

Larry Niven



Larry Niven - All the Bridges Rusting Take a point in space. Take a specific point near the star system Alpha Centaurus, on the line linking the center of mass of that system with Sol. Follow it as it moves toward Sol system at lightspeed. We presume a particle in this point. Men who deal in the physics of teleportation would speak of it as a "transition particle." But think of it

as a kind of super-neutrino. Clearly it must have a rest mass of zero, like a neutrino. Like a neutrino, it must be fearfully difficult to find or stop. Despite several decades in which teleportation has been in common use, nobody has ever directly demonstrated the existence of a "transition particle." It must be taken on faith. Its internal structure would be fearfully complex in terms of energy states. Its relativistic mass would be twelve thousand two hundred tons. One more property can be postulated. Its location in space is uncertain: a probability density, thousands of miles across as it passes Proxima Centauri, and spreading. The mass of the tiny red dwarf does not bend its path significantly. As it approaches the solar system the particle may be found anywhere within a vaguely bounded wave front several hundred thousand miles across. This vagueness of position is part of what makes teleportation work. One's aim need not be so accurate. Near Pluto the particle changes state. Its relativistic mass converts to rest mass within the receiver cage of a drop ship. Its structure is still fearfully complex for an elementary particle: a twelve-thousand-two-hundred-ton spacecraft, loaded with instruments, its hull windowless and very smoothly contoured. Its presence here is the only evidence that a transition particle ever existed. Within the control cabin, the pilot's finger is still on the TRANSMIT button. Karin Sagan was short and stocky. Her hands were large; her feet were small and prone to foot trouble. Her face was square and cheerful, her eyes were bright and direct, and her voice was deep for a woman's. She had been thirty-six years old when Phoenix left the transmitter at Pluto. She was three months older now, though nine years had passed on Earth. She had seen a trace of the elapsed years as Phoenix left the Pluto drop ship. The shuttlecraft that had come to meet them was of a new design, and its attitude tets showed the color of fusion flame. She had wondered how they made fusion motors that small. She saw more changes now, among the gathered newstapers. Some of the women wore microskirts whose hems were cut at angles. A few of the men wore assymetrical shirts-the left sleeve long, the right sleeve missing entirely. She asked to see one man's left cuff, her attention caught by the glowing red design. Sure enough, it was a functional wristwatch; but the material was soft as cloth. "It's a Bulova Dali," the man said. He was letting his amusement show. "New to you? Things change in nine years, Doctor." "I thought they would," she, said lightly. "That's part of the fun." But she remembered the shock of relief when the heat struck. She had pushed the TRANSMIT button a light-month out from Alpha Centaurus B. An instant later sweat was running from every pore of her body. There had been no guarantee. The probability density that physicists called a transition particle could have gone past the drop ship and out into the universe at large, beyond rescue forever. Or ... a lot could happen in nine years. The station might have been wrecked or abandoned. But the heat meant that they had made it. Phoenix had lost potential energy entering Sol's gravitational field and had gained it back in heat. The cabin felt like a furnace, but it was their body temperature that had jumped from 98.6° to 102°, all in an instant. "How was the trip?" The young man asked. Karin Sagan returned to the present. "Good, but it's good to be back. Are we recording?" "No. When the press conference starts you'll know it. That's the law. Shall we get it going?" "Fine." She smiled around the room. It was good to see strange faces again. Three months with three other people in a closed environment...it was enough. The young man led her to a dais. Cameras swiveled to face her, and the conference started. Q: How was the trip? "Good. Successful, I should say. We learned everything we wanted to know about the Centaurus systems. In addition, we learned that our systems work. The drop-ship method is feasible. We reached the nearest stars, and we came back, with no ill effects." Q: What about the Centaurus planets? Are they habitable? "No." It hurt to say that. She saw the disappointment around her. Q: Neither of them checked out? "That's right. There are six known planets circling Alpha Centaurus B. We may have missed a couple that were too small or too far out. We had to do all our looking from a light-month away. We had good hopes for B-2 and B-3-- remember, we knew they were there before we

set out-but B-2 turns out to be a Venus-type with too much atmosphere, and B-3's got a reducing atmosphere, something like Earth's atmosphere three billion years ago." Q: The colonists aren't going to like that, are they? "I don't expect they will. We messaged the drop ship Lazarus II to turn off its JumpShift unit for a year. That means that the colony ships won't convert to rest mass when they reach the receiver. They'll be reflected back to the solar system. They should appear in the Pluto, drop ship about a month from now." Q: Having lost nine years. "That's right. Just like me and the rest of the crew of Phoenix. The colonists left the Pluto transmitter two months after we did." Q: What are the chances of terraforming B-3 someday? Karin was glad to drop the subject of the colony ships. Somehow she felt that she had failed those first potential colonists of another star system. She said, 'Pretty good, someday. I'm just talking off the top of my head, you understand. I imagine it would take thousands of years, and would involve seeding the atmosphere with tailored bacteria and waiting for them to turn methane and ammonia and hydrocarbons into air. At the moment it'll pay us better to go on looking for worlds around other stars. It's so bloody easy, with these interstellar drop ships." Them was nodding among the newstapers. They knew about drop ships, and they had been briefed. In principle there was no difference between Lazarus II and the drop ships circling every planet and most of the interesting moons and asteroids in the solar system. A drop ship need not be moving at the same velocity as its cargo. The Phoenix, at rest with respect to Sol and the Centaurus suns, had emerged from Lazarus II's receiver cage at a third of lightspeed. "The point is that you can use a drop ship more than once," Karin went on. "By now Lazarus II is one and a third light-years past Centaurus. We burned most of its fuel to get the ship up to speed, but there's still a maneuver reserve. Its next target is an orange-yellow dwarf, Epsilon Indi. Lazarus II will be there in about twenty eight years. Then maybe we'll send another colony group." Q: Doctor Sagan, you were as far from Sol as anyone in history has ever gotten. What was it like out there? Karen giggled. 'We were as far from any star as anyone's ever gotten. It was a long night. Maybe it was getting to us. We had a bad moment when we thought there was an alien ship coming up behind us." She sobered, for that moment of relief had cost six people dearly. "It turned out to be Lazarus. I'm afraid that's more bad news. Lazarus should have been decelerating. It wasn't. We're afraid something's happened to their drive." That caused some commotion. It developed that many of the newstapers had never heard of the first Lazarus. Karin started to explain...and that turned out to be a mistake. The first interstellar spacecraft had been launched in 2004, thirty-one years ago. Lazarus had been ten years in the building, but far more than ten years of labor had gone into her. Her life-support systems ran in a clear line of development back to the first capsules to orbit Earth. The first fusion-electric power plants had much in common with her main drive, and her hydrogen fuel tanks were the result of several decades of trial and error. Liquid hydrogen is tricky stuff. Centuries of medicine had produced suspended-animation treatments that allowed Lazarus to carry six crew members with life-support supplies sufficient for two. The ship was lovely-at least, her re-entry system was lovely, a swing-wing streamlined exploration vehicle as big as any hypersonic passenger plane. Fully assembled, she looked like a haphazard collection of junk. But she was loved. There had been displacement booths in 2004: the network of passenger teleportation had already replaced other forms of transportation over most of the world. The cargo ships that lifted Lazarus' components into orbit had been fueled in flight by JumpShift units in the tanks. It was a pity that Lazarus could not, take advantage of such a method. But conservation of momentum held. Fuel droplets entering Lazarus's tanks at a seventh of lightspeed would tear them apart. So Lazarus had left Earth at the end of the Corliss accelerator, an improbably tall tower standing up from a flat asteroid a mile across. The fuel tanks-most of Lazarus's mass-had been launched first. Then the ship itself, with enough maneuvering reserve to run them down. Lazarus had left

Earth like a string of toy balloons, and telescopes had watched as she assembled herself in deep space. She had not been launched into the unknown. The telescopes of Ceres Base had found planets orbiting Alpha Centaurus B. Two of these might be habitable. Failing that, there might at least be seas from which hydrogen could be extracted for a return voyage. "The first drop ship was launched six years later," Karin told them. "We should have waited. I was five when they launched Lazarus, but I've been told that everyone thought that teleportation couldn't possibly be used for space exploration because of velocity differences. If we'd waited we could have put a drop ship receiver cage on Lazarus and taken out the life-support system. As it was, we didn't launch Lazarus II until-" She stopped to add up dates. "Seventeen years ago. 2018." Q: Weren't you expecting Lazarus to pass you? "Not so soon. In fact, we had this timed pretty well. If everything had gone right, the crew of Lazarus I would have found a string of colony ships pouring out of Lazarus II as it fell across the system. They could have joined up to explore the system, and later joined the colony if that was feasible, or come home on the colony return ship if it wasn't." Q: As it is, they're in deep shit. "I'm afraid so. Can you really say that on teevee?" There were chuckles at her naiveté. Q: What went wrong? Any idea? "They gave us a full report with their distress signal. There was some trouble with the plasma pinch effect, and no parts to do a full repair. They tried running it anyway-they didn't have much choice, after all. The plasma stream went wrong and blew away part of the stem. After that there wasn't anything they could do but set up their distress signal and go back into suspended animation." Q What are your plans for rescue? Karin made her second error. "I don't know. We just got back two days ago, and we've spent that time traveling. It's easy enough to pump energy into an incoming transition particle to compensate for a jump in potential energy, but the only drop ship we've got that can absorb potential energy is at Mercury. We couldn't just flick in from Pluto; we'd have been broiled. We had to flick in to Earth orbit by way of Mercury, then go down in a shuttlecraft." She closed her eyes to think. "It'll be difficult. By now Lazarus must be half a light-year beyond Alpha Centaurus, and Lazarus II more than twice that far. We probably can't use Lazarus II in a rescue attempt." Q: Couldn't you drop a receiver cage from Lazarus II, then wait until Lazarus has almost caught up with it? She smiled indulgently. At least they were asking intelligent questions. "Won't work. Lazarus II must have changed course already for Epsilon Indi. Whatever happens is likely to take a long time." Teevee was mostly news these days. The entertainment programs had been largely taken over by cassettes, which could be sold devoid of advertisements, and which could be aimed at more selective audiences. And newspapers had died out; but headlines had not. The announcers were saying things like Centaurus planets devoid of life ... colony ships to return ... failure of Lazarus scout ship engines... rescue attempts to begin ... details in a moment, but first this word... Jerryberry Jansen of CBA smiled into the cameras. The warmth he felt for his unseen audience was genuine: he regarded himself as a combination of entertainer and teacher, and his approximately twelve million students were the measure of his success. "The Centaurus expedition was by no means a disaster," he told them. "For one thing, the colony fleet which cost you, the taxpayer, about six hundred and sixty million new dollars nine years ago-can be re-used as is, once the UN Space Authority finds a habitable world. Probably the colonists themselves will not want to wait that long. A new group may have to be retrained. "As for the interstellar drop ship concept, it works. This has been the first real test, and it went without a hitch. Probably the next use of drop ships will not be a colony expedition at all, but an attempt to rescue the crew of Lazarus. The ship was sending its distress signal. There is good reason to think that the crew is still alive. "Doctor Karin Sagan has pointed out that any rescue attempt will take decades. This is reasonable, in that the distances to be covered are to be measured in light-years. But today's ships are considerably better than Lazarus could ever have been." "You idiot," said Robin Whyte,

PhD. He twisted a knob with angry force, and the teevee screen went blank. A few minutes later he made two phone calls. Karin was sightseeing on Earth. The UN Space Authority had had a new credit card waiting for her, a courtesy she appreciated. Otherwise she would have had to carry a sackful of chocolate dollars for the slots. Her hands quickly fell into the old routine: insert the card, dial, pull it out, and the displacement booth would send her somewhere else. It was characteristic of Karin that she had not been calling old friends. The impulse was there, and the worn black phone book with its string of nine-year-old names and numbers. But the people she had known must have changed. She was reluctant to face them. There had been a vindictive impulse to drop in on her ex-husband. Here I am at thirty-six, and you-Stupid. Ron knew where she had been for nine years, so why bug the man? She had cocktails at Mr. A's in San Diego, lunch at Scandia in Los Angeles, and dessert and coffee at Ondine in Sausalito. The sight of the Golden Gate Bridge sparked her to flick in at various booths for various views of all the bridges in the Bay area. For Karin, as for most of humanity, Earth was represented by a small section of the planet. There had been changes. She got too close to the Bay Bridge and was horrified at the rust. It had never occurred to her that the San Francisco citizenry might let the bridges decay. Something could be done with them: line them with shops a la London Bridge, or landscape them over for a park, or run drag races. . . They would make horribly obtrusive corpses. They would ruin the scenery. Still, that had happened before... Some things had not changed. She walked for an hour in King's Free Park, the landscaped section of what had been the San Diego Freeway. The trees had grown a little taller, but the crowds were the same, always different yet always the same. The shops and crowds in the Santa Monica Mall hadn't changed ... except that the city had filled in the space between the curbs, where people had had to step down into the empty streets. She did some shopping in the Mall. To a saleslady in Magnin's West she said, "Dress me." That turned out to be a considerable project, and it cost. When she left, her new clothes felt odd on her, but they seemed to blend better with the crowds around her. She did a lot of flicking around without ever leaving the booth-the ubiquitous booth that seemed to be one instead of millions, that seemed to move with her as she explored. It took her longer to find the right numbers than it did to dial. But she flicked clown the length of Wilshire Boulevard in jumps of four blocks, from the coast to central Los Angeles, by simply dialing four digits higher each time. She stopped off at the Country Art Museum in Fresno and was intrigued by giant sculptures in plastic foam. She was wandering through these shapes, just feeling them, not yet trying to decide whether she liked them, when her wrist phone rang. She could have taken the call then and there, but she went to a wall phone in the lobby. Karin preferred to see who she was talking to. She recognized him at once. Robin Whyte was a round old man, his face pink and soft and cherubic, his scalp bare but for a fringe of white hair over his ears and a single tuft at the top of his head. Karin was surprised to see him now. He was the last living member of the team that had first demonstrated teleportation in 1992. He had been president of JumpShift, Inc., for several decades, but he had retired just after the launching of Lazarus II. "Karin Sagan?" His frown gave him an almost petulant look. "My congratulations on your safe return." "Thank you." Karin's smile was sunny. An impulse made her add, "Congratulations to you, too." He did not respond in kind. "I need to see you. Urgently. Can you come immediately?" "Concerning what?" "Concerning the interview you gave this morning." But the interview had gone so well. What could be bothering the man? She said, "All tight." The number he gave her had a New York prefix. It was evening in New York City. Whyte's apartment was the penthouse floor of a half-empty building. The city itself had lost half its population during the past forty years, and it showed in the walls of dark windows visible through Whyte's picture windows. "The thing I want to emphasize," said Whyte, "is that I didn't call you here as a representative of JumpShift. I'm retired. But I've got a problem, and pretty quick I'm going to have to take it up with someone in JumpShift. I still own

enough JumpShift stock to want to protect it." His guests made no comment on his disclaimer. They watched as he finished making their drinks and served them. Karin Sagan was curious and a bit truculent at being summoned so abruptly. Jerryberry Jansen had known Whyte too long for that. He was only curious. "You've put JumpShift in a sticky situation," said Whyte. "Both of you, and the rest of the news media too. Karin, Jerryberry, how do you feel about the space program?" "I'm for it. You know that," said Jerryberry. "I'm in it," said Karin. "I feel no strong urge to quit and get an honest job. Is this a preliminary to firing me?" "No. I do want to know why you went into so much detail on Lazarus." "They asked me. If someone had asked me to keep my mouth shut on the subject I might have. Might not." "We can't rescue Lazarus," said Whyte. There was an uncomfortable silence. Perhaps it was in both their minds, but it was Jerryberry who said it. "Can't or won't?" "How long have you known me?" Jerryberry stopped to count. "Fourteen years, on and off. Look, I'm not saying you'd leave a six-man crew in the lurch if it were feasible to rescue them. But is it economically infeasible? Is that it?" "No. It's impossible." Whyte glared at Karin, who glared back. "You should have figured it out, even if he didn't." He transferred the glare to Jansen. "About that rescue mission you proposed on nationwide teevee. Did you have any details worked out?" Jerryberry sipped at his Screwdriver. "I'd think it would be obvious. Send a rescue ship. Our ships are infinitely better than anything they had in 2004." "They're moving at a seventh of lightspeed. What kind of ship could get up the velocity to catch Lazarus and still get back?" "A drop ship, of course! A drop ship burns all its fuel getting up to speed. Lazarus II is doing a third of lightspeed, and it cost about a quarter of what Lazarus cost-it's so much simpler. You send a drop ship. When it passes Lazarus you drop a rescue ship through." "Uh huh. And how fast is the rescue ship moving?" "...Oh." Lazarus would flash past the rescue ship at a seventh of lightspeed. "We've got better ships than the best they could do in 2004. Sure we do. But, censored dammit, they don't travel the same way!" "Well, yes, but there's got to be-" "You're cheating a little," Karin said. "A rescue ship of the Lazarus type could get up to speed and still have the fuel to get home. Meanwhile you send a drop ship to intercept Lazarus. The rescue ship drops through the receiver cage, picks them up-hmm." "It would have to be self-teleporting, wouldn't it? Like Phoenix." "Yah. Hmmm." "If you put a transmitter hull around something the size of Lazarus, fuel tanks included, you'd pretty near double the weight. It couldn't get up to speed and then decelerate afterward. You'd need more fuel, more weight, a bigger hull. Maybe it couldn't be done at all, but sure as hell we're talking about something a lot bigger than Lazarus." There had never been another ship as big as Lazarus. Karin said, "Yah. You'd ditch a lot of fuel tanks getting up to speed, but still-hmmm. Fuel to get home. Dammit, Whyte, I left Earth nine years ago. You've had nine years to improve your space industry! What have you done?" "We've got lots better drop ships," Whyte said quietly. Then, "Don't you understand? We're improving our ships, but not in the direction of a bigger and better Lazarus." Silence. "Then there's the drop ship itself. We've never built a receiver cage big enough to take another Lazarus. Phoenix isn't big; it doesn't have to go anywhere. I won't swear it's impossible to build a drop ship that size, but I wouldn't doubt it either. It doesn't matter. We can't build the rescue ship. We don't even have the technology to build Lazarus again! It's gone, junked when we started building drop ships!" "Like those damn big bridges in San Francisco Bay," whispered Karin. "Sorry, gentlemen. I hadn't thought it out." Jerryberry said, "You've still got the Corliss accelerator. And we still use reaction drives." "Sure. For interplanetary speeds. And drop ships." Jerryberry drained his Screwdriver in three swallows. With his mind's eye he saw six coffins, deathly still, and six human beings frozen inside. Three men, three women. Someone must have thought that a scout crew might just decide to colonize the Centurus system without waiting. Fat chance of that now. Three men, three women, frozen, falling through interplanetary space forever. They couldn't possibly have been

expecting rescue. Could they? "So we don't get them back," he said. "What are we holding, a wake?" "They knew the risks they were taking," said Whyte. "They knew, and they fought for the chance. We had over a thousand volunteers at the start of training, and that was after the preliminary weeding-out. Jerryberry, I asked you before about how you felt about the space program." "I told you. In fact-" He stopped. "Publicity." "Right." "I thought I was doing you some good. Public support for the space program isn't heavy right now, and frankly, Doctor Sagan, your report didn't help much." She flared up. "What were we supposed to do, build a planet?" "Failure of the first expedition. No planets. A whole colony fleet on its way home without ever having so much as seen Alpha Centaurus! I know, it's safer for them, and better not to waste the time, but dammit!" Jerryberry was on his feet and pacing. There was an odd glow in his eyes, an intensity that could communicate even through a teevee screen. "I tried to emphasize the good points. Now-I damn near promised the world a rescue mission, didn't I?" "Just about. You weren't the only one." He paced. "I'm pretty good at explaining. I have to be. I'll just have to tell them-no, let's do it right. Robin, will you go on teevee?" Whyte looked startled. "Tell you what," said Jerryberry. "Don't just tell them why we can't rescue Lazarus. Show them. Set up a cost breakdown, in dollars and years. We all know-" "I tell you it isn't cost. It-" "We both know that it could be done, if we gave up the rest of the space industry and concentrated solely on rescuing Lazarus for enough years. R and D, rebuilding old hardware-" "Censored dammit! The research alone on a drop ship that size-" Whyte cocked his head as if listening to an inner voice. "That is one way to put it. It would cost us everything we've built up in the past thirty years. Jerryberry, is this really the way to get it across?" "I don't know. It's one way. Set up a cost estimate you can defend. It won't end with just one broadcast. You'll be challenged, whatever you say. Can you be ready in two days?" Karin gave a short, barking laugh. Whyte smiled indulgently. "Are you out of your mind? A valid cost estimate would take months, assuming I can get anyone interested in doing a cost estimate of something nobody really wants built." Jerryberry paced. "Suppose we do a cost estimate. CBA, I mean. Then you wouldn't have anything to defend. It wouldn't be very accurate, but I'm sure we could get within a factor of two." "Better give yourselves a week. I'll give you the names of some people at JumpShift; you can go to them for details. Meanwhile I'll have them issue a press release saying we're not planning a rescue mission for Lazarus at this time." JumpShift Experimental Laboratory, Building One, was a tremendous pressurized Quonset hut. On most of his previous visits Jerryberry had found it nearly empty; too many of JumpShift's projects are secret. Once he had come here with a camera team, and on that occasion the polished, smoothly curved hull of Phoenix had nearly filled the building. He had never known exactly where the laboratory was. Its summers and winters matched the Northern Hemisphere, and the sun beyond the windows now stood near noon, which put it on Rocky Mountain time. Gemini Jones was JumpShift's senior research physicist, an improbably tall and slender black woman made even taller by a head of hair like a great white dandelion. "We get this free," she said, rapping the schematic diagrams spread across the table. "The Corliss accelerator. Robin wants to build another of these. We don't have the money yet. Anyway, we can use it for the initial boost." On a flattish disk of asteroidal rock a mile across, engineers of the past generation had raised a tower of metal rings. The electromagnetic cannon had been firing ships from Earth orbit since A.D. 2004. Today it was used more than ever, to accelerate the self-transmitting ships partway toward the orbital velocities of Mars, Jupiter, Mercury. Jerryberry studied the tower of rings, wider than any ship ever built. "Is it wide enough for what we've got in mind?" "I think so. We'd fire the rescue ship in sections, then put it together in space. But we'd still have to put a transmitter hull around it." "Okay, we've got the accelerator, and we'd use standard tanks. Beyond that-" "Now hold up," said Gem. "There's an easier way to do this. I thought of it this morning. If we do

it my way we won't need any research at all." "Oh? You interest me strangely." "See, we've still got this problem of building a ship big enough to make the rescue and then decelerate, and a drop cage big enough to take it. But we already know we can build self-transmitting hulls the size of Phoenix. What we can do is put the deceleration fuel in Phoenix hulls. We wouldn't need an unreasonably big drop cage that way." Jerryberry whistled. He knew what Phoenix had cost. Putting a rescue ship together would be like building a fleet of Phoenixes. And yet- "Robin was wrong. We could do that. We've got the hardware." "That's exactly right I figure maybe twenty Phoenix hulls full of slurried hydrogen, plus a Phoenix-type ship for the rescue, plus a couple more hulls to hold the drive and the rigging to string it all together. You'd have to assemble it after launch and accelerate it to a seventh of lightspeed, using a couple hundred standard tanks. Then take it apart, stow the rigging, and send everything through a Lazarus II drop ship one hull at a time." "We could do it. Does Robin know about this?" "Who's had time to call him? I only just thought of this an hour ago. I've been working out the math." "We could do it," Jerryberry said, his eyes afire. "We could' bring 'em back. All it would take would be time and money." She smiled indulgently down at him; at least she always seemed to, though her eyes were level with his own. "Don't get too involved. Who's going to pay for all this? You might talk your bemused public into it if you were extending man's dominion across the stars. But to rescue six failures?" "You don't really think of them that way." "Nope. But somebody's going to say it." "I don't know. Maybe we should go for it. Those self-trammitting hulls could be turned into ships afterward." "No. You'd drop them on the way back." Jerryberry ran a hand through his hair. "I guess you're right. Thanks, Gem. You've done a lot of work for something that isn't ever going to get built." "Good practice. Keeps my brain in shape," said Gem. He was at home, doggedly working out a time-and-costs schedule for the rescue of Lazarus, when Karin Sagan called. She said, "I've been wondering if you need me for the broadcast." "Good idea," said Jerryberry, "if you're willing. We could tape an interview any time you're ready. I'll ask you to describe the circumstances under which you found Lazarus, and use that to introduce the topic." "Good." Jerryberry was tired and depressed. It took him a moment to see that Karin was too. "What's wrong?" "Oh...a lot of things. We aren't just going to forget about those six astronauts, are we?" His laugh was brittle. "I think it unlikely. They aren't decently dead. They're in limbo, falling across our sky forever." "That's what I mean. We could wake them any time in the next thousand years, if we could get to them." "That's my problem. We can." "What?" "But it'd cost the Moon, so to speak. Come on over, Doctor. I'll show you." Lazarus cost
N\$ 2,000,000,000 Lazarus II cost N\$ 500,000,000 Phoenix
cost N\$ 110,000,000 Colony (six ships adequately
equipped) cost N\$ 660,000,000 Support systems in solar system
N\$ 250,000,000 TOTAL COLONY PACKAGE, IN CLUDING COLONY AND PHOENIX AND
SUPPORT SYSTEMS IN SOLAR SYSTEM: N\$ 1,520,000,000 Twenty-two
self-transmitting hulls cost N\$ 1,540,000,000 (One
self-transmitting hull costs N\$70,000,000) Interstellar drop ship costs
N\$ 900,000,000 Phoenix-type rescue ship costs N\$
110,000,000 R & D costs nothing Support systems in solar
system N\$ 250,000,000 TOTAL COST OF RESCUE N\$
2,000,000,000 "...which is just comfortably more than it cost to build
Lazarus in the first place, and a lot more than it cost us to not colonize
Alpha Centaurus. It wouldn't be impossible to go get them. Just inconvenient
and expensive." "In spades," said Karin. "You'd tie up the Corliss
accelerator for a week solid. The whole trip would take about thirty four
years starting from the launching of the drop ship." "And if it could be done
now it could always be done; we couldn't ever forget it until we'd done it.
And it would get more difficult every year because Lazarus would be getting
further away." "It'll nag us the rest of our lives." Karin leaned back in
Jerryberry's guest chair. His apartment was not big: three rooms, with doors

knocked between them, in a complex that had been a motel on the Pacific Coast Highway thirty years ago. "There's another thing. What are we really doing if we do it Whyte's way? We're talking the public into not backing a space project. Suppose they got the habit? I don't know about you-" "I just plain like rocket ships," said Jerryberry. "Okay. Can you really talk the public into this?" "No. Lazarus didn't even cost this much, and Lazarus almost didn't get built, they tell me. And Lazarus failed, and so did the colony project. So: no. But I'm not sure I can bring myself to talk them out of it." "Jansen, just how bad is public support for the Space Authority?" "Oh . . . it isn't even that, exactly. The public is getting unhappy about JumpShift itself." "What? 'What for?" "CBA runs a continuous string of public opinion polls. The displacement booths did genuinely bring some unique problems with them-" "They solved some too. Maybe you don't remember." Jerryberry smiled. "I'm not old enough. Neither are you. Slums, traffic jams, plane crashes-nobody's that old except Robin Whyte, and if you try to tell him the booths brought problems of their own, he thinks you're an ungrateful bastard. But they did. You know they did." "Like flash crowds?" "Sure. Any time anything interesting happens anywhere, some newstaper is going to report it. Then people flick in to see it from all over the United States. If it gets big enough you get people flicking in just to see the crowd, plus pickpockets, looters, cops, more newstapers, anyone looking for publicity. "Then there's the drug problem. There's no way to stop smuggling. You can pick a point in the South Pacific with the same longitude and opposite latitude as any given point in the USA and most of Canada, and teleport from there without worrying about the Earth's rotational velocity. All it takes is two booths. You can't stop the drugs from coming in. I remember one narcotics cop telling me to think of it as evolution in action." "God." "Oh, and the ecologists don't like the booths. They make wilderness areas too available. And the cops have their problems. A man used to be off the hook if he could prove he was somewhere else when a crime happened. These days you have to suspect anyone, anywhere. The real killer gets lost in the crowd. "But the real beef is something else. There are people you have to get along with, right?" "Not me," said Karin. "Well, you're unusual. Everyone in the world lives next door to his boss, his mother-in-law, the girl he's trying to drop, the guy he's fighting for a promotion. You can't move away from anyone. It bugs people." "What can they do? Give up the booths?" "No. There aren't any more cars or planes or railroads. But they can give up space." Karin thought about that. Presently she gave her considered opinion. "Idiots." "'No. They're just like all of us: they want something for nothing. Have you ever solved a problem without finding another problem just behind it?" "Sure. My husband . . . well, no, I was pretty lonely after we split up. But I didn't sit down and cry about it. When someone hands me a problem, I solve it. Jansen, we're going at this wrong. I feel it." "Okay, so we're doing it wrong. What's the right way?" "I don't know. We've got better ships than anyone dreamed of in 2004. That's fact." "Define ship." "Ship! Vehicle! Never mind, I see the point. Don't push it." So he didn't ask her what a 747 circling the sinking Titanic could have done to help, or whether a Greyhound bus could have crossed the continent in 1849. He said, "We know how to rescue Lazarus. What's the big decision? We do or we don't." "Well?" "I don't know. We watch the opinion polls. I think . . . I think we'll wind up neutral. Present the project as best we can finagle it up. Tell 'em the easiest way to do it, tell 'em what it'll cost, and leave it at that." The opinion polls were a sophisticated way to read mass minds. Over the years sampling techniques had improved enormously, raising their accuracy and lowering their cost. Public thinking generally came in blocks: JumpShift's news release provoked no immediate waves. But one block of thinking began to surface. A significant segment of humanity was old enough to have watched teevee coverage of the launching of Lazarus. A smaller, still significant segment had helped to pay for it with their taxes. It had been the most expensive space project of all time. Lazarus had been loved. Nothing but love could have pushed the taxpayer into paying such a price. Even

those who had fought the program thirty-one years ago now remembered Lazarus with love. The reaction came mainly from older men and women, but it was worldwide. Save Lazarus. Likewise there were those dedicated to saving the ecology from the intrusion of Man. For them the battle was never-ending. True, industrial wastes were no longer dumped into the air and water the worst of these were flicked through a drop ship in close orbit around Venus, to disappear into the atmosphere of that otherwise useless world. But the ultimate garbage-maker was himself the most dangerous of threats. Hardly a wilderness was left on Earth that was not being settled by men with JumpShift booths. They would have fought JumpShift on any level. JumpShift proposed to leave three men and three women falling across the sky forever. To hell with their profit margin: save Lazarus. There were groups who would vote against anything done in space. The returns from space exploration had been great, admittedly, but they all derived from satellites in close orbit around Earth: observatories, weather satellites, teevee transmitters, solar power plants. These were dirt cheap these days, and their utility had surely been obvious to any moron since Neanderthal times. But what use were the worlds of other stars? Even the worlds of the solar system had given no benefit to Man, except for Venus, which made an excellent garbage dump. Better to spend the money on Earth. Abandon Lazarus. But most of the public voted a straight Insufficient Data. And of course they were right. Robin Whyte was nervous. He was trying not to show it, but he paced too much and he smiled too much and he kept clasping his hands behind his back. "Sit down, for Christ's sake," said Jerryberry. "Relax. They can't throw tomatoes through their teevee screens." Whyte laughed. "We're working on that in the research division. Are you almost ready?" "An hour to broadcast. I've already done the interview with Doctor Sagan. It's on tape." "Let's see what you've got." What CBA had for this broadcast was a fully detailed rescue project, complete with artist's conceptions. Jerryberry spread the paintings along a wall. "Using your artists, whom we hired for a week with JumpShift's kind permission. Aren't they beautiful? We also have a definite price tag. Two billion three hundred million new dollars." Whyte's laugh was still shaky. "That's right on the borderline. Barely feasible." He was looking at an artist's conception of the launching of the rescue mission: a stream of spherical fuel tanks and larger, shark-shaped Phoenix hulls pouring up through the ringed tower of the Corliss accelerator. More components rested on flat rock at the launch end. "So Gem thought of it first. I must be getting old." "You don't expect to think of everything, do you? You once told me that your secretary thought of the fresh-water tower gimmick during a drunken office party." "True, too. I paid her salary for thirty years, hoping she'd do it again, but she never did ... Do you think they'll buy it?" "No." "I guess not." Whyte seemed to shake himself. "Well, maybe we'll use it some other time. It's a useful technique, shipping fuel in Phoenix hulls. We'll probably need it to explore, say, Barnard's Star, which is moving pretty censored fast with respect to Sol." "We don't have to tell them they can't do it. Just tell 'em the price tag and let them make up their own minds." "Listen, I had a hand in launching Lazarus. The launching boosters were fueled by JumpShift units." "I know." Whyte, prowling restlessly, was back in front of the launching scene. "I always thought they should have drilled right through the asteroid. Leave the Corliss accelerator open at both ends." Activity in the sound studio had diminished. Against a white wall men had placed a small table and two chairs, and a battery of teevee cameras and lights were aiming their muzzles into the scene. Jerryberry touched Whyte's arm. "Let's go sit down over there." Whyte might freeze up if confronted by the cameras too suddenly. Give him a chance to get used to it. Whyte didn't move. His head was cocked to one side, and his lips moved silently. "What's the matter?" Whyte made a shushing motion. Jerryberry waited. Presently Whyte looked up. "You'll have to scrap this. How much time have we got?" "But- An hour. Less. What do you mean, scrap it?" Whyte smiled. "I just thought of something. Get me to a telephone, will you? Has Gem still got the schematics of the Corliss accelerator?" An

hour to broadcast time, and Jerryberry began to shake. "Robin, are we going to have a broadcast or not?" Whyte patted him on the arm. "Count on it." Gen Jones's big white-on-blue schematic had been thumbtacked to the white wall over the table and chairs. Below it, Jerryberry Jansen leaned back, seemingly relaxed, watching Whyte move about with a piece of chalk. A thumbtacked blueprint and a piece of chalk. It was slipshod by professional standards. Robin Whyte had not appeared on teevee in a couple of decades. He made professional mistakes: he turned his back on the audience, he covered what he was drawing with the chalk. But he didn't look nervous. He grinned into the cameras as if he could see old friends out there. "The heart of it is the Corliss accelerator," he said, and with the chalk he drew an arc underneath the tower's launch cradle, through the rock itself. "We excavate here, carve out a space to get the room. Then-" He drew it in. A JumpShift drop ship receiver cage. "The rescue ship is self-transmitting, of course. As it leaves the accelerator it transmits back to the launch end. What we have then is an electromagnetic cannon of infinite length. We spin it on its axis so it doesn't get out of alignment. We give the ship an acceleration of one gee for a bit less than two months to boost it to the velocity of Lazarus, then we flick it out to the drop ship. "This turns out to be a relatively cheap operation," Whyte said. "We could put some extra couches in Phoenix and use that. We could even use the accelerator to boost the drop ship up to speed, but that would take four months, and we'd have to do it now. It would mean building another Corliss accelerator, but-", Whyte grinned into the cameras, "we should have done that anyway, years ago. There's enough traffic to justify it. "Return voyage is just as simple. After they pick up the crew of Lazarus, they flick to the Pluto drop ship, which is big enough to catch them, then to the Mercury drop ship to lose their potential energy, then back to the Corliss accelerator drop cage. We use the accelerator for another two months to slow it down. The cost of an interstellar drop ship is half a billion new dollars. A new Corliss accelerator would cost us about the same, and we can use it commercially. Total price is half of what Lazarus cost." Whyte put down the chalk and sat. Jerryberry said, "When can you go ahead with this, Doctor?" "JumpShift will submit a time-and-costs schedule to the UN Space Authority. I expect it'll go to the world vote." "Thank you, Doctor Whyte, for . . ." It was a formula. When the cameras were off Jerryberry sagged in his chair. "Now I can say it. Boy, are you out of practice." "What do you mean? Didn't I get it across?" "I think you did. I hope so. You smiled a lot too much. On camera that makes you look self-satisfied." "I know, you told me before," said Whyte. "I couldn't help it. I just felt so good." The End

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