LONGLINE

"We must have missed it! You could see we were going to miss it! What happened? Where are we?" Wattimlan's voice carried more than a tinge of panic. Feroxtant did not exactly nod, since this implies not only a head but a shape, but he made a reassuring gesture in his own way.
"We did miss it. We also missed the fact that it was double—two stars so close together that we sensed only one. We missed the first, and are in the other—a perfectly good landing. If you can calm down enough to do reliable work, we'd better go through post-flight check. I'd like to be able to go home again even if this star turns out to be as nice as it seems, and I won't fly a ship on guesswork. Are you all right now?"
"I—I think so." Wattimlan was young, and unavoidably short in both experience and self-confidence. This, the longest flight ever made through the void between stars where energy became so nearly meaningless, had been his first. He had done his routine work competently, but routine adds little to maturity. "Yes. I can do it, sir."
"All right. It's all yours." Feroxtant knew better than to put the young-ster through any more of an inquisition; neither of the explorers was even remotely human, but some qualities are common to all intelligence. They set carefully to work. The mechanism which permitted them to exist in and to travel through a medium almost devoid of quantum-exchange niches had to be complex and delicate, and was almost alive in its occa-sional perversity. Until they were certain that it was in perfect order, ready to carry them back over the incredibly long line they had just traced, they could feel little interest in anything else, even their new environment.
Just how long the check required is impossible to say, but eventually the Longline floated, stable and ready for flight, in an equally stable pattern of potential niches, and her crew was satisfied.
"Now what?" Wattimlan's question, the captain suspected, was rhe-torical; the youngster probably had already made up his mind about what to do next. "I've never seen any star but home before, and I suppose we should learn enough about this one to permit a useful report when we announce our arrival—at least, we should have seen more than just the boundary film. On the other spin, though, there's the other star you say must be close to this one—should we start casting for it right away? If it's really close, maybe we'd hit it without too many tries."
"You really want to get back into space so quickly?"
"Well—I thought you'd prefer to make the casts, at least at first, but we can take turns if you prefer. Frankly, I'd rather look over the landscape first."
"I agree," Feroxtant replied rather dryly. "Let's reinforce our identi-ties and get to it."
Landscape is of course a hopelessly crude translation of Wattimlan's communication symbol. Inside a neutron star there is no close analogy to hills and valleys, rivers and forests, sky, sunlight, or clouds. It is a virtually infinite complex of potential levels—some unoccupied, others occu-pied by one or more of the fundamental particles which made up the universe known to the two explorers, some in flux among the various possible states. This is equally true, of course, of the matter universe, and just as a man groups the patterns of electrons and other force fields

around him into perceived objects, so did Wattimlan and Feroxtant. A pattern capable of identity maintenance, growth, and duplication, which main-tained its existence by ingesting and restructuring other such patterns, might be called a lion or a shark by a human being; such an entity would also possess an identification symbol in the minds of the explorers, but translating that symbol into any human word would be unwise, since the hearer could probably not help clothing the central skeleton of abstrac-tion with very misleading flesh.

It is therefore not correct to say that Wattimlan was charged by a lion and saved himself by climbing a tree during their preliminary examina-tion of the new star. It would be even less accurate, however, to say that the exploration was uneventful. It would be most accurate, but still very incomplete, to say that when he got back to the Longline the younger traveller held a much more tolerant attitude toward the boring aspects of space-casting than had been the case earlier. They had learned enough for an acceptable report. They had named their discovery Brother, intending to add the prefix of Big or Little when they reached the companion star and found out which word applied. They had amused themselves, each in his own way—they were individuals, as different from each other as any two human beings. As a natural conse-quence, they had even perceived Brother differently, and had already de-veloped different attitudes toward it.

The length of time all this had taken is impossible to state, since their time is not really commensurable with that in the Einstein-matter uni-verse. Eventually they made their call to their home star, along the incomprehensibly extended line of uniform potential which their ship had marked in space. They reported their finds, and received acknowledg-ment. They received assurance that other ships would follow. They spent more time at their equivalents of working, eating, drinking, and merry-making; and finally they faced the question of trying to reach Big or Little Brother, as it might turn out to be—the companion star which Feroxtant had identified in the instant of their landing.

I feel a little funny about this," Wattimlan admitted as they began the Longline's preflight check. "I've heard of stars which were close com-panions of each other, but there was always one difference. You could see one from the other just about anywhere, as long as you hadn't gone below the surface film, but you could see it only half the time. This one you can see all the time if you're in the right place in the film, but not at all if you're anywhere else. It scares me. Can it be a real star?"

"I'm not sure." Feroxtant would not admit to fear, but he was admit-tedly as puzzled as his junior. "At least, we don't have to worry about start-ing time. Since we can always see it from here, we can lift any time we choose."

"That's just what bothers me. Of course, no one minds flying when he knows where he's going—when there's a steady-pot line to follow. I didn't mind the blind start we made on this trip, since we'd either hit another star sooner or later or be able to reverse and go home. Now I don't know what we may hit. This constant visibility situation bothers me. Could this other thing actually be a part of the star we're in now, separated by some strange potential pattern instead of ordinary space?"

"I hadn't thought of that," Feroxtant replied. "It's a bit wild an idea. I had thought there might be

some connection between this situation and a lecture I once heard on something called direction."
"Never heard of it."
"I'm not surprised. It's as abstract a notion as I've ever heard of, and I can't put it into ordinary words."
"Does it suggest any special risks?"
"It makes no suggestions at all on the personal level. You knew when you volunteered for exploration that it involved the unknown, and therefore meant some risk. Now you're worrying, apparently without even considering all the peculiarities we are facing."
"What? What haven't I considered?"
"You've said nothing about the neutrino source which must also be in this neighborhood, since it is bright enough to see, but which is behaving normally—visible half the time, out of sight the other half."
Wattimlan was silent for a time, checking his own sensory impres-sions, his memories, and the Longline's instrument recordings. Finally he switched attention back to his commander, and asked another question.
"Can that possibly be a star?"
"I doubt it. More probably it's a protostar—one of the neutrino sources which we think finally condenses to an ordinary star. Presumably the neutrinos carry off whatever energy manifestations prevent the for-mation of a normal star. In any case, it's harmless—people have probably flown through them without any effect. There's no way to tell whether this one is nearer or farther than the star we're casting for, but it's nothing to worry about. Now—do you want to make the first few casts, or shall I?"
The youngster hesitated only a moment. "I'll do it, if you trust me to make an open-space reversal."
"Sure. You know the routine. I'm not worrying, and you shouldn't be. Take her out."
"You can't make a guess at strike probability, I suppose?"
"No. It depends on target distance, and apparently on target size, though no one knows why—maybe it's another of those direction phe-nomena. Anyway, we know only that the distance is small—which makes the chances fairly high—and I'm not suggesting that there's any way to guess at something's size just by looking at it. Ready for final checkout?"
"Ready."
"Pressor lens?"
"Open."
"Film field one?"
"In synch."
"Line track power..."

The Longline emerged from the surface film of the neutron star and hurtled away from the tiny body, leaving far behind the burst of neutrino emission which accompanied the lift. The explorers had only a rough idea of the possible distance to their target, and none at all of their

vessel's speed in open space. It had been discovered by experience that slowing down sufficiently to let neutrinos overtake them was apparently impos-sible. The more advanced theories in fundamental mechanics implied that substance as they understood it became mathematically unreal below neutrino speed; what this implied in terms of observable properties was anyone's guess. It was generally believed that stars in galaxies—that is, the neutron stars which were all they could sense of such bodies—were separated by a few hundred to a few thousand of their own diameters. Space travel had given them, in addition, the concept of galaxies separated by a dozen or two times their own size, on the average.

Wattimlan and Feroxtant, therefore, could only guess at the distance needed for their casts. They had set up an arbitrary travel time; if the pilot failed to make a landing before that was up, he would reverse and return to the starting point along the new constant-pot line his trip would have established. The time was short enough so that even the youngster, Feroxtant hoped, could hardly get either bored or nervous.

The chance of landing on any one cast was presumably very small, though there was no way of calculating just how small. Feroxtant's sug-gestion that this might become possible when the concept of direction was finally clarified by the advanced mathematicians was not really a se-rious prediction, since he had no real idea of what the theory was all about; it was more like the suggestions in Earth's early twentieth century that radium might prove a cure for cancer and old age.

Wattimlan, therefore, gave no serious thought to what he would do if and when the Longline made starfall. It would be routine, anyway. He flew. He readied himself for his first open-space reversal with some un-easiness, but missed its time only slightly. The miss annoyed him as a reflection on his professional skill, but it was in no way dangerous; the Longline was suddenly retracing its outward path. There was none of the deceleration which a human pilot would have had to plan and experi-ence; the concept of inertia was even stranger and more abstract to Wat-timlan than that of direction—or would have been if anyone had ever suggested it to him. The only observable phenomenon marking the re-versal was another burst of neutrinos, vaguely analogous to the squeal of tires from a clumsily handled ground vehicle but—unlike the time error or a tire squeal—not indicative of poor piloting.

In the sub-light universe, a simple direction reversal does not involve change in kinetic energy, except for whatever entropy alteration may be involved; equal speed means equal kinetic energy. In the tachyon universe, momentum is naturally as meaningless as direction, kinetic energy almost equally so, and the interactions between forces and the various fundamental particles follow very different rules. However, the rules were the ones Wattimlan knew, and the time interval between the reversal and reentry into the neutron star's surface film was for him boringly uneventful. He landed.

Feroxtant was nowhere to be seen; he had apparently gone off either working or playing. Wattimlan decided to be pleased at the implied compliment to his competence rather than hurt at the suggested indifference

to his welfare, and went through post-flight and pre-flight checks without waiting for his commander and instructor to appear. He made another cast, and another, and another...

"So pay up!" Sforza leaned back from the display tank which domi-nated the Manzara's maneuvering console, and just barely managed to refrain from smirking.

Jeb Garabed, a quarter century younger and correspondingly less restrained, glared first into the tank and then at the two-liter silvery cube beside it. He didn't quite snarl—the captain was also present—but there was a distinct edge to his voice.

"I should know better than to let myself get fooled by that old line about mechanical brains. I know that thing is made of doped diamond, but I didn't realize how much weight the first word carried!"

Sforza lifted an eyebrow. "I don't seem to appreciate your humor as much as I used to."

"Don't bother to put that eyebrow on top of your head. It would be conspicuous. I wasn't trying to be funny."

"That's just as well. You—" Sforza cut himself off with an effort, and fell silent. For a moment each of the men wondered if he had said too much, as Garabed's face and Sforza's scalp both flushed.

Captain Migna Sarjuk listened to the exchange without too much concern; she knew both men well, and could tell that the jibes were not serious. When arguments became too frequent, of course, it was a tempta-tion to separate the disputants for a few months by judicious watch-shift-ing; but it was possible to be too hasty with this solution. One could break up good working teams, and even run out of possible combinations. With over eighty people on the Manzara the latter seemed mathematically im-probable, but since most of the possible combinations were in fact elimi-nated by conditions of specialty training it was not entirely impossible. The ship had spent eighteen months—subjective time—en route, would be at least that long going back, and might remain several years at this end of the flight line; the captain had no intention of running out of solutions to the most likely personnel problems any sooner than she could help. She waited silently, paying close attention to Sforza's reactions; the younger man, she knew, would not lose his temper in her presence.

He didn't. The young radiometrist caught himself in turn, grinned, and tossed a couple of time-slugs onto the console. Sforza gathered them up. Garabed half-apologized as he continued to stare into the display.

It was not a picture in the conventional sense. The three-dimensional presentation did show images of a number of celestial bodies, but they were festooned with numbers, vector arrows in various colors, and other symbols. To Sforza, it was a completely informative description of all the detectable objects within a light-day of the ship. Garabed would have felt happier with the images alone, stripped of the extra symbols. He could then have thought of it as a simple bead-and-wire model.

He greatly preferred the direct view of space from the Manzara's ob-servation dome, even though human perception was not really adequate for its analysis. For most of the trip it had been

an unchanging Milky Way—unchanging, that is, except as his own intellect changed it. He had found he could change its appearance from a flat spray-paint job on a screen a few yards outside the dome to a more nearly correct, but far from complete, impression of infinite star-powdered depths. His home star had been fading throughout the journey, of course, though the change in a single day had been imperceptible except at the very beginning. It was now an unimpressive object about as bright as Polaris.

The Manzara's target star was now overwhelmingly bright, and the human mind had no trouble accepting that it was far closer than Sol; but its white dwarf companion had only recently grown brighter than the sun the explorers had left some ten objective years before.

But Garabed could read the display symbols even if he preferred to visualize differently, and now one of them caught his attention. It was typical of him that he did not call immediate attention to it; his first reaction was to recoup his betting losses. At this distance, a few minutes' delay in reporting a discovery would not be of importance to the ship's safety—or, more important, to the captain. He continued the conversa-tion, and even Sarjuk failed to catch any change in his manner.

"So I was wrong. It just means we'll have to spend a year and a half of our personal time flying back—unless I turn right while we're here."

"I'll cover another bet on that, if you like."

Garabed shook his head. "I guess not. Now that real work is starting, I don't need so much distraction—and probably can't afford it. It was different on the way, when I needed amusement. Conning my way out of boring jobs by smart bets provided that—even when I lost, the jobs themselves made a change. Now it's time to be serious, though, if you'll pardon the pun. How do things look to you?"

The ballistician gestured toward the display into which Garabed was still staring. "There you are. Cutting drive didn't make much difference. It adds up to what we've known for a couple of centuries, plus what we've picked up in the last few months. One type A main sequence sun, known since before human history began—with an unexplained, not to men-tion unproved, charge of having been red instead of white a couple of millennia ago. One white dwarf in a fifty-year orbit with it, known since the nineteenth century. Four high-density planets discovered by us in the last few weeks. No gas giants, which would be out where the white dwarf would perturb them hopelessly anyway. And no trace of the faster-than--light ship you were betting would be here from Earth waiting for us."

Garabed shrugged. "It was still a reasonable bet. We have artificial gravity, and a field drive system which can be described as a space warp without lying too grossly. It still seems to me that those should ease us into FTL flight before I'm very much older."

"In spite of the fact that both the gadgets you mention were devel-oped on the assumption that Einstein was right? And that even the warp which makes a portable fusion engine practical is an Einstein applica-tion? I seem to be missing a rung or two in your ladder of logic."

Garabed glanced at the captain before answering. "Yes," he said after a moment. "In spite of that."

"And in spite of the fact that this trip was only a political gesture to quiet the people who don't think Earth is home enough? And that there were long, loud screams about the better things which could be done with the resources which went into the Manzara and her equipment? Why-should--we-explore-the-stars, practically-no-chance-of-life, a-waste-of-resources, we've-solved-all-our-real-problems, let's-sit-back-and-live? You've heard it all."

"Sure I have." Garabed did not look at the captain this time. "But people are still curious—that's what makes them people. Once we were on the way some of them were bound to want to find out what we'd see—first. It's being human. You have the same drive, whether you want to admit it or not; I'll show you." He reached across and flicked off the dis-play in the computer's tank.

"How sure are you that there's nothing really unexpected to be found in the Sirius system? And would you bet there isn't a clue to it in your data banks right now?"

The older man looked into the blank display unit, and thought. The kid might have seen something, though Sforza himself should have no-ticed anything important; it was certainly possible. On the other hand, Sforza had known the young con artist to bluff his way out of one or another of the ship's less popular jobs on at least four occasions during the trip, three of them at Sforza's own expense. Had there been anything sur-prising on the display? Something he should, of course, have seen himself?

The captain had come over to the ballistics console to look for herself, though she of course said nothing. She knew, far better than Sforza, that Garabed might not be bluffing.

The ballistician hesitated a moment longer, straining his memory with no useful result, and decided to take a chance.

"All right. Two hours' worth." He put the slugs he had just won on the panel before him. Garabed covered them with two more, and turned the display back on. For a moment there was silence.

"What was the time limit on this?" the older man finally asked. The captain, unseen behind him, smiled and slipped back to her own station, where she busied herself at the intercom. The instrument specialist paid no obvious attention to her; the smile on his face might have been simply one of triumph.

"No time needed. Look at the white dwarf's radial velocity"

"I see it. So what? You wouldn't expect it to match A's. Even a fifty-year orbit means a few kilos per second—"

"Changing how fast?" asked Garabed pointedly.

"Not very—" Sforza fell silent again, glued his eyes to the display, and within a minute the eyebrows were climbing toward the desert above. "It's changing!"

"How right you are. Do you pay now, or calculate first?"

Sforza waved the slugs away with an impatient gesture of his head; his fingers were already busy. He didn't stop to wonder why the velocity variation had not been spotted sooner; it was obvious enough. The axis of the previously unknown orbit must point almost exactly at the Solar system. The Manzara was now so close to the Sirius group that the A star and the white dwarf appeared fully forty degrees apart, and the ship was well off the line between Sol and the dwarf. Hence, there was a radial velocity component not previously detectable.

This clue to the line of the orbit axis permitted an assumption which would otherwise have been a wide-open guess in Sforza's computation. He plugged it in, let the spectral sensors which Garabed kept in such good condition feed their readings and the Manzara's clock signals in after it, and waited until the display steadied. Then, and only then, did he speak.

"Take your pirated money, and call Physics and Policy—"

"They're coming," the captain interjected quietly. Sforza continued.

"The white dwarf is in a nearly perfect-circle orbit with something too small to see, but of comparable mass. The period is seven hundred seventy-two seconds. The dwarf is thirty-two thousand miles from the barycenter, orbital speed two hundred seventy-seven miles per second —"

"Miles?" queried Sarjuk. "I can sympathize with the Creative Anach-ronism urge, but—"

"Fifty-one thousand five hundred, four hundred forty-six. The invisible body's radius vector is open until we can get a mass ratio, but can hardly be more than a few tens of thousands of kilometers. We have a dividend. It's either a neutron star or—"

"Or nothing," pointed out the captain. "It can't be more massive than the total previously measured for Sirius B—point nine suns. Too little for a black hole."

Garabed was nodding slowly, his face nearly expressionless, but both his companions could tell he was containing strong excitement. His only words, however, formed a terse question.

"New flight plan, Captain?"

The Manzara had been free-falling in an orbit intended to make a close swing past Sirius B, enter a slingshot transfer to A with a periastron distance from the latter of only a fifth of an astronomical unit, and a sec-ond sling to interception with the largest, outermost, and probably most Earthlike of A's four planets.

Sarjuk was by training an engineer specializing in safety extrapola-tion, which naturally included administrative psychology and hence quali-fied her for her present command status. She was certainly no ballisti-cian, but she knew what a change in orbit meant in terms of fuel reserve—which after all was a major safety factor for the Manzara. In this case, of course, a good secondary-school student could have performed the ap-propriate calculations.

"New flight plan, of course," she agreed quietly. "But let's hear what Physics wants before Mr. Sforza does any number work." She swung her seat about as a dozen excited researchers entered the bridge, motioned them to the seats which ringed the chamber, and turned back to Garabed.

"Jeb," she asked, "can you possibly get anything with real resolving power to cover this object? I know it must be small, but until we know just how small and just where it is we're going to be crippled in any plan-ning. Sforza can give you the direction from the dwarf to the orbit cen-ter, and you can search along the projection of that line with whatever seems likely to work best. Build something if you have to."

Without waiting for the two men to get to work, she turned back to the newcomers and gave them a summary of the new information. They lis-tened in near silence, their eyes never leaving her face until she had finished.

"How close can we get?" Tikaki and Distoienko spoke almost in uni-son.

"Will it take too much fuel to park beside it?" was the more thought-ful question from Dini Aymara, a warp theoretician. Tikaki answered instantly.
"Of course not! Look—it's a binary, with the two bodies similar in mass. All we'll need is maneuvering power; we can use an orbit which will transfer our energy to one of the bodies instead of slinging us away. When we do want to leave, we can slingshot out in the same fashion. We can get as close to the neutron star as you want—meters, if your experi-ments need it —"
"Three objections, Mr. Tikaki," the captain spoke quietly still. "First, at a distance even of kilos, to say nothing of meters, not even our best cameras could get clear images—figure the orbital speed at such a dis-tance. Second, neutron stars are likely to have strong magnetic fields, and there are plenty of conductors in this ship, starting with the main hull stringers. Finally, there is such a thing as tidal force. I will not permit this ship into a gee-gradient of more than five inverse-seconds squared, and only then if all main and backup artificial gravity units are in perfect con-dition. Mr. Sforza, what distance would that tidal limit mean from the two bodies?"
The ballistician had finished providing Garabed's needed figures, and was able to answer the captain's question almost instantly.
"For the white dwarf it would be somewhere inside; you'll be worry-ing about other things first. For the neutron star, it of course depends on the mass, which we don't—"
"I have it—at least, I have a respectable mass on the line you gave me, affecting the gravity-wave unit," cut in Garabed.
"Line?" responded Sforza. The instrument technician supplied a set of numbers which the ballistician's fingers fed into his computer as they came; a set of luminous symbols appeared in the display tank, and were translated at once. "Mass is point three eight suns. The tidal limit dis-tance you want is a hair under five thousand kilometers—about three quarters of an Earth radius."
The captain nodded, and glanced around the group. "I thought so. Gentlemen and ladies, the Manzara is half a kilometer long—not a point." If she expected Tikaki to look properly sheepish or disgruntled she was disappointed. He simply nodded, and after a moment she went on. "Very well. If Mr. Sforza can warp us into a capture orbit without exceeding tidal and radiation limits, and without using more than five hundred ki-lograms of hydrogen, I approve a pass. If you can all work from the mass center of the pair, I set no time limit; those who want to stay will have to make their peace with those who want to get on to A and the planets. Engineers, let's get the umbrella out. Mr. Sforza, report if we can't conform to the restrictions I've set. Meeting adjourned."
The "umbrella" was a thin sheet of highly reflective, highly conduct-ing alloy which could be mounted on the bow of the Manzara, giving her rather the appearance of a fat-stemmed mushroom. Like the hull itself, it could be cooled by Thompson-effect units whose radiators were ordinary incandescent searchlights, able to send the waste energy in any conve-nient direction. The whole unit was something of a makeshift, a late ad-dition to the mission plan intended to permit a brief but very close pass by each of the stars being studied. It had to be set up manually, since it had not been included in the ship's original specifications—and even a

fusion-powered giant like the Manzara was rationed in the mass she could devote to automatic machinery. Once again, the versatility of the human researcher was being utilized.

Space-suit work, still called EVA, was still taken seriously by those who had to perform it. There is a human tendency to ignore the dangers in a given action if they become familiar enough—people who cannot bring themselves to look down from a twelfth-story window are often quite ca-sual about the equivalent energy exposure of driving a ground vehicle at sixty miles per hour. On the other hand, the high steel worker seems as casual about walking a twelve-inch beam five hundred feet above the street.

There is, however, a difference. The professional high steel worker, or submarine engineer, or for that matter racing driver, has his apparent unconcern underlain by a solid foundation of hard-won safety habits which in turn grow from a fully conscious awareness of the dangers of his calling. Also, the professional does not like to be distracted by amateurs, though he will usually admit the necessity of devoting some time to the training of new professionals.

Space workers are professionals—normally. Some two thirds of the Manzara's personnel, however, were researchers whose space-suit and free-fall experience were strictly for the occasion. This would not by itself have been serious, since the ship's space professionals could have put out the umbrella without their aid—and would have been glad to do so. Unfor-tunately, the makeshift aspect of the umbrella included the assumption that it could serve more than one purpose. It was basically protection for the ship, of course; but the ship was a research instrument, and it had been taken for granted that the umbrella would also serve the researchers directly. They would mount instruments on it. They would study, and alter, its own activity as it absorbed and converted the radiation flux.

And during the year-and-a-half flight from the Solar system most of the scientists had improved their time developing new plans and projects to supplement the original programs and to replace them if unexpected conditions made them impractical. Consequently, the researchers expected to be on hand during the assembling and fitting of the umbrella.

"How can I possibly wait until it's set up?" Tikaki was hurt and in-dignant. "Look—four of these leads have to go through the mirror. I can't possibly drill holes after the segments are assembled—I'll have to groove the joints, and after they're butted put in the interferometer units—"

"Look—I obviously have to run impedance checks on every intersection junction as they're put together." Crandell was being patient. "Every stage of assembly will make changes in electrical and thermal prop-erties of the whole unit. I can't just use one term for the assembled unit—different segments will be getting their irradiation at different angles; it's not a plane surface—"

"Certainly these heat-flow meters have to be installed and calibrated during the assembly—" Cetsewayo was matter-of-fact.

Captain Migna Sarjuk did not debate any of the issues. She did not point out that if any imperfections developed in the umbrella, all the proposed experiments would have to be cancelled because the Manzara would not be able to get close enough to either star to perform them. She assumed that the scientists knew this, just as an alcoholic knows what a cocktail will do to him. She was politely firm.

"Nothing is attached to the umbrella until it is installed and its re-frigeration system tested. After that, any installations will be done by engineers, engineers who know the umbrella systems and circuitry."

"But, Captain!" The howl was almost universal. "How can they—?" The details of the question varied, but the basis was constant and not very original. Scientific training does not always prevent a human being from falling in love with his own ideas and inventions; it does not always even let him recognize when he has done so. They had to install their own equipment—they had built it themselves, they had adjusted and calibrated it themselves, and no one else could be trusted to set it up prop-erly for its intended use. Sarjuk was not even tempted, however, mission-conscious though she was.

On the other hand, she was not one to argue when it was not neces-sary. She used a technique which would not have been available to a ship's captain on the oceans of Earth a century before: she made herself un-available for policy discussion by going outside to oversee the work on the umbrella. At least, that was her declared purpose, and in view of her responsibilities and personality it was taken for granted by those inside that she was too busy to be interrupted by radioed arguments.

She did, of course, oversee; she also relaxed. Space lacks the change, the sound, and the scents which impress human senses and combine to give planetary landscapes that subjective quality called beauty; but space, too, is beautiful, and the captain appreciated it. Between examinations of newly made connections she simply floated, drinking in her surround-ings through the only sense available and reinforcing the visual images of the Milky Way, distant Sol, and blazing Sirius from the body of knowl-edge which was part of her heritage as a civilized, cultured being. She "saw" the four planets which the Manzara's instruments had detected, just as she saw the more numerous and varied worlds of the Solar system and the frozen attendants of Proxima Centauri—she could look where she knew them to be, and let memory and imagination fill the gaps left by human sensory limitations.

She spent more hours, perhaps, than she should have done at this combination of duty and pleasure. She was physically very tired, though emotionally refreshed, when she finally floated back to an air lock to face more argument from her scientists. She was met inside by Tikaki, who perhaps had been refreshed himself in some fashion during the past few hours; at least, he was changing tactics from pressure to compromise.

"Captain, if we can't do our own installing outside," he suggested, "can we choose, or at least brief, the engineer who does it? Preferably the former, of course."

Sarjuk had known something of the sort was coming, of course; as her fatigue had mounted, out there in the blissful darkness, she had de-layed her return out of reluctance to face it.

But tired or not, Sarjuk was a professional. She was quite able to bal-ance the overall safety of the Manzara against the reasons why the ship and crew were here at all. She was incapable of making a compromise which would be likely to cause total failure of the mission, but the idea of compromise itself did not bother her. She racked the helmet she had just removed, but made no move to get out of the rest of her vacuum armor as she considered the physicist's proposal.

"Whom would you select for your own installation job?" she asked after a moment.
"Garabed, of course. He's the best instrument specialist we have." A shade of expression flickered across Sarjuk's face.
"That's not because—" She cut off the remark, but Tikaki finished for her.
"No, it's not because he's your husband. I wouldn't budge an ang-strom from my insistence on doing the job myself if I weren't willing to admit how good he is—and you should know it!"
She nodded. "Sorry. I do know it. Very well, I agree to the suggestion in principle, provided that Jeb—"
"Provided that Jeb agrees? Who's captain here?"
"I am, Dr. Tikaki. Provided that Jeb has time enough after doing his routine work and the favors which three out of four of the so-ingenious researchers we have here keep asking of him when they can't make their own improvisations work. I am quite aware that he is the best instrument specialist we have—and that everyone aboard this ship knows it. If you wish to put your suggestion to him, you may do so—when he comes in. Please be brief, however. He has been in a space suit for sixteen of the last twenty-four hours, and has just been delayed by another circuit problem in a Thompson unit. I don't know when he will finish, but he is consid-erably more overdue for sleep than I am—and if you will excuse me, I am going off watch now."
She turned away and quickly doffed the rest of her space armor, while Tikaki tried vainly to think of the right thing to say. He failed, and wisely said nothing.
However, he left the lock bay at the same time the captain did. Even appearing to stay around to wait for Garabed seemed tactless at the mo-ment.
Nothing more was said directly—Tikaki reported the gist of the con-versation to several of his fellows, and the word spread rapidly enough to the other researchers. However, twelve hours later a watch reassignment was published, putting the two other instrument workers alternately on outside duty and assigning Garabed to liaison with the researchers who had equipment to be mounted on the finished umbrella. It occurred to Tikaki that his pressure might actually have been a favor for Sarjuk, giv-ing her an excuse to do something she had wanted to do anyway, but he decided that any experimental check of this hypothesis would be too much like trying to find the taste of monofluoroacetic acid.
Over four days were spent outside by the space-suited engineers, with Sarjuk watching them closely two thirds of the time and sleeping most of the rest. Then, the umbrella assembled, attached, and electrically proven, a tiny change was made in the Manzara's velocity. The result was obvious only to people like Sforza, who could read the vector symbols in the bal-listics tank as readily as a novel. Sirius B had already become a dazzlingly brilliant point of light, while A was blazing well to one side; but it would be days yet before unaided human senses could convince their owners that the ship was in a B-centered orbit.

The velocity change as such was no more apparent to the Longline's pilot than to the human beings on the Manzara, but the neutrino flux from the Solar vessel's hydrogen fusers was another matter. It was tiny in amount compared to the flood from Sirius A, even after inverse square

decrement, but it was well above the noise level of the Longline's instru-ments, and Wattimlan, still casting outward from the neutron star with completely unhuman patience, detected it and was properly confused.

Another pseudo-star? Did they come this small? Or was it really small—perhaps the feebleness meant distance. But did stars suddenly wink into existence like that? He had never heard of such a thing. Maybe Feroxtant would know...

So the Longline paused in her endless casting, and the young pilot searched the neutron star calling rather frantically for his chief. Feroxtant was amusing himself in a fashion quite beyond the possibility of describ-ing to a human being, and did not particularly wish to be found at the moment. Consequently, even though the Manzara's acceleration lasted a very long time by tachyon standards, it had ended by the time Wattimlan found him, convinced him that something was strange, and got him back to the ship to see for himself. The peculiar neutrino flux had ceased—the Manzara's general operations were powered by chemical accumulators, since operating fusers at what amounted to trickle power was inherently wasteful. Feroxtant saw nothing, and Wattimlan had to admit that there was now nothing to see. The net result was that Feroxtant, deciding that his assistant needed a rest, took over at piloting the Longlane's casts. Nei-ther he nor Wattimlan gave any thought whatever to the fact that the neutrino bursts from their own vessel's acceleration would have appeared similar in intensity, though far briefer in duration, to any nearby ship.

Jeb Garabed was kept very, very busy. Neither the captain nor any-one else had mentioned a word about the Tikaki argument to him; he had, indeed, taken the reassignment almost for granted. He was not of-fensively conceited, but had a perfectly realistic awareness of his own competence. If the change had given him and the captain any more time together off-watch than before, he might have been slightly suspicious of an ulterior motive; but it had no such effect. All three of the instrument workers were now occupied every waking moment. Everything the Manzara carried whose analytical range much exceeded that of a chemist's test tube was now in use, probing the white dwarf itself and groping for the still invisibly small neutron star whipping around it. The name of Garabed or one of his colleagues echoed over the intercom whenever something failed to operate properly—and, as he com-plained occasionally, whenever an unexpected reading was recorded and the researcher involved was afraid his machine was working improperly.

Consequently, while Garabed was not actually the first to detect impulses from the Longline, he was certainly the first to believe that those impulses constituted genuine, objective data rather than instrumental artifacts.

To him, the neutrino telescopes were just another set of instruments which he knew intimately. They would not have been recognized a cen-tury or so earlier; they were far more sophisticated than the original tank of cleaning fluid in a mine. They still did not approach ordinary optical equipment in resolving power, but the word "telescope" was far more appropriate than it had once been. They even reported their data in the form of visual images on very conventional

electron tubes, though their "optical" parts were warp fields.
Jef Pardales, the physicist who made most use of the neutrino equip-ment, was never surprised to see ghost images on the tube, but he was never happy about them.
"Find it, please, Jeb," he said in a rather tired voice. "It's bad enough to have neutrinos at all from a supposedly dead white dwarf. It's worse when they come in separate bursts. It's worst of all when I can't tell whether they're actually coming from the dwarf or from some place as much as a million kilometers away from it. At least, though, I'd like to be sure that half of what I see isn't originating right in that circuit box."
"It shouldn't be." Garabed's voice was almost as tired. "I had it apart less than five days ago. What's the pattern that makes you worry?"
"Doubling of the image."
"That does sound embarrassing for me. What's the pattern? Hori-zontal? Vertical? Same brightness? Energy difference?"
"Energy about the same in original and ghost. Time difference varies from too close to distinguish—which may mean no ghost at all—up to just about one second. Position difference seems random—but at this range my resolving power in angle means more than one light-second."
Garabed frowned. "That doesn't sound like anything I've ever seen happen inside one of these things. Have you checked it out on the A star?"
"Yes. Nothing surprising. A steady image of what might be its active nucleus, blurred by resolution limit at this distance."
"Then I suggest you believe what you're getting here. I can't take apart everything on the ship every time someone is surprised by what he sees."
Embarrassment supplemented the fatigue on Pardales' face. "I know, Jeb. I wouldn't ask, except I've gone over it all myself, and can't find anything wrong with the telescope, and all of us have been beating our brains out without even a whisper of an idea of what could emit neutrinos in any such way. I'm not so much asking you whether there's anything wrong with the 'scope as I am asking what you can do to improve its resolution. In theory, inside tuning should give us another power of ten. I know we'll be that much closer in a couple of weeks, but if we have to wait that long some of us may not be in shape to work. I mean it."
Jeb's eyebrows started to imitate those of his former watchmate Sforza before he remembered and controlled them.
"That bad? I suppose that means one of you came up with the de-mon theory and no one else can think of anything to replace it—but you don't want to admit it."
"Just help us measure, please, Jeb." Garabed said nothing more; he nodded sympathetically and opened the case of the telescope. He understood perfectly. For Cro-Magnon man, it could be taken for granted that lightning was produced by a living being—one with special powers, but not entirely beyond man's comprehension. A few millennia later, the notion that disease was a divine punishment for sin was equally acceptable. Then the idea of an essentially human universe—one in which man was not only of central importance but of typical powers—began to fade as

a more coherent concept of natural law was developed. Intelligent creators of the Martian canals, though popular as a concept, were not uni-versally accepted; the flying saucer phenomenon a few decades later saw the "little green men" accepted by a minority, composed largely of the less disciplined imaginations. Very, very few seriously considered the pulsars as possible space beacons planted by star-faring races. And scarcely anyone interpreted the regular crystal-growth patterns, whose images were first transmitted to Earth by unmanned probes from the moons of Jupi-ter, as the remains of cities. Blaming things on intelligence had simply gone out of style. This, of course, put the Manzara's researchers at a profound disad-vantage.

It also put Jeb Garabed to a great deal of unnecessary work. "I can't get you ten times the resolution," he said at last. "You'll have to settle for about seven, and get the rest by waiting. Look, I'm no psychologist, but why should you let this worry you now? Can't you just collect your measures, and not worry about explaining them until you've recorded everything you can ex-pect to get? That's what Min would certainly advise, and—"

"And you would naturally be inclined to take her advice. I admit it's good; I just doubt that it's possible to follow. All right, Jeb. I'll be calling for you shortly, I'm sure."

"Not until that thing has been run for at least six hours," Garabed said firmly. "Unless you actually do go overboard and hit it with a torch, I refuse to believe that it can go wrong before then. Just get all your nice measures on the tapes, and don't—what do you scientists call it—theo-rize ahead of your data." He left hastily—there were two other calls for his services already.

He mentioned the conversation some hours later to the captain, not as a complaint or even an official report, but as an example of how things were going, in one of their rare private conversations. She proved more concerned than he had expected.

"I've heard a little about it," she agreed. "The star people seem terri-bly bothered at the idea of a white dwarf's putting out neutrinos, and even more so at the thought of their coming from the neutron star. The idea is that such bodies should be past that stage. I'd have thought that a real scientist would be delighted at the chance to discover something really new, but this crowd seems short on self-confidence; they can't convince themselves that the data aren't mistakes."

"That's what it looked like to me," agreed her husband. "I suggested to Jeff that he just collect measures for a while, hoping that the bulk of material would convince him there must be something to it, but I don't know whether it'll work."

Sarjuk pondered for a minute or two. "I can't think of anything better, myself," she admitted finally, "except that you'd better do everything you can to keep up their confidence in the equipment—even if it takes more than its fair share of your time. If necessary, I'll juggle watch assign-ments even further."

"Hmph. I hope it won't be. I like my work, but enough is as good as too much. That telescope is working; there are bursts of neutrinos com-ing from somewhere near that whirligig pair, whether Jeff and his friends want to believe it or not."

"I'm willing to take your word for it—so far." He looked at her sharply as she made the qualification. She smiled. "I just hope you don't have to do their work as well, and come up with a theory to satisfy them. But forget all that for a few hours—no one can work all the time."

Sarjuk did not actually have to reassign watches, but Garabed spent a great deal of time on the neutrino telescope during the next ten days. By that time, every one of its component modules had been replaced at least once, and the decreasing distance had improved image resolution to the point where it began to look as though at least some of the bursts were centered on, if not actually originating in, the neutron star.

By that time, also, the Manzara had made two minor—very minor—orbit corrections. The fusers had been used, and Feroxtant had seen for himself that his assistant had not been hallucinating. He did not stop his casts, however; there seemed no point in debating the matter until more data could be secured. Therefore, the Longline continued to emit its own neutrino bursts as it left the neutron star and when it made its reversal some three hundred thousand kilometers away.

To the surprise of Garabed and the relief of the captain, the physi-cists were beginning to accept the reality of their data, and were eagerly awaiting the completion of the capture maneuvers. The plan was to place the Manzara at the mass center of the white dwarf-neutron star pair, hold-ing the umbrella toward the dwarf; in effect, this would place the ship's instruments at the origin of a system-centered coordinate set, and the observers relative motion should be zero. This would avoid a lot of vari-ables...

The capture maneuver was artistic, though hard for nonspecialists to appreciate. Sforza cut as closely as he could first to one of the bodies and then the other, choosing his vectors so that the inevitable gain in kinetic energy as he approached each would be more than offset by the loss as he withdrew, and combining this with an initial approach direction which caused each near-parabolic deflection to carry the Manzara from one body towards the other. It would have been elegant, as Sforza admitted, to do the whole job with a single application of steering power to get them into the proper initial approach curve; unfortunately, it was impossible. The period of the system remained just below thirteen minutes—which cut things tight enough as it was—while that of the ship was constantly decreasing as it surrendered energy to the little stars.

The job was finally finished, with the umbrella warding off the ra-diation flood from the hot star some twenty thousand miles off the bow and the vessel's stem pointing toward the invisible mystery a little more than twice as far away. The data continued to flood in.

Feroxtant had also received a flood of data. It was not easy to inter-pret; one fact common to both his and the human universe is that the number of independent equations must equal or exceed the number of unknowns before any certainty is possible. The actual power drain on the Manzara's fusers had been varying in complex fashion; so had the ship's distance from the neutron star. Hence, the neutrino flux recorded by the Longline's sensing equipment had varied widely and erratically during the many minutes of Sforza's maneuvering. Feroxtant felt subjectively that the variation was not random, but could find no pattern in it. He had stopped casting very quickly, and called Wattimlan back aboard. The youngster was equally mystified, though happy that his commander had also seen the strange readings.

"No star ever acted like that." Feroxtant was firm. "I don't know what we've found—well, what you've found, to be honest—but it's new."

"But—stars aren't the only things that give off neutrinos," Wattimlan pointed out rather timidly. "Ship's accelerators—food factories—"
"I thought of that. Of course artificial processes emit neutrinos, too; but what imaginable process would produce them in a pattern which varies like this?"
Wattimlan had no answer.

Oddly enough, Garabed's work load eased off; the physicists were accepting the information and had turned back into scientists. Sarjuk felt that the earlier problem must have been mere inertia—their minds had been running free, except for the planning of possible experiments, for nearly a year and a half; they had simply slipped clutches briefly at the first contact with reality in so many months.
She might have been right. Garabed wasn't sure, but didn't argue; he enjoyed the respite, and listened with interest to the questions flying about. Why should a neutron star emit neutrinos at all? Why in separate bursts? Why, if the Sirius system had started as a single unit, had its least massive member reached the neutron star stage first? Why were the white dwarf and its companion so close together—so close that when both were main sequence stars their radii would have overlapped? Why, if its magnetic field meant anything, was the neutron star in locked rotation facing the dwarf rather than spinning several times a second like all the others known?
Answers were not forthcoming. Physical data—size, mass, detailed motion, even temperature and conductivity—were flowing in nicely; but any question beginning with "why" remained wide open.
The white dwarf was being very cooperative, though it was not much to look at through a filter—no sunspots, no corona, no prominences or faculae; simply a featureless disc, Nevertheless, information about its in-ternal structure was coming in very well, and none of it was very surprising. It was now clear that the neutrino bursts were not coming from this body; as far as nuclear activity was concerned, it was dead.
The neutrino telescope had been shut down during the capture ma-neuvers, and the pause when Feroxtant had stopped casting for a time had been missed.
It was equally clear that not all of the bursts were coming from the neutron star, either. Just half of them were—or at least, from a region within about eight hundred kilometers of it, that being the resolution limit of the telescope at this distance. The other half appeared to origi-nate randomly at any point within about a light-second of the same cen-ter. They still came in pairs, one of each pair at the center and one away from it, with pauses of a few seconds every ten to twenty minutes—not completely random, but not orderly enough for anyone to have worked out a system yet.
"You have the betting look on your face again. I thought you were going to stop until the work let up." Garabed looked at the captain, try-ing to decide how serious she might be.
"It has been easier lately. This isn't to take care of boredom, though. It's just one of those sure things. Would you care to allow any odds that the as-trophysics crowd won't be begging, within

the next twenty-four hours, that we go into a parking orbit around the neutron star at tidal limit distance?"
Sarjuk gave a snort of disbelief. "They must know better. A few thousand more kilograms of hydrogen and we'll have to get fuel from one of the planets to get home."
"Well, we probably can. The big one seems to have water."
"With enough deuterium already? Or do we build a separator?"
"We could. We expected to be here for as much as three years anyway, and personally I wouldn't mind settling down into a less hectic life than this for a while."
"The idea was, and remains, to make a preliminary survey and get the results home. The three-year plan was contingent on either unforeseen complication—just a safety margin—or on the making of some really fundamental discovery important enough to demand immediate work, rather than wait for the next expedition."
"And how important would that have to be?" asked her husband.
"That will have to be settled when—and if—it happens. Until something of the sort comes up, we plan to return as soon as the planned op-eration-"
"Was the neutron star part of anyone's plan?"
"No, but you know as well as I that it can really be handled only by a group set up specifically for it. No one even dreamed that such a thing would be here, I can't see staying on and trying to do that job ourselves, even though we could live in the Manzara indefinitely. And, as I still think they know too well to ask, I will not sanction the fuel expense of getting into a parking orbit as far down in a gravity well like this as they'd need. And I won't do any betting on the matter, dear husband."
"I didn't really think you would. I'll cook up something even more certain."
He refused to be more specific, and the captain knew him well enough by now not to try very hard.
The Manzara's station between the two ex-stars was of course unstable, so Sforza and his colleagues would permit no interruption in their con-stant watch of the ballistics computer and its display. There were other, equally versatile units on board, however, and Garabed had no trouble getting time on one of these; he had an idea to cheek. He would have been as reluctant as any physicist to describe it to anyone; he would have admitted at the time, as was charged later by amateur psychologists, that it stemmed purely from wishful thinking. He made a point of setting it up in private, and looked for a long time at the display when the com-puter had done its work. Then he cleared the setup, and spent some time trying to decide whether to break it first to his wife or to Pardales.
The decision brought a smile to his face.
"Jeff," he remarked to the physicist a few minutes later, "I don't see why you fellows have had so much trouble with those pairs of neutrino bursts. I was just running your records through to check out one of the computer cores, and it seems perfectly straightforward to me."
"Straightforward? How do you mean?"
"Well, the pattern is so simple. One of each pair is at the neutron star, as you've been admitting,

and the other is always on the surface of a hemisphere just over a light-second in radius, centered on the neutron star and with its axis pointing—"

"Show me!" The physicist was satisfyingly jolted.

Garabed led him back to the station where he had tried his idea, and set up the material again. It showed as he had said; he had arranged the plot on a coordinate system which rotated with the Sirius B doublet, so the two main bodies showed no motion. The hundreds of luminous points which represented the records of the neutrino bursts were indeed arranged in a nearly perfect hemisphere for the one part, and concentrated around the neutron star for the other.

"Our plot was all over the place—nothing like that regular!" exclaimed Pardales. "What did you plug in there? You must have put in some extra data—"

"Not exactly," replied Garabed. "There's my program. Actually, I left something out. Look it over." There was silence for a minute or two.

"You took for granted, as we did, that there was a causal relation be-tween the members of each pair. You allowed for travel time from point of origin of each flash to the ship; you allowed for travel time from one of each pair to the other—wait a minute! No, you didn't! You assumed they were really simultaneous!"

"Right," grinned Garabed. "No travel time. Think it over, friend; I have to talk to the captain."

Pardales did not notice his departure. It is all very well to admit that coincidence can account for only so much; but when nothing else believable can account for it either...

"Captain!" called the instrument technician. Sarjuk was on the bridge, and there were others present, so he automatically avoided familiarity. "I think you'll be having another request from Physics very shortly. I think I can forestall a suggestion of moving the ship, if you'll let me take a tender out for a while."

Sarjuk frowned. "That will take fuel, and are you a good enough pilot to play around in a gravity well this deep?"

"I don't insist on driving it myself. Look, they are going to have another spell of doubting the neutrino telescope—I'll bet on that. I want to take out the tender so they can check the scope against its engine emis-sions, and kill that argument before it gets started. Isn't that worth a kilogram or two of hydrogen?"

Garabed's words were very straightforward, but his wife thought she could detect something under them. She looked at him sharply. "Is that the whole thing?" she asked.

He knew better than to lie to her. "Not entirely," he admitted, "but isn't it enough?" Their eyes locked for several seconds; the others on the bridge carefully concentrated on their own jobs for the moment. Then she nodded.

"All right. Plan to stay inside one kilogram. Sforza will drive you."

Minutes later the tender was hurtling away from the dying stars. Garabed would have climbed straight out along their orbital axis, with little regard for energy expenditure; Sforza, as a matter of habit and policy, cut out in the plane of their common orbits, slipped behind the neutron star at minimum safe distance, and let it sling them outward. Once he could see that they were safely away, Garabed made his key request.

"Will you let me have it for a few minutes? I want to change thrust patterns so Jeff and his friends can check their gear. There's no damage I can do, I take it."
"None that I can guess at," replied the ballistician. "If there's anything here to run into, I don't know about it either. Go ahead."
Garabed fingered the thrust potentiometer and began changing it in a careful pattern—alternately high and low, once, once again; twice, then four times; thrice, then nine times. Again and again he went through the cycle, while Sforza watched in amusement.
"It's lucky this is a warp drive. You'd have broken our straps with straight reaction. If I were a mystery fan, I'd say you were playing spy sending code."
"It does suggest that a little, doesn't it?" acknowledged Garabed.

It was not the code which first caught Feroxtant's attention; the drive units of the Manzara had bothered him enough, and the addition of the tender's power plant gave him at least as much of a shock as Garabed had just given Pardales. The notion that anything could travel less rapidly than neutrinos was as hard for him to swallow as the demon hypothesis. Since neither his senses nor his imagination could provide data on the direc-tion of the human machines, he could not be sure of their slow motion; but his attention, and Wattimlan's, were firmly focused on them while the two explorers continued their casting for the white dwarf—or rather, for its slowly developing neutronium core, still so small that their thousands of random shots had not struck it.
Garabed's code—the squares of the first three numbers—started the two on an argument which, by human standards, would have gone on for hours. Eventually, more to prove Wattimlan wrong than because he expected any results, Feroxtant performed a multiple reversal in open space which produced neutrino bursts closer to the neutron star; and he delib-erately produced a set of four, followed by sixteen. He then brought the Longline back to her mooring in the neutron star's surface film, and sent a frantic report to his home star. By the time Garabed's five-twenty-five reply was spreading into space, the word had come that scientists were on the way. Not even the most conservative of beings could doubt that a series of numbers followed by their squares could originate in anything but a living mind—perhaps acting indirectly, but still a mind. It might have been some sort of recording—but it had responded when Feroxtant extended the number series. It responded with neutrinos, which had reached Feroxtant's ship very quickly, in spite of the fact that they trav-eled with the ultimate slowness, so the mind—or minds—must be close to the newly discovered star. The discovery of an unknown intelligent race was worth a major research project—even if no one believed that they could travel slower than neutrinos.

"Just a minute." Jeb Garabed was not a member of Policy, but he had the common right to speak up to the group. "We don't dare go back to the Solar system at this stage, and you know it. We are sure now that these faster-than-light things have a different time rate than we do; if we disappeared from here for twenty years, without any more attempt to talk with them, they might be extinct—or at least, their culture might be, and they could have forgotten us. I know it takes fuel to talk to them, and we're running low—though we could certainly build smaller fusion gen-

erators if all that's needed is neutrino output. The only sensible thing to do is get over to planet Four, which we're sure has water, set up a deute-rium plant so we have no power problems, and just settle down to do research—which is what we're here for anyway. We can stay right here, and keep sensibly and happily busy, and live very good lives for nineteen years until the next expedition gets here."

"If they come," interjected his wife.

"You know they'll come." Garabed spoke directly to her, but did not forget the others. "They can't do anything else. The whole argument against interstellar flight has been the time it would take, as long as we thought the speed of light was a limit. Now we know it isn't, and however short-sighted human beings may be, they don't live happily with the certainty that someone can do something they can't. Remember your history! What made it impossible to keep the nuclear bomb a secret? Leaky spy shield-ing? Balloon juice! The only important piece of information was given away free by the original builders—the fact that it could be done! There'll be shiploads of people here from the Solar system as soon as they can make it. They'll start so fast after our waves get there that we'll probably have to rescue the first few—they'll have set out without proper prepara-tion. Sirius A-IV may not be really habitable, but there'll be a human colony here in twenty years—or sooner, if my old idea is right. That ra-dio message of ours may be all that's needed, after all. Anyone want to bet whether it's ten years or twenty before they get here?"

"You and your everlasting betting!" growled Sforza. "You know per-fectly well that the reason you want to settle down in a colony and work only twelve hours a day has nothing to do with getting in touch with these tachyon people."

"That," said Garabed, "is irrelevant. The main thing is that we have to do it—not just that I want to." He looked at his captain as he spoke, and even she couldn't tell whether his grin meant triumph or merely con-tentment. She nodded slowly. "We stay. Mr. Sforza, plot a minimum-fuel course to A-IV. Chemistry, check practicability of a surface base as soon as we're close enough for you to work. Mr. Garabed, report to me at the end of the watch."

Garabed nodded absently. He was not really listening. He was look-ing into the display tank, seeing with his imagination more of the details of Sirius A-IV than the sensors had yet determined. The planet might not turn out to be as Earthlike as its color suggested, and he knew perfectly well that wishful thinking was painting a lot of his mental picture—but he was ready to bet that the next decade or two would be fun.