason why any summary of it would be sent out on the Dirac afterwards."

"That's true, Robin. However, when I leave here, I will make such a transcass myself, on my own Dirac. Obviously I will because I've *already* picked it up, from the beep."

"In other words, you're going to call yourself up months ago."

"That's it," Dana said. "It's not as useful a technique as you might think at first, because it's dangerous to make such broadcasts while a situation is still developing. You can safely 'phone back' details only after the given situation has gone to completion, as a chemist might put it. Once you know, however, that when you use the Dirac you're dealing with time, you can coax some very strange things out of the instrument."

She paused and smiled. "I have heard," she said conver-

sationally, "the voice of the President of our Galaxy, in 3480, announcing the federation of the Milky Way and the Magellanic Clouds. I've heard the commander of a world-line cruiser, traveling from 8873 to 8704 along the world line of the planet Hathshepa, which circles a star on the rim of NGC 4725, calling for help across eleven million light-years but what kind of help he was calling for, or will be calling for, is beyond my comprehension. And many other things. When you check on me, you'll hear these things too and you'll wonder what many of them mean.

"And you'll listen to them even more closely than I did, in the hope of finding out whether or not anyone was able to understand in time to help."

Weinbaum and Wald looked dazed.

Her voice became a little more somber. "Most of the voices in the Dirac beep are like that—they're cries for help, which you can overhear decades or centuries before the senders get into trouble. You'll feel obligated to answer every one, to try to supply the help that's needed. And you'll listen to the succeeding messages and say: 'Did we will we get there in time? Did we understand in time?'

"And in most cases you won't be sure. You'll know the future, but not what most of it means. The farther into the future you travel with the machine, the more incomprehensible the messages become, and so you're reduced to telling yourself that time will, after all, have to pass by at its own pace, before enough of the surrounding events can emerge to make those remote messages clear.

"The long-run effect, as far as I can think it through, is not going to be that of omniscience of our consciousness being extracted entirely from the time stream and allowed to view its whole sweep from one side. Instead, the Dirac in effect simply slides the bead of consciousness forward from the present a certain distance. Whether it's five hundred or five thousand years still remains to be seen. At that point the law of diminishing returns sets in or the noise factor begins to overbalance the information, take your choice and the observer is reduced to traveling in time at the same old speed. He's just a bit ahead of himself."

"You've thought a great deal about this," Wald said slowly. "I dislike to think of what might have happened had some less conscientious person stumbled on the beep."

"That wasn't in the cards," Dana said.

In the ensuing quiet, Weinbaum felt a faint, irrational sense of let-down, of something which had promised more than had been delivered rather like the taste of fresh bread as compared to its smell, or the discovery that Thor Wald's Swedish "folk song" *Nat-og-Dag* was only Cole Porter's *Night and Day* in another language. He recognized the feeling: it was the usual emotion of the hunter when the hunt is over, the born detective's professional version of the *post coitum tristite*. After looking at the smiling, supple Dana Lje a moment more, however, he was almost content.

"There's one more thing," he said. "I don't want to be insufferably skeptical about this but I want to see it work. Thor, can we set up a sampling and smearing device such as Dana describes and run a test?"

"In fifteen minutes," Dr. Wald said. "We have most of the unit in already assembled form on our big ultrawave receiver, and it shouldn't take any effort to add a high-speed tape unit to it. I'll do it right now."

He went out. Weinbaum and Dana looked at each other for

a moment, rather like strange cats. Then the security officer got up, with what he knew to be an air of somewhat grim determination, and seized his fiancée's hands, anticipating a struggle.

That first kiss was, by intention at least, mostly *pro forma*. But by the time Wald padded back into the office, the letter had been pretty thoroughly superseded by the spirit. The scientist harrumphed and set his burden on the desk. "This is all there is to it," he said, "but I had to hunt all through the library to find a Dirac record with a beep still on it. Just a moment more while I make connections. . . ."

Weinbaum used the time to bring his mind back to the matter at hand, although not quite completely. Then two tape spindles began to whirl like so many bees, and the end-stopped sound of the Dirac beep filled the room. Wald stopped the apparatus, reset it, and started the smearing tape very slowly in the opposite direction.

A distant babble of voices came from the speaker. As Weinbaum leaned forward tensely, one voice said clearly and loudly above the rest:

"Hello, Earth bureau. Lt. T. L. Matthews at Hercules Station NGC 6341, transmission date 13-22-2091. We have the last point on the orbit curve of your dope-runners plotted, and the curve itself points to a small system about twenty-five light-years from the base here; the place hasn't even got a name on our charts. Scouts show the home planet at least twice as heavily fortified as we anticipated, so we'll need another cruiser. We have a 'can-do' from you in the beep for us, but we're waiting as ordered to get it in the present NGC 6341 Matthews out."

After the first instant of stunned amazement for no amount of intellectual willingness to accept could have prepared him for the overwhelming fact itself Weinbaum had grabbed a pencil and begun to write at top speed. As the voice signed out he threw the pencil down and looked excitedly at Dr. Wald.

"Seven months ahead," he said, aware that he was grinning like an idiot. "Thor, you know the trouble we've had with that needle in the Hercules haystack! This orbit-curve trick must be something Matthews has yet to dream up at least he hasn't come to me with it yet, and there's nothing in the situation as it stands now that would indicate a closing time of six months for the case. The computers said it would take three more years."

"It's new data," Dr. Wald agreed solemnly.

"Well, don't stop there, in God's name! Let's hear some more!"

Dr. Wald went through the ritual, much faster this time. "The speaker said:

"Nausentampen. Eddettompic. Berobsilom. Airnkaksetchoc. Sanbetogmow. Datdectamset. Domatrosmin. Out."

"My word," Wald said. "What's all that?"

"That's what I was talking about," Dana Lje said. "At least half of what you get from the beep is just as incomprehensible. I suppose it's whatever has happened to the English language, thousands of years from now."

"No, it isn't," Weinbaum said. He had resumed writing, and was still at it, despite the comparative briefness of the transmission. "Not this sample, anyhow. That, ladies and gentlemen, is codeno language consists exclusively of four-syllable words, of that you can be sure. What's more, it's a version of our code. I can't break it down very far

it takes a full-time expert to read this stuff but I get the date and some of the sense. It's March 12, 3022, and there's some kind of a mass evacuation taking place. The message seems to be a routing order."

"But why will we be using code?" Dr. Wald wanted to know. "It implies that we think somebody might overhear us somebody else with a Dirac. That could be very messy."

"It could indeed," Weinbaum said. "But we'll find out, I imagine. Give her another spin, Thor."

"Shall I try for a picture this time?"

Weinbaum nodded. A moment later, he was looking squarely into the green-skinned face of something that looked like an animated traffic signal with a helmet on it. Though the creature had no mouth, the Dirac speaker was saying quite clearly, "Hello, Chief. This is Thammos NGC 2287, transmission date Gor 60, 302 by my calendar, July 2, 2973 by yours. This is a lousy little planet. Everything stinks of oxygen, just like Earth. But the natives accept us and that's the important thing. We've got your genius safely born. Detailed report coming later by paw. NGC 2287 Thammos out."

"I wish I knew my New General Catalogue better," Weinbaum said. "Isn't that M 41 in Canis Major, the one with the red star in the middle? And we'll be using non-humanoids there! What *was* that creature, anyhow? Never mind, spin her again."

Dr. Wald spun her again. Weinbaum, already feeling a little dizzy, had given up taking notes. That could come later, all that could come later. Now he wanted only scenes and voices, more and more scenes and voices from the future. They were better than aquavit, even with a beer chaser.

4

THE INDOCTRINATION tape ended, and Krasna touched a button. The Dirac screen darkened, and folded silently back into the desk.

"They didn't see their way through to us, not by a long shot," he said. "They didn't see, for instance, that when one section of the government becomes nearly all-knowing no matter how small it was to begin with it necessarily becomes all of the government that there is. Thus the bureau turned into the Service and pushed everyone else out."

"On the other hand, those people did come to be afraid that a government with an all-knowing arm might become a rigid dictatorship. That couldn't happen and didn't happen, because the more you know, the wider your field of possible operation becomes and the more fluid and dynamic a society you need. How could a rigid society expand to other star systems, let alone other galaxies? It couldn't be done."

"I should think it could," Jo said slowly. "After all, if you know in advance what everybody is going to do . . ."  
"But we don't, Jo. That's just a popular fiction, if you like, a red herring. Not all of the business of the cosmos is carried on over the Dirac, after all. The only events we can ever overhear are those which are transmitted as a message. Do you order your lunch over the Dirac? Of course you don't. Up to now, you've never said a word over the Dirac in your life."

"And there's much more to it than that. All dictatorships are based on the proposition that government can somehow control a man's thoughts. We know now that the conscious-



ness of the observer is the only free thing in the Universe. Wouldn't we look foolish trying to control that, when our entire physics shows that it's impossible to do so? That's why the Service is in no sense a thought police. We're interested only in acts. We're an Event Police."

"But why?" Jo said. "If all history is fixed, why do we bother with these boy-meets-girl assignments, for instance? The meetings will happen anyhow."

"Of course they will," Krasna agreed immediately. "But look, Jo. Our interests as a government depend upon the future. We operate *as if* the future is as real as the past, and so far we haven't been disappointed: the Service is 100 per cent successful. But that very success isn't without its warnings. What would happen if we *stopped* supervising events? We don't know, and we don't dare take the chance. Despite the evidence that the future is fixed, we have to take on the role of the caretaker of inevitability. We believe that nothing can possibly go wrong . . . but we have to act on the philosophy that history helps only those who help themselves.

"That's why we safeguard huge numbers of courtships right through to contract, and even beyond it. We have to see to it that *every single person who is mentioned in any Dirac 'cast gets born*. Our obligation as Event Police is to make the events of the future possible, because those events are crucial to our society even the smallest of them. It's an enormous task, believe me, and it gets bigger and bigger every day. Apparently it always will."

"Always?" Jo said. "What about the public? Isn't it going to smell this out sooner or later? The evidence is piling up at a terrific rate."

"Yes and no," Krasna said. "Lots of people are smelling it out right now, just as you did. But the number of new people we need in the Service grows faster it's always ahead of the number of laymen who follow the clues to the truth."

Jo took a deep breath. "You *take* all this as if it were as commonplace as boiling an egg, Kras," he said. "Don't you ever wonder about some of the things you get from the beep? That 'cast Dana Lje picked up from Canes Venatici, for instance, the one from the ship that was traveling backward in time? How is that possible? What could be the purpose? Is it?"

"*Pace, pace,*" Krasna said. "I don't know and I don't care. Neither should you. That event is too far in the future for us to worry about. We can't possibly know its context yet, so there's no sense in trying to understand it. If an Englishman of around 1600 had found out about the American Revolution, he would have thought it a tragedy; an Englishman of 1950 would have a very different view of it. We're in the same spot. The messages we get from the really far future have no contexts as yet."

"I think I see," Jo said. "I'll get used to it in time, I suppose, after I use the Dirac for a while. Or does my new rank authorize me to do that?"

"Yes, it does. But, Jo, first I want to pass on to you a rule of Service etiquette that must never be broken. You won't be allowed anywhere near a Dirac mike until you have it burned into your memory beyond any forgetfulness."

"I'm listening, Kras, believe me."

"Good. This is the rule: *The date of a Serviceman's death must never be mentioned in a Dirac 'cast.*"

Jo blinked, feeling a little chilly. The reason behind the rule was decidedly tough-minded, but its ultimate kindness was plain. He said, "I won't forget that. I'll want that protection myself. Many thanks, Kras. What's my new assignment?"

"To begin with," Krasna said, grinning, "as simple a job as I've ever given you, right here on Randolph. Skin out of here and find me that cab driver—the one who mentioned time-travel to you. He's uncomfortably close to the truth; closer than you were in one category.

"Find him, and bring him to me. The Service is about to take in a new raw recruit!"