

Star Light

By Hal Clement

Second of Four Parts

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When two vastly different peoples, stemming from widely different philosophies, try to cooperate in exploring a planet with conditions unknown to either one-problems of what's "fair" can be almost as dangerous as a wierdo world!

Dhrawn is the star/planet companion of Lalande 21185, a red dwarf half a dozen light-years from the solar system. It has been bothering the cosmologists and planetologists. In terms of mass, it is on the borderline between typical Jovian planet and extreme dwarf star; in terms of composition, it seems to be as nearly destitute of light elements as Earth, or Venus. It is generating internal energy; its sun could not warm it above a few tens of degrees Kelvin, but there are local regions as hot as 1200K. The atmosphere contains free oxygen, although the oceans (?) contain not only water but ammonia-a chemically unstable situation leading to the presumption that Dhrawn has active life.

Direct exploration is impossible for human beings because of the forty-Earth surface gravity. It has been decided to hire natives of Mesklin, the variable-G planet of 61 Cygni A, to do the work. BARLENNAN, the Mesklinite sea captain who had worked with non-Mesklinite researchers on his own world fifty Earth years before, jumps at the offer-with unmentioned idea of his own in connection with the deal. A Mesklin-conditioned settlement is established on Dhrawn, and a dozen exploring vehicles to be manned by the Mesklinites are designed and built.

One of these, the Kwembly, is commanded by DONDRAGMER, Barlennan's first officer in the old days when were carrying alien instruments around their own planet. One of the Kwembly's helmsmen is a young sailor named BEETCHERMARLF.

The surface work is being monitored from a station manned principally by human beings, in synchronous orbit six million miles from the planet. Its chief administrator is ALAN AUCION, who has a basic, though fairly well hidden, distrust of non-human beings. His staff includes ELISE RICH HOFFMAN-"EASY"-who functions as interpreter with the Mesklinites, and general spreader of oil on troubled waters; and her husband IB HOFFMAN. Their seventeen-year-old son BENJ is also at the station, serving an apprenticeship in the aerology laboratory. Like his mother, Benj is as excellent natural linguist and can talk directly with the Mesklinites.

A distrust has been developing between human and Mesklinite leaders, partly because of Aucion's attitude and partly from Barlennan's underhanded activities. Even though field communication between the settlement on Dhrawn and the land-cruisers has to be relayed through the human station, Barlennan has been working to establish another settlement independent of, and unknown to, the human beings. Toward this end he has arranged the "loss" of the landcruiser Esket and the disappearance of her crew. The Esket is being used as the nucleus of the new settlement, at which mining and other activities are leading toward local self-sufficiency are being carried on.

Now, however, genuine troubles are developing. The complex phase relationships between water and ammonia have been outwitting the human aerobiologists and their computers, and Dondragmer's

Kwembly has been washed down a river formed by a sudden melting "snow" field, grounded, damaged, partly repaired and finally frozen in. Beetchermarlf and a companion have been trapped under the cruiser by the ice; another officer, KERVENSER, has disappeared in one of the tiny scout helicopters carried by the Kwembly.

Part 2

VI

Impatience and irritation were noticeable in the Planning Laboratory, but so far no tempers had actually been lost. Ib Hoffman, back less than two hours from a month long errand to Earth and Droom, had said practically nothing except to ask for information. Easy sitting beside him, had said nothing at all so far; but she could see that something would have to be done shortly to turn the conversation into constructive channels. Changing the Project's basic policy might be a good idea-it often was-but for the people at this end of the table to spend time blaming each other for the present one was futile. It was even less useful than the scientists' bickering at the other end. They were still wondering why a lake should freeze when the temperature had been going up. Such a question might conceivably have a useful answer, of course, especially if it led to a reasonable course of useful action; but it seemed to her like a question for the laboratory rather than a conference room.

If her husband didn't take a hand in the other discussion soon, Easy would have to do something herself, she decided.

"I've heard all about that side of it before, and I still don't buy it!" snapped Mersereau. "Up to a point it's good common sense, but I think we're way past that point. I realize that the more complex the equipment, the fewer people you need to run it; but you also need more specialized apparatus and specially trained personnel to maintain and repair it. If the land-cruisers had been fully automated as some people wanted, we could have got along with a hundred Mesklinites on Dhrawn instead of a couple of thousand at first; but the machines would be out by now because we couldn't possibly have landed all the backup equipment and personnel they'd need. There aren't enough technically trained Mesklinites in existence yet, for one thing. I agreed with that, Barlennan agreed with it; it was common sense, as I said.

"But you, and for some reason Barlennan, went even further. He was against including helicopters. I know there were some characters in the Project who assumed you could never teach a Mesklinite to fly, and maybe it was racial acrophobia that was motivating Barlennan; but at least he was able to realize that without air scouting the land-cruisers wouldn't dare travel more than a few miles an hour over new ground, and it would take roughly forever to cover even Low Alpha at that rate. We did talk him over on that basis.

"But there was a lot of stuff we'd have been glad to provide, which would have been useful and have paid its way, which he talked us out of using. No weapons; I agree they'd probably have been futile. But no short-range radio equipment? No intercoms in the Settlement? It's dithering nonsense for Dondragmer to have to call us, six million miles away, and ask us to relay his reports to Barlennan at the Settlement. It's usually not critical, since Barl couldn't help him physically and the time delay doesn't mean much, but it's silly at the best of times. It is critical now, though, when Don's first mate has disappeared, presumably within a hundred miles of the Kwembly and possibly less than ten, and there's no way in the galaxy to get in touch with him either from here or from the cruiser. Why was Barl against radios,

Alan? And why are you?"

"The same reason you've just given," Aucoin answered with just a trace of acerbity. "The maintenance problem."

"You're dithering. There isn't any maintenance problem on a simple voice or even a vision, communicator. There were four of them, as I understand it, being carried around on Mesklin with Barlennan's first outside-sponsored trip fifty years of so ago, and not one of them gave the slightest trouble. There are sixty of Dhrawn right now, with not a blip of a problem from any of them in the year and a half they've been there, Barlennan must know that, and you certainly do. Furthermore, why do we relay what messages they do send by voice? We could do it automatically instead of having a batch of interpreters hashing things up... sorry, Easy... and you can't tell me there'd be a maintenance problem for a relay unit in this station. Who's trying to kid whom?"

Easy stirred; this was perilously close to feud material. Her husband, however, sensed the motion and touched her arm in a gesture she understood. He would take care of it. However, he let Aucoin make his own answer.

"Nobody's trying to kid anyone. I don't mean equipment maintenance, and I admit it was a poor choice of words. I should have said morale. The Mesklinites are a competent and highly self-reliant species, at least the representatives we've seen the most of. They sail over thousands of miles of ocean on those ridiculous groups of rafts, completely out of touch with home and help for months at a time, just as human beings did a few centuries ago. It was our opinion that making communication too easy would tend to undermine that self-confidence. I admit that this is not certain; Mesklinites are not human, though their minds resemble ours in many ways, and there's one major factor whose effect we can't evaluate and may never be able to. We don't know their normal life spans, though they are clearly a good deal longer than ours. Still, Barlennan agreed with us about the radio question-as you said, it was he who brought it up-and he has never complained about the communication difficulty."

"To us." Ib cut in at this point. Aucoin looked surprised, then puzzled.

"Yes, Alan, that's what I said. He hasn't complained to us. What he thinks about it privately none of us knows."

"But why shouldn't he complain, or even ask for radios, if he has come to feel that he should have them?" The planner was not completely sidetracked, but Easy noted with approval that the defensiveness was gone from his tone.

"I don't know why," Hoffman admitted. "I just remember what I've learned about our first dealings with Barlennan a few decades ago. He was a highly cooperative, practically worshipped agent for the mysterious aliens of Earth and Panesh and Dromm, and those other mysterious places in the sky during most of the Gravity mission, doing our work for us just as we asked; and then at the end he suddenly held us up for a blackmail jolt which five human beings, seven Paneshka, and nine Drommians out of every ten still think we should never have paid. You know as well as I do that teaching advanced technology, or even basic science, to a culture which isn't yet into its mechanical revolution makes the sociologists see red because they feel that every race should have the right to go through its own kind of growing pains, makes the xenophobes scream because we're arming the wicked aliens against us, gets the historians down on us because we're burying priceless data, and annoys the administrative types because they're afraid we're setting up problems they haven't learned to cope with yet."

"It's the xenophobes who are the big problem," Mersereau snapped. "The nuts who take it for granted

that every nonhuman species would be an enemy if it had the technical capacity. That's why we give the Mesklinites only equipment they can't possibly duplicate themselves, like the fusion units-things which couldn't be taken apart and studied in details without five stages of intermediate equipment like gamma-ray diffraction cameras, which the Mesklinites don't have either. Alan's argument sounds good, but it's just an excuse. You know as well as I do that you could train a Mesklinite to fly a reasonably part-automated shuttle in two months if the controls were modified for his nippers, and that there isn't a scientist in this station who wouldn't give three quarts of his blood to have loads of physical specimens and instruments of his own improvising bouncing between here and Dhrawn's surface."

"That's not entirely right, though there are elements of truth in it," Hoffman returned calmly. "I agree with your personal feeling about xenophobes, but it's a fact that with energy so cheap a decently designed interstellar freighter can pay off its construction cost in four or five years, an interstellar war isn't the flat impossibility it was once assumed to be. Also, you know why this station has such big rooms, uncomfortable as some of us find them, and inefficient as they certainly are for some purposes. The average Drommian, if there were a room here he couldn't get into, would assume that it contained something deliberately kept secret from him. They have no concept of privacy, and by our standards most of them are seriously paranoid. If we had failed to share technology with them when contact was first made, we'd have created a planetful of highly competent xenophobes much more dangerous than anything even Earth has produced. I don't know that Mesklinites would react the same way, but I still think that starting the College on Mesklin was the smartest piece of policy since they admitted the first Drommian to MIT."

"And the Mesklinites had to blackmail us into doing that."

"Embarrassingly true," admitted Hoffman. "But that's all side issue. The current point is that we just don't know what Barlennan really thinks, or plans. We can, though, be perfectly sure that he didn't agree to take two thousand of his people including himself onto an almost completely unknown world, certain to be highly dangerous even for a species like his, without having a very good reason indeed."

"We gave him a good reason," pointed out Aucoin.

"Yes. We tried to imitate him in the art of blackmail. We agreed to keep the College going on Mesklin over the objections of many of our own people, if he would do the Dhrawn job for us. There was no suggestion on either side of material payment, though the Mesklinites are perfectly aware of the relation between knowledge and material wealth. I'm quite willing to admit that Barlennan is an idealist, but I'm not sure how much chauvinism there is in his idealism, or how far either one will carry him.

"All this is aside from the point, too. We shouldn't be worrying about the choice of equipment for the Mesklinites. They agreed with it, whatever their private reservations may have been. We are still in a position to help them with information on physical facts they don't know, and which their scientists can hardly be expected to work out for themselves; we have high-speed computation; and right now we have one extremely expensive exploring machine frozen in on a lake on Dhrawn, together with about a hundred living beings who may be personnel to some of us but are personalities to the rest. If we want to change policy and insist on Barlennan's accepting a shuttleful of new equipment, that's fine; but it's not the present problem, Boyd. I don't know what we could send down right now that would be slightest help to Dondragmer."

"I suppose you're right, Ib, but I can't help thinking about Kervenser, and how much better it would have been if-

"He could have carried one of the communicators, remember. Dondragmer had three besides the one on

his bridge, all of them portable. The decision to take them, or not, was strictly, on Kervenser himself and his captain. Let's leave out the if's for now and try to do some constructive planning."

Mersereau subsided, a little irritated at Ib for the latter's choice of words but with his resentment of Aucoin's attitude diverted for the moment. The planner took over the conversational lead again, looking down the table toward the point where the scientists had now fallen silent.

"All right, Dr. McDevitt. Has any agreement been reached as to what probably happened?"

"Not completely, but there is an idea worth checking further. As you know the Kwembly's observers had been reporting nearly constant temperature since the fog cleared-no radiational cooling, if anything a very slight warming trend. Barometric readings have been rising very slowly at that place ever since the machine was stranded; readings before that time are meaningless because of the uncertain change in elevation. The temperatures have been well below freezing points of either pure water below the freezing points of either pure water or pure ammonia, but rather above that of the ammonia monohydrate-water eutectic. We're wondering whether the initial thaw might now have been caused by the ammonia's fog reacting with the water snow on which the Kwembly was riding-Dondragmer was afraid of that possibility; and if so, the present freeze might be due to evaporation of ammonia from the eutectic. We'd need humidity readings."

"What?" cut in Hoffman and Aucoin almost together.

"Sorry. Office slang. Partial pressure of the ammonia relative to the saturation value-equivalent of relative humidity for water. We'd need readings on that to confirm, or kill, the notion, and the Mesklinites haven't been taking them."

"Could they?"

"I'm sure we could work out a technique with them. I don't know how long it would take. Water vapor wouldn't interfere; its equilibrium pressure is four or five powers of ten smaller than ammonia's in that temperature range. The job shouldn't be too hard."

"I realize this is an hypotheses rather than a full-blown theory, but is it good enough to base action on?"

"That would depend on the action." Aucoin made a gesture of impatience, and the atmospheric physicist continued hastily. "That is, I wouldn't risk an all-or-nothing breakout effort on it alone, but I'd be willing to try anything which didn't commit the Kwembly to exhausting some critical supply she carries, or put her in obvious danger."

The planner nodded. "All right," he said. "Would you rather stay here and supply us with more ideas, or would it be more effective to talk this one over with the Mesklinites?"

McDevitt pursed his lips and thought for a moment.

"We've been talking with them pretty frequently, but I suppose there's more good likely to come from that direction than-" he stooped and Easy and her husband concealed smiles. Aucoin appeared not to notice the near faux pas, and nodded.

"All right. Go on back to Communications, and good luck. Let us know if either you, or they, come up with anything else that seems worth trying."

The four scientists agreed to this, and left together. The ten remaining conference members were silent for

some minutes before Aucoin voiced what they were all thinking—all but one.

"Let's face it," he said slowly. "The real argument is going to come when we relay this report to Barlennan."

Ib Hoffman jerked upright. "You haven't yet?" he snapped.

"Only the fact of the original stranding, which Easy told them, and occasional progress reports on the repair work. Nothing yet about the freeze-up."

"Why not?" Easy could read danger signals in her husband's voice, and wondered whether she wanted to smooth this one over or not. Aucoin looked surprised at the question.

"You know why as well as I do. Whether he learned about it now, or ten hours from now, or from Dondragmer when he gets back to the Settlement a year from now would make little difference. There is nothing Barlennan could do immediately to help, and the only thing he could do at all is something we'd rather he didn't."

"And that is?" interjected Easy sweetly. She had about made up her mind which line to take.

"That is, as you well know, sending one of the two land-cruisers still at the Settlement off to rescue the Kwembly, as he wanted to do for the Esket."

"And you still object to that."

"Certainly, for exactly the same reasons as before—which Barlennan, I admit, accepted that time. It's not entirely that we have other specific plans for those two cruisers, but that's part of it. Whatever you may think, Easy, I don't dismiss life as unimportant merely because it isn't human life. I do object, though, to wasting time and resources; and changing policy in the middle of an operation generally does both."

"But if you claim that Mesklinite lives mean as much to you as human ones, how can you talk about waste?"

"You're not thinking, Easy. I understand and don't really blame you, but you're ignoring the fact that the Kwembly is something like ten thousand miles airline from the Settlement, and more like thirteen thousand by the route they took. A rescue vehicle could not possibly follow that track in less than two hundred or two hundred and fifty hours. The last part of it, which the Kwembly traversed by being washed down a river, they might not be able to follow at all; the last four thousand miles across the snowfield may no longer be passable."

"We could give them directions with satellite fixes."

"We could, no doubt. The fact remains that unless Dondragmer can get himself, his crew, and his vehicle out of their present trouble, nothing Barlennan can send out for him is likely to be of the slightest help—if the Kwembly is in real and immediate danger. If she is not—if it's just a matter of being frozen in like a nineteenth century whaler—they have indefinite supplies with their closed-cycle life system and fusion converters, and we and Barlennan can plan a nice, leisurely rescue."

"Like Destigmat's Esket," retorted the woman with some bitterness. "It's been over seven months, and you squelched all rescue talk then—and ever since!"

"That was a very different situation. The Esket is still standing there, unchanged as far as her vision sets can tell us, but her crew has dropped out of sight. We haven't the faintest idea what happened to them or how, but, since they're not on board and haven't been for all this time it's impossible to believe they're still

alive. With all their abilities and physical toughness, even Mesklinites don't live on Dhrawn for seven months without a good deal more of artificial assistance than their airsuits."

Easy had no answer. On pure logic, Aucoin was perfectly right; but she had trouble accepting the idea that the situation was purely logical. Ib knew how she felt, and decided that the time had come to change course again. He shared the planner's opinion, up to a point, on basic policy; but he also knew why his wife could not possibly do that.

"The real, immediate problem, as I see it," Hoffman interjected, "is the one Don has with the men who are still outside. As I get it, two are under the ice, as far as anyone can tell; and no one seems to know whether that puddle is frozen to the bottom. In any case, judging by the work they were supposed to be doing, they're in among the _Kwembly's_ trucks somewhere. I suppose that means a straight ice-pick-and-search job. I can't guess what the chances are of an airsuited Mesklinite's living through that sort of thing. The temperature won't bother them that far below melting water-ice, but I don't know what other physiological limitations they may have.

"The other missing one is Don's first officer, who is overdue from a helicopter flight. We can't help directly, since he didn't take a communicator with him, but there is another flier available. Has Dondragmer asked us to assist while a search is made with the other machine and a vision set?"

"He hadn't up to half an hour ago," replied Mersereau.

"Then I strongly advise that we suggest it to him."

Aucoin nodded agreement, and glanced at the woman. "Your job, I'd say, Easy."

"If someone hasn't beaten me to it." She rose, pinched Ib's ear in passing, and left the room.

"Next point," Hoffman went on, "Granting that you may be right in opposing a rescue expedition from the Settlement, I think it's time Barlennan was brought up to date about the Kwembly."

"Why as for more trouble that we need?" retorted Aucoin. "I don't like to argue with anyone, especially when he doesn't really have to listen to me."

"I don't think you'll really have to. Remember, he agreed with us the other time."

"You were saying a few minutes ago that you weren't sure how sincere his agreements have been."

"I'm not, in general; but if he had been strongly against us that time he'd have done just what he wanted, and sent a crew out to help the Esket. He did, remember, on a couple of other occasions when there was a cruiser in trouble."

"That was much closer to the settlement, and we finally approved the action," retorted Aucoin.

"And you know as well as I do that we approved it because we could see that he was going to do it anyway."

"We approved it, Ib, because your wife was on Barlennan's side both times, and out-talked us. You argument, incidentally, is a point against telling him about the present situation."

"Whose side was she on during the _Esket_ argument? I still think we _should_ tell Barlennan the present situation pronto. Plain honesty aside, the longer we wait the more certain he is to find out, sooner or later, that we've been censoring expedition reports on him."

"I wouldn't call it censoring. We've never changed a thing."

"But you have delayed the relay plenty of times while you decided what he ought to know, and as I've said before I don't think that's the game as we agreed to play it with him. Pardon my reactionary sentiments, but on purely selfish grounds we'd be well advised to keep his confidence as long as possible."

Several of the others, who had listened in silence up to this point, spoke up almost at once when Hoffman expressed this sentiment. It took Aucoin several seconds to untangle their words, but it eventually became clear that the feeling of the group was with Ib. The chairman yielded gracefully; his technique did not involve standing in front of the bull.

"All right, we pass on the complete report to Barlennan as soon as we adjourn." He glanced at the winner. "That is, if Mrs. Hoffman hasn't done it already. What's the next point?"

One of the men who had done little but listen up to this point asked a question. "Forgive me if I didn't follow you too clearly a few minutes ago. Ib, you and Alan both claim that Barlennan agreed with Project policy in limiting to an absolute minimum the amount of sophisticated equipment his expedition was to use. That was my understanding also; but you, Ib, just mentioned having doubts about Barlennan's sincerity. Do any of those doubts stem from his accepting the helicopters?"

Hoffman shook his head. "No. The arguments we used for their necessity were good, and the only surprising thing to me was that Barlennan didn't see the for himself and take the equipment without argument."

But Mesklinites are acrophobic by nature. The thought of flying, to anyone from a world like that, must be just unimaginable."

Ib smiled grimly. "True. But one of the first things Barlennan did after he made his deal with the Gravity people and started learning basic science was to design, build and fly on Mesklin-in the polar zone where gravity is at its highest-a hot air balloon. Whatever is motivating Barlennan, it isn't acrophobia. I don't exactly doubt him; I'm just not sure of his thinking, if you'll forgive a rather crude quibble."

"I agree," Aucoin interjected. "And I think we're running dry. I suggest we break up for, say, six hours. Think, or go down to Comm and listen to the Mesklinites or talk with them-anything that will keep your thoughts on Dhrawn questions. You know my ideas about that."

"That's where mine have been." It was the same speaker. "I keep wondering about the _Esket_, every time one of the cruisers runs into trouble-even when the trouble is obviously natural."

"So do we all, I imagine," rejoined Aucoin.

"The more I think of it, the more I feel that her crew must have run into intelligent opposition. After all, we know there is life on Dhrawn-more than the bushes and pseudo-algae the Mesklinites have found. They wouldn't account quantitatively for that atmosphere; there must be a complete ecological complex somewhere. I'd guess in the higher-temperature regions."

"Such as Low Alpha." Hoffman completed the thought. "Yes, you don't have ammonia and free oxygen in the same environment for very long, on the time scale of a planet. I can believe the possibility of an intelligent species here; we haven't found any sign of it from space, and the Mesklinite ground parties haven't met it-unless the _Esket_ did-but seventeen billion square miles of planet make a lot of good reasons for that. The idea is plausible, and you're not the first to get it, but I don't know where it leaves

us. Barlennan thought of it, too, according to Easy, and has debated sending another cruiser to the area of the _Esket's_ loss specifically to seek and contact any intelligence that may be there; but even Barlennan is doubtful about the idea, and we certainly haven't pushed it."

"Why not?" cut in Mersereau. "If we could get in touch with natives as we did on Mesklin, the project could rally get going! We wouldn't have to depend so completely on... oh."

Aucoin smiled grimly.

"Precisely," he said. "Now you _have_ found a good reason for wondering about Barlennan's frankness. I'm not saying that he's an ice-hearted politician who would give up the lives of his men just to keep a hammerlock on the Dhrawn operation-but the _Esket's_ crew was pretty certainly already beyond rescue when he finally agreed not to send the _Kalliff_ in the same direction."

"There is another point, thought," Hoffman said thoughtfully.

"What?"

"I'm not sure its worth mentioning, since we can't evaluate it; but the _Kwembly_ is commanded by Dondragmer, who is a long-time associate of Barlennan's and, by ordinary reasoning, should be an extremely close friend. Is there any chance that his being involved would influence Barl's judgement about a rescue trip-or even make him order one against his better judgement? Like you, I don't think that caterpillar is just an administrative machine. His cold-bloodedness is purely physical."

"I've wondered about that, too," the chief planner admitted. "It surprised me greatly months ago when he let Dondragmer go out at all; I had the impression that he didn't want him to take major chances. I didn't worry too much about it-certainly no one knows enough about Mesklinite psychology in general, Barlennan's in particular, to base any serious planning on. If anyone does, Ib, it's your wife, and she can't or won't, put what she understands about them into words. As you say, we can't assign weight to the friendship-influence possibility. We just add it to the list. Let me hear if there are any ideas about those crewmen who are presumably frozen under the _Kwembly_, and then we really must break up."

"A fusion converter would keep a good, large heating coil going, and resistors aren't very complex equipment," Mersereau pointed out. "Heaters aren't a very unreasonable piece of equipment on Dhrawn, either. If only-"

"But we didn't," interrupted Aucoin.

"But we did, if you'd let me finish. There are enough converters with the _Kwembly_ to life her off the planet if their energy could be applied to such a job. There must be some metal aboard which can be jury-rigged into resistors, or arcs. Whether the Mesklinites could operate such gadgets I don't know-there must be a limit even to their temperature tolerance-but we might at least ask if they've thought of such a thing."

"You're wrong on one point. I know there is very little metal either in their equipment or their supplies on those land-cruisers, and I'd be most startled if Mesklinite rope turned out to be a conductor. I'm no chemist but anything bonded as firmly as that stuff must have its electrons pretty well latched in place. By all means check with Dondragmer, though. Easy is presumably still in Comm; she can help you if there are no linguistically broad Mesklinites on duty at the other end. We're adjourned."

Mersereau nodded, already heading toward the door, and the meeting broke up. Aucoin followed Mersereau through one door; most of the others went other ways. Only Hoffman remained seated.

His eyes were focused nowhere in particular, and there was a frown on his face which made him look a good deal older than his forty years.

He liked Barlennan. He liked Dondragmer even better, as did his wife. He had no grounds for the slightest complaint about the progress of the Dhrawn research, considering the policies he himself had helped set up, nor did the rest of the planners. There was no concrete reason whatever, except his trick of half a century before, to distrust the Mesklinite commander-the suggested motive for keeping hypothetical natives Dhrawn out of the picture could hardly be given weight. No, certainly not. After all, the problems of shifting to such beings, even if they existed, as agents for the Dhrawn research project would cause even more delay, as Barlennan must surely realize.

The occasional cases of disagreement between explorers and planners were minor-it was the sort of thing which would happen ten times as often with, say, Drommians; not reason to suppose the Mesklinites were already going off on independent plans of their own.

Still-Barlennan had not wanted helicopters, though he had finally been persuaded to accept them. He was the same Barlennan who had built and flown in a hot-air balloon as his first exercise in applied science.

He had not sent relief to the _Esket_, necessary as all the giant land-cruisers were to the Project and regardless of the fact that a hundred or so of his people were aboard.

He had refused local-range radios, useful as they would obviously be. The argument against them was the sort that a firm-minded teacher might use in a classroom situation, but this was real life-and deadly earnest.

He had, fifty years before, not only jumped at the change to acquire alien knowledge; he had maneuvered deliberately to force his non-Mesklinite sponsors to give it to him.

Ib Hoffman could not rid himself of the notion that Barlennan was up to something underhanded-again.

He wondered what Easy thought about it.

VII

Beetchermarlf and Takoorch, like the rest of the _Kwembly's_ crew, were taken by surprise when the lake froze. Neither had had any occasion to look around for several hours, since the maze of fine cords on which their attention was focused was considerably more complicated than, say, the rigging of a clipper ship. Both knew exactly what to do, and there was little need for conversation. Even if their eyes had wandered from the job, there was little else to see; they were under the immense hull of their vehicle, roofed by the pneumatic "mattress" which distributed its weight among the trucks, walled partly by the trucks themselves and partly by the blackness of Dhrawn's night which swallowed everything beyond the range of their little portable lights.

So they had not seen, any more than the sailors inside the _Kwembly_, the tiny ice crystals which began to form at the surface of the lake and settle to the bottom, glinting and sparkling in the _Kwembly's_ floods like lead chloride setting in a cooling solution.

They had completed the reconnecting on the port row, Number 1, all the way from bow to stern, and were working their way forward on Row 2 when they discovered that they were trapped.

Takoorch's battery light was fading a trifle, and he took it over to the nearest fusion converter, which

happened to be on a Row 1 truck, for recharging. He was quite startled to find that he couldn't get at or even see the converter, and after a few seconds of fumbling and looking he called Beetchermarlf. It took nearly ten minutes for them to establish that they were completely enclosed by an opaque white wall, impenetrable even to their strength, which had welded all the outer trucks together and filled off the spaces between them from mattress above to cobbles below-nearly three feet of height, on the average. Inside the wall they were still free to move about.

Their tools were edged rather than pointed, and too small to make appreciable way against the ice, though it took fully an hour of scraping to convince them both of that. Neither was greatly concerned as yet; obviously the ice was immobilizing the *Kwembly*, and the rest of the crew would have to dig down to them in the interest of freeing the vehicle if not for the prime purpose of rescue. Of course their supply of life hydrogen was limited, but this meant less to them than a corresponding oxygen shortage would have to a human being. They had at least ten or twelve hours yet of full activity, and when the hydrogen partial pressure dropped below a certain value they would simply lose consciousness; their body chemistry would slow down more and more, but fifty and perhaps a hundred hours would pass before anything irreversible occurred. One of the reasons for Mesklinite durability, though human biologists had had no chance to find it out, was the remarkable simplicity of their biochemistry.

The two were calm enough, in fact, to go back to their assigned work; and they were almost to the front of Row 2 before another discovery was made. This one did perturb them.

The ice was creeping inward. It was not coming rapidly, but it was coming, and as it happened, neither of them knew any better than Ib Hoffman what being frozen into a block of the stuff was likely to do to them. Neither had the slightest desire to learn.

At least there was still light. Not all the power units were on outside trucks, and Takoorch had been able to recharge his battery. This made it possible to make another, very careful search of the boundaries of their prison. Beetchermarlf was hoping to find unfrozen space either near the bottom or, preferably, near the top of the walls around them. He did not know whether the freezing would have started from the top or the bottom of the pond. HE was not familiar, as any human being would have been, with the fact that ice floats on liquid water. This was just as well, since it would have led him to an erroneous conclusion in this instance. The crystals had indeed formed at the top, but they had been denser than the surrounding liquid and had settled, only to redissolve as they reached levels richer in ammonia. This pseudo-convection effect had had the result of robbing the lake rather uniformly of ammonia until it had reached a composition able to freeze almost simultaneously throughout. As a result, the search turned up no open spaces.

For some time the two lay between the two of the trucks, thinking and occasionally checking to see how far the freezing had progressed. They had no time-measuring equipment, and, therefore, no basis for estimating the speed of the process; Takoorch formed the opinion that it was slowing down, but Beetchermarlf was less sure.

Occasionally an idea would strike one of them, but the other usually managed to find a flaw in it.

"We can move some of these stones-the smaller ones," Takoorch remarked at one point. "Why can't we dig our way under the ice?"

"Where to?" countered his companion. "The nearest edge of the lake is forty or fifty cables away, or was the last I knew. We couldn't begin to dig that far in these rocks before our air gave out, even if the freezing didn't include the water between the rocks underneath. Coming up before the edge wouldn't get us anywhere."

Takoorch admitted the justice of this with an acquiescent gesture. and silence fell while the ice grew a fraction of an inch nearer.

Beetchermarlf had the next constructive thought.

"These lights must give off some heat, even if we can't feel it through the suits," he suddenly exclaimed.

"Why shouldn't they the ice from forming near them and even let us melt our way to the outside?"

"Worth trying," was Takoorch's laconic answer.

Together they approached the frosty barrier. Beetchermarlf built a small cairn of stones leaning against the ice, and set the light, adjusted for full brightness, at its top. They both crowded close, their front ends part way up the heap of pebbles, and watched the space between the lamp and the ice.

"Come to think of it," Takoorch remarked as they waited, "our bodies give off heat, don't they? Shouldn't our just being here help melt this stuff?"

"I suppose so." Beetchermarlf was dubious. "We'd better watch to make sure that it doesn't freeze at each side and around behind us while we're waiting here."

"What will that matter? If it does, it means that we and the light together are enough to fight the freezing, and we should be able to melt our way out."

"That's true. Watch, though, so we'll know if that's happening." Takoorch gestured agreement, and they fell silent again.

The older helmsman, however, was not the type to endure in silence indefinitely, and presently he gave utterance to another idea.

"I know our knives didn't make much impression on the ice, but shouldn't it help if we did some scraping right here where it's nearest the light?" He unclipped one of the blades they carried for general use and reached toward the ice.

"Wait a minute!" exclaimed Beetchermarlf. "If you start working there, how are we ever going to know whether the heat is having any effect?"

"If my knife gets us anywhere, who cares whether it's the heat or the work?" retorted Takoorch. Beetchermarlf found no good answer ready, so he subsided, muttering something about "controlled experiments" while the other Mesklinite went to work with his tiny blade.

As it happened, his interference did not spoil the experiment, though it may have delayed slightly the appearance of observable results. Body heat, lamp heat, and knife all together proved unequal to the job; the ice continued to gain. They had to remove the lamps from the cairn at last, and watch the latter slowly become enveloped in the crystalline wall.

"It won't be long now," Takoorch remarked as he swung the lights around them. "Only two of the power units are free, now. Should we charge up the lights again before they go, or isn't it worth the trouble?"

"We might as well," answered Beetchermarlf. "It seems a pity that that's the only use we can get out of all that power-four of those things can push the `_Kwembly_` around on level ground, and I once heard a human being say that one could do it if it could get traction. That certainly could chip ice for us if we could find a way to apply it."

"We can take the power box out easily enough, but what we'd do afterward beats me. The units put out electric current as once choice, but I don't see how we could shock the ice away. The mechanical torque you can get from them works only on the motor shafts."

"We'd be more likely to shock ourselves away if we used the current. I don't know very much about electricity-it was mostly plain mechanics I got in the little time I was at College-but I know enough of it can kill. Think of something else."

Takoorch endeavored to comply. Like his young companion, he had had only a short period of exposure to alien knowledge; both had volunteered for the Dhrawn project in preference to further classwork. Their knowledge of general physics might have compared fairly well with that of Benj Hoffman when he was ten or twelve years old. Neither was really comfortable in thinking about matters for which no easily visualized model could be furnished.

They were not, however, lacking in the ability to think abstractly. Both had heard of heat as representing the lowest common denominator of energy, even if they didn't picture it as random particle motion.

It was Beetchermarlf who first thought of another effect of electricity.

"Tak! Remember the explanations we got about not putting too much power into the trucks until the cruiser got moving? The humans said it was possible to snap the treads or damage the motors, if we tried to accelerate too fast."

"That's right. Quarter power is the limit below a hundred cables per hour."

"Well, we have the power controls here where we can get at them, and those motors certainly aren't going to turn. Why not just turn on the power on this truck and let the motor get as hot as it wants to?"

"What makes you think it will get hot? You don't know what makes those motors go any more than I do. They didn't say it would make them hot, just that it was bad for them."

"I know, but what else could it be. You know that any sort of energy that isn't used up some other way turns into heat."

"That doesn't sound quite right, somehow," returned the older sailor. "Still, I guess anything is worth trying now. They didn't say anything about the motor's wrecking the rest of the ship, too; and if it ruins us-well, we won't be much worse off."

Beetchermarlf paused; the thought that he might be endangering the Kwembly hadn't crossed his mind. The more he thought of it, the less he felt justified in taking the chance. He looked at the relatively tiny power unit nestling between the treads of the nearby truck, and wondered whether such a minute thing could really be a danger to the huge bulk above them. Then he remembered the vastly greater size of the machine which had brought him and his fellows to Dhrawn, and realized that the sort of power which could hurl such immense masses through the sky was not to be handled casually. He would never be afraid to use such engines, since he had been given a chance to become familiar with their normal and proper handling; but deliberately misusing one of them was a different story.

"You're right," he admitted somewhat inaccurately-Takoorch had been, after all, willing to take the chance. "We'll have to work it differently. Look, if the tracks are free to turn, then we can't damage the motor or the power box; and just stirring up water will warm it."

"You think so? I remember hearing something like that, but if I can't break up this ice with my own strength it's hard to see how simply stirring water is going to do it. Besides, the trucks aren't free; they're

on the bottom with the _Kwembly's_ weight on them."

"Right. You wanted to dig. Start moving rocks; that ice is getting close."

Beetchermarlf set the example and began prying the rounded cobbles from the edges of the treads. It was a hard job even for Mesklinite muscles. Smooth as they were, the stones were tightly packed; and when one was moved, there was not too much room in which to put it. The two labored furiously to clear a ditch around the truck, and were frightened at the time it took.

When the ditch was deep enough they tried to pry stones from under the treads, and this was even more discouraging.

The _Kwembly_ had a mass of about two hundred tons. On Dhrawn, this meant a weight of sixteen million pounds to distribute among the fifty-six remaining trucks, and the mattress did a good job of distributing. Three hundred thousand pounds, even if it is a rather short three hundred thousand, is rather too much even for a Mesklinite-whose weight at even Mesklin's pole is little over three hundred. It is a great deal even for some eight square feet of caterpillar tread; if Dhrawn's gravity had not done an equally impressive job of packing its surface materials, the _Kwembly_ and her sister vehicles would probably have sunk to their mattresses before travelling a yard.

In other words, the rocks under the tread were held quite firmly. Nothing the two sailors could do would move one of them at all. There was nothing to use as a lever; their ample supplies of spare rope were useless without pulleys; their unaided muscles were laughably inadequate-a situation still less familiar to Mesklinites than to races whose mechanical revolution lay a few centuries in the past.

The approaching ice, however, was a stimulus to thought. It could also have been a stimulus to panic, but neither of the sailors was prone to that form of disintegration. Again, it was Beetchermarlf who led.

"Tak, get out from under. We can move those pebbles. Get forward; they're going to go the other way." The youngster was climbing the truck as he spoke, and Takoorch grasped the idea at once. He vanished beyond the next-forward truck without a word. Beetchermarlf stretched out along the main body of the drive unit, between the treads. In this foot-wide space, beneath and in front of him, was the recess which held the power converter. This was a rectangular object about the same size as the communicators, with ring-tipped control rods projecting from its surface and guide loops equipped with tiny pulleys at the edges. Lines for the remote handling from the bridge were threaded through some of the guides and attached to the rings, but the helmsman ignored them. He could see little, since the lights were still on the bottom several feet away and the top of the truck was in shadow, but he did not need sight. Even clad in an airsuit he could handle these levers by touch.

Carefully he eased the master reactor control to the "operate" position, and then even more gingerly started the motors forward. They responded properly; the treads on either side of him moved forward, and a clattering of small, hard objects against each other became audible for a moment. Then this ceased, and the treads began to race. Beetchermarlf instantly cut off the power, and crawled off the truck to see what had happened.

The plan had worked, just as a computer program with a logic error works-there is an answer forthcoming, but not the one desired. As the helmsman had planned, the treads had scuffed the rocks under them backward; but he had forgotten the effect of the pneumatic mattress above. The truck had settled under its own weight and the downward thrust of the gas pressure until the chassis between the treads had met the bottom. Looking up, Beetchermarlf could see the bulge in the mattress where the entire drive unit had been let down some four inches.

Takoorch appeared from his shelter and looked the situation over, but said nothing. There was nothing useful to say.

Neither of them could guess how much more give there was to the mattress, and how much further the truck would have to be let down before it would really hang free, though, of course, they knew the details of the _Kwembly's_ construction. The mattress was not a single gas bag but was divided into thirty separate cells, having two trucks in tandem attached to each. The helmsman knew the details of the attachment, of course-both had just spent many hours repairing the assemblies-but even the recent display of the _Kwembly's_ underside with the weight off nearly all the trucks left them very doubtful about how far any one of them could extend by itself.

"Well, back to the stone lugging," remarked Takoorch as he worked his nippers under a pebble. Maybe these have been jarred loose now; but it's going to be awkward, getting at them only from the ends."

"There isn't enough time for the job. The ice is still growing toward us, and we might have to get the treads a whole body-length deeper before they'd run free. Leave the trucks alone, Tak. We'll have to try something else."

"All I ask is to know what."

Beetchermarlf showed him. Taking a light with him this time, he climbed once more to the top of the truck. Takoorch followed, mystified. The younger sailor reared up against the shaft which formed the swiveling support of the truck, and attacked the mattress with his knife.

"But you can't hurt the ship!" Takoorch objected.

"We can fix it later. I don't like it any better than you, and I'd gladly let the air out by the regular bleeder valve if we could reach it; but we can't, if we don't get the load off this truck very soon we won't do it at all." He continued slashing as he spoke.

It was little easier than moving the stones. The mattress fabric was extremely thick and tough; to support the _Kwembly_ it had to hold in a pressure more than a hundred pounds per square inch. One of the nuisances of the long trips was the need to pump the cells up manually, or to bleed off the excess pressure, when the height of the ground they were traversing changed more than a few feet. At the moment the mattress was a little flat, since no pumping had been done after the run down the river, but the inner pressure was, of course, that much higher.

Again and again Beetchermarlf sliced at the same point on the taut-stretched surface. Each time the blade went just a little deeper. Takoorch, convinced at last of the necessity, joined him; the second blade's path crossed that of the first, the two flashing alternately in a rhythm almost too fast for a human eye to follow-a human witness, had one been possible, would have expected them to sever each other's nippers at any moment.

Even so, it took many minutes to get through. The first warning of success was a fine stream of bubbles which spread in all directions up the slope of the bulging gas cell. A few more slashes and then cross-shaped hole with its inch long arms was gushing Dhrawnian air in a flood of bubbles that made the work invisible. The prisoners ceased their efforts.

Slowly but visibly the stretched fabric was collapsing. The bubbles fled more slowly across its surface, gathering at the high point near the wall of ice. For a few moments Beetchermarlf thought the fabric would go entirely flat, but the weight of the suspended truck prevented that. The center of the cell-or at least, the point at which the truck was attached; neither of them knew just where the cell boundaries

were-was straining downward, but it was now pull instead of push.

"I'll started the engine again and see what happens," said Beetchermarlf. "Get forward again for a minute." Takoorch obeyed. The younger helmsman deliberately wedged a number of pebbles under the front ends of the treads, climbed the truck once more and settled between them. He had kept the light with him this time, not to help him but to make it easier to tell how and whether the unit moved. He looked at the point of attachment a few inches above him as he started the engine once more.

The pebbles had provided some traction; the fabric wrinkled and the swivel tilted slightly as the truck strained forward. An upper socket, inaccessible inside the cell, into which the shaft telescoped prevented the tilt from exceeding a few degrees-the trucks, of course, could not be allowed to touch each other-but the strain could be seen. AS the motion reached its limit the tracks continued moving, but this time they did not race free. Sound and tactile vibrations both indicated that they were slipping on pebbles, and after a few seconds the feel of swirling, eddying water became perceptible against Beetchermarlf's airsuit. He started to climb down from the truck, and was nearly swept under one of the treads as he shifted grips; he barely stopped the motor in time with a hasty snatch at the control. He needed several seconds to regain his composure after that; even his resilient physique could hardly have survived being worked through the space between the treads and rocks. At the very least, his airsuit would have been ruined.

Then he took time to trace very carefully the control cords leading from the reactor to the upper guides along the bottom of the mattress, following them by eye to the point above the next truck forward where he could reach them. A few seconds later he was on top of the other truck, starting the motor up again from a safe distance and mentally kicking himself for not having done it that way from the beginning.

Takoorch reappeared beside him and remarked, "Well, we'll soon know whether stirring water up does any warming."

"It will," replied Beetchermarlf. "Besides, the treads are rubbing against the stones on the bottom instead of kicking them out of the way this time. Whether or not you believe that stirring makes heat, you certainly know friction does. Watch the ice, or tell me if the neighborhood is getting too hot. I'm at the lowest power setting but that's still a lot of energy."

Takoorch rather pessimistically went over to a point where the cairn should be visible if it were ever freed of ice, and settled himself to wait. The currents weren't too bad here, though he could feel them tugging at his not-too-well ballasted body. He anchored himself to a couple of medium sized rocks and stopped worrying about being washed under the treads.

He did not really see how merely stirring water up could heat anything, but Beetchermarlf's point about friction was comforting. Also, while he would not have admitted it in so many words, he tended to give more weight to the younger sailor's opinion than his own, and he fully expected to see the ice yielding very shortly.

He was not disappointed; within five minutes he suspected that more of the stony bottom was visible between him and the barrier. In ten he was sure, and a hoot of glee apprised Beetchermarlf of the fact. The latter took the risk of leaving the control lines untended to come to see for himself, and agreed. The ice was retreating. Immediately he began to plan.

"All right, Tak. Let's get the other units going as fast as they melt free and we can get at their controls. We should be able to melt the Kwembly loose from this thing, besides getting ourselves out from under."

Takoorch asked a question.

"Are you going to puncture the cells under all the powered units? That will let the air out of a third of the mattress."

Beetchermarlf was taken slightly aback.

"I'd forgotten that. No-well, we could patch them all-but-no, that's not so good. Let's see. When we get another power unit clear we can mount it on the other truck that's on this cell we've drained already; that will give us twice as much heat. After that I don't know. We could see about digging under the others-no, that didn't work so well-I don't know. Well we can set one more driver going. Maybe that will be enough."

"We can hope," said Takoorch dubiously. The youngster's uncertainty had rather disappointed him, and he wasn't too impressed with the toned-down substitute for a plan; but he had nothing better himself to offer. "What do I do first?" he asked.

"I'd better go back and stand by those ropes, though I suppose everything's safe enough," replied Beetchermarlf indirectly. "Why don't you keep checking around the edges of the ice, and get hold of another converter as soon as one is unfrozen? We can put it into that truck"-he indicated the other one attached to the deflated cell-"and start it up as soon as possible. All right?"

Takoorch gestured agreement and started the round of the ice barrier. Beetchermarlf returned to the control lines, waiting passively. Takoorch made several circuits of the boundary, watching happily as the ice retreated in all directions. He was a little bothered by the discovery that the process was slowing down as the cleared space increased, but even he was not too surprised. He made up his mind eventually which of the frozen-in power boxes would be the first to be released, and settled down near it to wait.

His attitude, like that of his companion waiting at the controls, cannot be described exactly to a human being. He was neither patient nor impatient in the human sense. He knew that waiting was unavoidable, and he was quite unaffected emotionally by the inconvenience. He was reasonably intelligent and even imaginative by both human and Mesklinite standards, but he felt no need of anything even remotely resembling daydreaming to occupy his mind during the delay. A half-conscious mental clock caused him to check the progress of the melting at reasonably frequent intervals; this is all a human being can grasp, much less describe, about what went on in his mind.

He was certainly neither asleep nor preoccupied, because he reacted promptly to a sudden loud thud and a scattering of pebbles around him. The spot where he was lying was almost directly aft of the truck which was running, and he knew instantly what must have happened.

So did Beetchermarlf, and the power unit was shut down by a tug on the control line before a man would have perceived any trouble. The two Mesklinites met, a second or two later, beside the truck which had been running.

It was in a predictable condition, Beetchermarlf had to admit to himself. Mesklinite organics are very, very tough materials, and the tread would have lasted many more months under ordinary travel wear; but deliberately rubbing against unyielding rocks under even very modest engine power was a little too much for it.

Perhaps the word "unyielding" does not quite describe the rocks; those which had been under the moving bad of fabric were visibly flattened on top by the wear of the last hour or so. Some of them, indeed, were more than half gone, and the young helmsman decided, after a careful examination, that the failure of the tread had been due less to simple wear than to a cut started by a formerly spherical pebble which had worn down to a thin slice with sharp edges. Takoorch agreed, when the evidence was pointed out to

him.

There was no question about what to do, and they did it at once. In less than five minutes the power converter had been removed from the damaged truck and installed in the one aft of it, which had also been unloaded by puncturing the pressure cell; and without worrying about the certainty of destroying another set of treads, Beetchermarlf started this one up promptly.

Takoorch was uneasy now. The reasonable optimism of an hour before had had the foundation cut from under it; he was doubtful that the second set of treads would last long enough to melt a path all the way to freedom. It occurred to him, after some minutes wrestling with the question, that concentrating the warmed water on one spot might be a good idea, and he suggested this to his companion. Beetchermarlf was annoyed with himself for not having thought of the same thing earlier, and for half an hour the two labored heaping pebbles between and around the trucks surrounding their heat source. They eventually produced a fairly solid wall confining some of the water they were heating to a region between the truck and the nearest part of the ice wall. Takoorch had the satisfaction of seeing the ice along a two-yard front toward the starboard side of the _Kwembly_ melting back almost visibly.

He was not completely happy of course. It did not seem possible to him, any more than it did to Beetchermarlf, that the treads could last very long on the second truck either; and if they went before the way out was clear, it was hard to see what else they could do toward their own salvation. A man in such a situation can sometimes sit back and hope his friends will rescue him in time-he can, in fact, carry that hope to the last moment of consciousness. Few Mesklinites are so constituted, and neither of the helmsmen was among the number. There was a Stennish word which Easy had translated as "hope," but this was one of her less successful inference from context.

Takoorch, driven by this undefinable attitude, stationed himself between the humming truck and the melting ice, hugging the bottom to keep from deflecting the warmed current of water, and tried to watch both simultaneously. Beetchermarlf remained at the control lines.

Since no digging had been done under the second truck, the friction was greater and the heating effect stronger-the control was for speed rather than power, in spite of the words the helmsman had used. Naturally but unfortunately, the wear on the treads was also greater, and the heavy thud which announced their failure came annoyingly soon after the complete of the rubble wall. As before, the two bands of fabric gave way almost simultaneously-probably the jerk imparted to the drive shaft as one let go was enough to take care of the other.

Again, the Mesklinites acted instantly, in concert, and without consultation. Beetchermarlf cut the power as he plunged away from his station toward the melting surface; Takoorch got there before him only because he started from halfway there. Both had blades out when they reached the barrier, and both began scraping frantically at the frosty surface. They knew they were fairly close to the _Kwembly's_ side; less than a body length of ice remained to be penetrated, at least horizontally. Perhaps before freezing took over once more sheer muscle could get them through...

Takoorch's knife broke in the first minute. Several of the human beings above would have been interested in the sounds he made, though not even Easy Hoffman would have understood them. Beetchermarlf cut them off with a suggestion.

"Get behind me and move around as much as you can, so that the water cooled by the ice is moved away and mixed with the rest. I'll keep scraping, you keep stirring." The older sailor obeyed, and several more minutes passed with no sound except that of the knife.

Progress continued, but both could see that its rate was decreasing. The heat in the water around them was giving out. Though neither knew it, the only reason that their environment had stayed liquid for so long was that the freezing around them had cut off the escape of the ammonia-the theoreticians, both human and Mesklinite, had been perfectly correct, though they had been no help to Dondragmer. The freezing under the Kwembly had been more a matter of ammonia slowly diffusing into the ice through the still-liquid boundaries between the solid crystals.

The captain, even with this information, could have done no more about it than his two men now trapped under his ship. Of course, if the information had come as a prediction instead of an inspired afterthought, he might have driven the Kwembly onto dry land-if she had been able to move in time.

Even if Beetchermarlf had had all this information at the time, he would not have been considering it consciously. He was far too busy. His knife flashed in the lamplight, and his conscious mind was concerned solely with getting the most out of the tool with the least risk of breaking it.

But break it he did. he never cared to discuss the reason later. He knew that his progress was slowing, with the urge to scrape harder changing in inverse proportions; but being the person he was, he disliked the suggestion that he might possibly have been the victim of panic. Being what he was also prevented him, ever, from making any suggestion that the bone of the knife might have been defective; and he himself could think of no explanations but those two. Whatever the reason, the knife gripped in his right-forward pair of chelae was suddenly without a blade, and the sliver of material lying in front of him was no more practical to handle for his nipper than it would have been in human fingers. He flung down the handle in annoyance, and since he was under water didn't even have the satisfaction of hearing it strike the bottom violently.

Takoorch grasped the situation immediately. His comment would have been considered cynical if it had been heard six million miles above, but Beetchermarlf took it at face value.

"Do you think it would be better to stay here and freeze up near the side, or get back toward the middle? The time won't make much difference, I'd say."

"I don't know. Near the side they might find us sooner; it would depend on where they come through first, if they manage to do it at all. If they don't, I can't see that it will make much difference at all. I wish I knew what being frozen in a block of ice would do to a person."

"Well, someone will know before long," said Takoorch.

"Maybe. Remember the Esket."

"What has that to do with it? This is a genuine emergency."

"Just that there are a lot of people who don't know what happened there."

"Oh, I see. Well, personally I'm going back to the middle and think while I can."

Beetchermarlf was surprised. "What's to think about? We're here to stay unless someone gets us out or the weather warms and we thaw naturally. Settle down."

"Not here. Do you suppose that running the drivers, with no treads on them, would make enough friction with anything to keep the water nearby from-"

"Try it if you like. I wouldn't expect it, with no real load on them even at their fastest. Besides, I'd be afraid to get this close to them if they're really turning up speed. Face it, Tak, we're under water-water, not regular ocean-and when it freezes we're going to be inside it. There's just nowhere else to... oh!"

"What?"

"You win. We should never stop thinking. I'm sorry. Come on."

Ninety seconds later the two Mesklinites, after some trouble in wriggling through the knife slits, were inside the punctured air cell, safely out of the water.

VIII

Dondragmer, dismissing as negligible the chance that one of his missing helmsmen might be directly underneath, had ordered his scientists to set up the test drill near the main lock and get a sample of the ice. This established that the puddle in which the *Kwembly* was standing in had frozen all the way to the bottom in at least one spot. It might be hoped that this would not apply directly under the hull, where neither heat nor ammonia could escape so rapidly; but the captain vetoed the suggestion of a slanting bore into this region. That did seem to be the most likely whereabouts of the missing helmsmen; they had been at work there, and it was hard to see how they could have failed to see the freeze coming if they had been anywhere else.

There was no obvious way to get in touch with them, however. The *Kwembly's* plastic hull would transmit sound, of course; rapping would have solved the problem if it had not been for the mattress. On the off chance that hull sounds might be heard even through this, Dondragmer ordered a crewman to go from bow to stern on the lowest deck, tapping with a pry bar every few feet. The results were negative, which meant inconclusive. There was no way to tell whether there was no one alive below to hear, no penetration of the sound, or simply no way for those below to reply.

Another group was outside working at the ice, but the captain had already learned that progress would be slow. Even with Meskinitic muscular strength little was being accomplished. Tools about the size of a human machinist's center punch, being wielded by eighteen-inch twenty-pound caterpillars, would take a long time to get around some two hundred and fifty feet of hull circumference to an unknown depth. They would take even longer if detailed chipping around drivers, trucks and control lines were to be necessary, as seemed likely.

Besides all this, the second helicopter was aloft again with Reffel once more at its controls. The communicator was still aboard, and the human beings were examining as carefully as Reffel himself the landscape revealed by the little machine's lights. They were also cursing as heartily as the pilot the length of Dhrawn's nights; this one had well over six hundred hours yet to go, and until the sun rose really quick and effective searching would be impossible. Even Lalande 21185 at a distance of a quarter of a billion miles sheds nearly a thousandth as much illumination as Earth gets from its sun. This does not sound like a great deal, but it is about a thousand times the illumination of full moonlight, which in turn is much better than the helicopter's floodlights could do if they were spread to cover the whole area visible from a thousand feet up.

To be helpful to either Meskinitic eyes or the video pickup of the communicator, the lights had to be held to a rather narrow beam, covering a circle only a few hundred feet across. Reffel was flying a slow zigzag course which swept this circle back and forth across the valley as he moved slowly westward. At the station far above, the televised image on his screen was being recorded and reproduced for the benefit of topographers. These were already working happily on the structure of an intermittent stream valley under forty Earth gravities. As a search effort for the missing Kervenser, little profit was expected for some time; but scientifically no one was complaining—not even the Mesklinites.

Dondragmer was not exactly _worried_ about his first officer and helmsmen, of course, since he couldn't really worry. It would be fair to say that he was concerned, since he had done all he could about the missing crewmen, but having done it his attention had been turned elsewhere. He had two principal things on his mind. He would have liked information about soon the ice was likely to melt, compared with how soon another have given even more for a workable suggestion on how to get rid of the ice quickly and safely for himself. He had given both wishes to the human beings as well as to his own scientists, thought he had made it clear to the latter that he was not demanding a crash program; the search for ideas could be combined with, or even subordinated to, the basic research they were carrying on. Dondragmer was not exactly cold-blooded, but his sense of values included the notion that even his final act should be a useful one.

The human reaction to this remarkably objective and inhumanly calm reaction was mixed. The weathermen and planetologists took it for granted-most of them probably weren't even aware of the _Kwembly's_ predicament, much less of the missing Mesklinites. Easy Hoffman, who had stayed on watch after bring Barlennan up to date as Aucoin had directed, was not surprised; if she had any emotional reaction so far it was one of respect for the captain's ability to avoid panic in a personally dangerous situation.

Her son felt very differently about it. He had been released temporarily from duty in the aerology lab but McDevitt, who was a tactful and sympathetic person and had been aware of the friendship developing between the boy and Beetchermarlf. Benj had become a fixture in the communication room as a result.

He had watched quietly while arrangements were being made by Dondragmer to dispatch the helicopter and the ice-chipping crews. He had even been somewhat interested in the exchange between the human and Mesklinite scientists-McDevitt had been a little reluctant to risk more weather predictions, feeling that his professional reputation had taken jolts enough recently, but promised to do his best. When all these matters had been settled, however, and Dondragmer seemed willing to do nothing but lie on his bridge and wait on events, the boy grew uneasy. Patience, the closet human equivalent to the Mesklinite reaction now being displayed, was not yet one of the youngster's strong points. For some minutes he shifted uneasily in his seat before the screens, waiting for something to happen, and finally could restrain himself no longer.

"If no one has any immediate material to send, is it all right for me to talk to Don and his scientists?" he asked.

Easy glanced at him, and then at the others. The men shrugged or otherwise gestured indifference, so she nodded. "Go ahead. I don't know whether any of them are in a mood for casual chatter, but the worst they'll do is tell you they aren't."

Benj didn't waste time explaining that he was not going to indulge in chatter, casual or otherwise. He switched his microphone to Dondragmer's bridge set and began to talk.

"Don, this is Benj Hoffman. You have nothing but a bunch of sailors chipping away at the ice at the _Kwembly's_ bow. There is a lot of energy in your power units, more than a planetful of Mesklinites could put out by muscle in a year. Have your scientists thought of using converter output to either run that test drill for moving ice, or in some sort of heater?"

"Second, are your sailors just removing ice, or are they specifically trying to get down underneath to find Beetchermarlf and Takoorch? I know it's important to get the _Kwembly_ loose, but the same ice will have to be taken out sometime anyway. It seems to me there's a good chance that some of the water under the ship hasn't frozen yet, and that your two men are still alive in it. Are you tunneling, or just

ditching?"

Some of the human listeners frowned slightly at the boy's choice of words, but no one saw fit to interrupt or even comment. Most of those who heard glanced at Easy, and decided against saying anything which might be interpreted as criticism of her son. Some, as it happened, did not feel critical anyway; they had wanted to ask similar questions but had not quite liked to be heard at it.

As usual in the conversations between the station and Dhrawn, Benj had plenty of time while waiting for the answer to think of other things he might have asked or said, and better ways in which he might have put the things he did say. Most of the adults knew from experience what was going on in his mind at this point; some were amused, all were to some degree sympathetic, several made bets with themselves that he would not be able to resist the temptation to send a reworded version of his message before the answer came back. When Dondragmer's response came from the speaker with Benj still silent no one actually cheered, but those who knew Easy best could read and understand the satisfaction in her expression. She had not dared to bet, even with herself.

"Hello, Benj. We're doing all we can, both for the helmsmen and my first officer. I'm afraid there is no way to apply ship's power to any of the tools. The converters produce electric current and also rotation torque fields to the truck motors, as I am sure you know, but none of our ordinary equipment can use this-just the helicopters, some of the research equipment in the laboratory, and the lights. Even if we could work out a way to apply the drive motors to digging, we can't get at them; they're all under the ice. You must remember, Benj, that we deliberately chose to remain as independent as possible of really complex equipment. Just about everything we have on the planet which we couldn't make ourselves is directly concerned with your research project." Ib Hoffman was not present to hear that sentence, which was unfortunate; later he spent a long time making sure of its exact wording from his son's memory.

"I know that, but-" Benj fell silent; none of the words he wanted to say seemed to have ideas under them. The lights, he knew, could not be used as heaters; they were solid state electroluminescent devices, not arcs or resistance bulbs. They had, after all, been designed not only to last indefinitely but to operate in Dhrawn's atmosphere, with its free oxygen and enormous pressure range, without killing the Mesklinites. If Beetchermarlf had realized this he might have wasted less time, though he might not have accomplished more. "Can't you... can't you just run the current from a converter through some heavy wires, and melt the ice with the heat? Or even run it straight through the water? There must be plenty of ammonia still-it would surely conduct."

Again there was the pause, while Benj hunted for flaws in his own suggestions and the message flashed its way across emptiness.

"I'm not sure I know enough about that sort of physics, though I suppose Borndender and his men would," Dondragmer replied doubtfully. "more to the point, I don't know what we'd use for wires, and I don't know what current would flow. I know that when the power units are connected to regular equipment, like lights or motors, there is automatic safety control; but I have no idea of how that works, or whether it would work on a simple, direct series circuit. If you'll find out from your engineers what sort of risk we'd be running, I'll be glad of the information, but I still don't know what we'd use to carry the current. There just isn't much metal in the _Kwembly_. Most of our maintenance supplies are things like rope and fabric and lumber. Certainly there's nothing that is _meant_ to carry heavy electrical current.

"You may be right about using the ice itself as a conductor, but do you think it would be a good idea with Beetchermarlf and Takoorch somewhere under it? I can see they wouldn't be right in the circuit, but I'm still a little uncertain that they'd be safe. There, again, one of you people could probably help out. If you can-if we can get enough detailed information from you to plan something really promising-I'll be glad to try it. Until that happens, I can only say we're doing all _we_ can. I'm as concerned about the

Kwembly, and Kervenser, and Beetchermarlf, and Takoorch as you can possibly be."

The captain's closing sentence was not entirely true, though the error was not intentional. He did not really grasp how a friendship could become at all close in a short time and without direct contact between the parties; his cultural background included neither an efficient mail service nor amateur radio. The concept of a pen pal, or microphone buddy, may not have been completely strange to him-he had, after all, been with Barlennan years before when Charles Lackland had accompanied the _Bree_ by radio across thousands of miles of Mesklin's oceans-but real friendship was, to him, in a different category. He had been only conventionally regretful at the news of Lackland's death years later. Dondragmer knew that Benj and the younger helmsman had been talking to each other a great deal, but he had not overheard much of their conversation and would probably not have fully understood the feelings involved even if he had.

Fortunately Benj did not realize this, so he had no reason to doubt the captain's sincerity. However, he was not satisfied with either the answer or the situation. It seemed to him that far too little was being done specifically for Beetchermarlf; and he had only been _told_ about this. He could not participate in it-he could not even see very much of it happening.

His feelings showed clearly enough in his next words, as far as the human listeners were concerned, and Easy made a half-completed gesture of protest. Then she controlled herself; it was too late, and there was always the chance that the Mesklinite would not read as much into the words and tone as the speaker's mother had.

"But you can't just sprawl there and do nothing!" Benj exclaimed. "Your men could be drowning this very second. Do you know how much air they had in their suits?"

This time temptation won. Realization of what he had said caught up with him within seconds, and in less than half a minute he had what he hoped were better chosen words on their way to Dhrawn.

"I know your doing your best, but I just don't see how you can simply wait around for results. I'd have to go outside myself and chip ice, or something-and I can't, up here."

"I have done all that can be done in the way of starting rescue action," Dondragmer's response to the first part of the message finally arrived. "There is no need to worry about the air for many hours yet-we don't respond to its lack as I understand you humans do. Even if the hydrogen concentration goes too low for them to stay conscious, their body machinery will just slow down more and more for several eights of hours-no one knows just how long, and it probably isn't the same for everyone. You needn't worry about their-drowning I think was the word you used, if I have guessed its meaning correctly.

"All tools we have are in use. There would be no way for me to help outside if I did go, and it would take me longer to get reports from Reffel through your people. Perhaps you can tell me how his search for Kervenser is coming on. I assume that nothing meaningful has turned up, since the light from his flier is still visible from here and his flight pattern has not changed, but perhaps there is description you could pass on to me-I'd like to know as much about this region as possible."

Easy once again stifled an exclamation before it could be noticed by Benj. As the boy shifted his attention to the screen carrying the helicopter's signal, she wondered whether Dondragmer was merely trying to keep the youngster out of his figurative hair, or perhaps had some real grasp of the boy's need to be busy and feel useful. The latter seemed unlikely, but even Easy Hoffman, who probably knew Mesklinite nature better than any other human being alive, was not sure.

Benj had not been watching the other screen at all, and had to ask whether anything had been happening. One of the observers replied briefly that all anyone had seen had been a surface of pea-to-house-sized cobbles, interrupted by frozen puddles similar to the one holding the *_Kwembly_*. There had been no sign of the other helicopter or its pilot. No one really expected any for some time; the search had to be slow to be complete, but if Kervenser had actually crashed this close to his starting point the accident would probably have been seen from the cruiser. The little fliers did carry lights, and Kervenser had certainly been using his.

Benj relayed this information to Dhrawn, and threw in an obvious question of his own.

"Why is Reffel making such a slow and careful search so close to you? Wasn't Kervenser at least watched out of sight?"

"He was, Benj. It seemed more reasonable to make a complete coverage centering here and starting outward, and that would also have the advantage of providing more complete data for your scientists; but, if they can wait for the information, please order Reffel for me to fly straight west along the valley until he can just see my bridge light, and resume the search pattern at that point."

"Sure thing, Captain." Benj was almost gay for the moment. The conversation had been in Stennish, so none of the watching scientists had understood it; and the boy did not bother to ask their approval before passing on the order in the same language. Reffel seemed to have no trouble understanding Benj's accent, and in due course his little machine headed west.

"And what's happening to our map?" growled a topographer.

"You heard the captain," replied Benj.

"I heard something. If I'd understood it, I'd have entered an objection, but I suppose it's too late now. Do you suppose they'll fill in the gap their leaving now, when they come back?"

"I'll ask Dondragmer," the boy replied obligingly, but with an uneasy glance toward his mother. She had put on the unreadable expression which he could read all too well. Fortunately, the scientist was already leaving the communication room growling under his breath; and fortunately Benj turned his attention back to Reffel's screen before Easy let her gravity. Several other nearby adults who had gleaned the substance of the conversation with Dondragmer were also having trouble keeping their faces straight, but Benj failed to notice.

Dondragmer's assurance that lack of hydrogen would not be an immediate problem had helped some, but the idea of being frozen solidly into the ice was still bothersome. Even if this took longer to happen under the *_Kwembly's_* hull, it would happen at last. It might even have happened already. It should be possible to do *_something_*.

Heat melts ice. Heat is energy. The *_Kwembly_* carried enough energy to life her out of Dhrawn's gravity well, though there was no way to apply it to that task. Didn't the huge vehicle have any sort of heaters in its life-support equipment which could be disassembled and used outside?

No. The Mesklinites were unlike ever to need heat on Dhrawn. Even the parts of the planet where internal heat seemed to be lacking were held up close to fifty degrees absolute by the sun; the regions they would have most to do with for many years yet, such as Low Alpha's center, were too hot rather than too cold for them. The *_Kwembly_* did have refrigeration equipment powered from its fusion converters, but as far as Benj knew it had never been used since the original testing. It was expected to be necessary during the penetration of the central part of Low Alpha, not scheduled for at least an Earth

year yet-and possibly even later; the fate of the _Esket_ had made some of the original plans rather shaky.

But a refrigerator is a heat pump. Even Benj knew that; and at least in theory, most pumps are reversible. This one must have, somewhere _outside_ the cruiser's hull, a high-temperature section for dumping heat. Where was it? Was it removable? At what temperature did it run? Dondragmer must know. But would he have thought of this already? Maybe not. He was far from stupid, but his background wasn't human. What physics he knew had been picked up from non-Mesklinites long after he was adult. It would not-presumably-be part of the underlying stock of knowledge which most intelligent beings lump under the concept of "common sense." The boy nodded at this thought, spent another second or two reminding himself that even if he made himself look silly this might be worth it, and reach for his microphone switch.

This time there was no amusement among the surrounding adults as the message pulsed toward Dhrawn. None of those present knew enough of about the engineering details of the land-cruisers to answer the questions about the refrigerator heat-dump, but all knew enough physics to be annoyed with themselves for not having thought of the question earlier.

"The refrigerator is one of your solid-state electronic devices which I don't pretend to understand in detail." The captain's words finally reached the station. He was still using his own language, to the annoyance of some of the listeners. "We haven't had to use it since the acceptance tests; the weather here had sometimes been pretty warm, but not really unbearable. It's a simple thing to describe; there are metal plates in all the rooms which get cold when we turn the power on in the system. There is a metal bar-a sort of loop-running along each side of the hull at start and finish-one of the few things that does. I assume that bar must be the heat radiator; I see, as you imply I should, that there must be such a part to the system and that it must be outside, and nothing else seems to qualify. Unfortunately, it couldn't be much farther from the ice, even if it runs hot enough to melt it-which I don't know offhand. I realize that it could be made as hot as you please by running enough electricity through it, but I'm not sure I like the idea of trying to take it off the hull for such a purpose."

"I suppose it would wreck your refrigeration system-especially if you couldn't get it back," agreed Benj. "Still, maybe it's not that bad. Let me find an engineer who really knows that system. I have an idea. I'll call you back later." The boy slid out of his seat without waiting for Dondragmer's reply, and left the communication room on the run.

The moment he was gone, the observers who had not understood the language asked Easy for a summary of the conversation, which she gladly supplied. It did not make anyone happier with himself to find that they could not guess what the youngster's idea might be. When Benj returned with an engineer in tow, those in hearing frankly abandoned their jobs to listen. Several heartfelt prayers of thanksgiving must have ascended when it was noted that the newcomer was not a linguist, and the boy was interpreting for him. The two settled into seats before the screens, and Benj made sure he knew what to say before energizing his microphone.

"I should tell the captain that most of the fastenings holding the radiator bar to the _Kwembly's_ skin are sort of nails; they only go a little way into the skin and can be pried out without damaging the hull. It might be necessary to use cement to fasten them back in afterward, but they should have plenty of that. The connections at the rear will have to be cut, thought . The alloy isn't very hard and their saws will be able to handle it. Once detached, the bar can be used as a resistance heater simply by pushing its ends into the D.C. holes in a power box. I can tell him that there is no danger from a short circuit, since the converters have internal safeties. Is that right, Mr. Katini?"

"That's it," the small, grizzled engineer replied with a nod. He was one of those who had helped design

and build the land-cruisers, and one of the very few human beings actually to spend much time at Mesklin's three-gravity equator. "I don't think you'll have any trouble making it clear to Dondragmer, even without translation; I'll tell him directly if you wish. He and I always got along easily enough in my own language."

Benj nodded acknowledgement of this, but started speaking into his microphone in Stennish. Easy suspected that he was showing off, and hoped that it wouldn't backfire on him too badly, but saw no real need to interfere. The boy was old enough to stand a little stewing in his own juice. She had to admit that he was doing a good job of translation; he must have picked up a great deal from his friend Beetchermarlf.

When the captain's answer came back it was in the human tongue. Dondragmer had seen the most probable reason why Benj, rather than the engineer who had provided the information, should be doing the talking. The boy looked a little startled and confirmed his mother's suspicions by glancing quickly at her. She carefully kept her eyes on Dondragmer's screen.

"I have the picture," the Mesklinite's slightly accented voice came through-he what not always perfectly successful in confining his voice to the human audibility range. "We can detach the refrigerator bar use it, with a power box, as a heater to melt the ice around the ship. There will be plenty of power in the converter, and no danger of blowing it up. Please clear me on two points however.

"First, how can we be sure that we can reconnect the bar electrically afterward? I know enough to doubt that cement is the right method. I don't want to lose the refrigerator system permanently, since Dhrawn is approaching its sun and the weather will have to be getting warmer.

"Second, with the metal carrying a current touching the ice, or dipping into the melted water, will there be any danger to people on, or in, or under that water? Will the airsuits be protection enough? I suppose they must be pretty good electrical insulators, since they are transparent."

The engineer began to answer at once, leaving Benj to wonder what connection there might be between transparency and electrical conductivity-and how Dondragmer, with his background, happened to be acquainted with it.

"You can make the connection easily enough. Simple have the metal ends pressed tightly together, and use the adhesive to fasten a wrapping of fabric around the joint. You're right about the glue's conductance; make sure it doesn't get between the metal surfaces.

"Also, you needn't worry about electrocuting anyone in an airsuit. There'll be plenty of protection. I rather suspect that it would take a lot of voltage to hurt you people anyway, since your body fluids are nonpolar, but I have no experimental proof and I don't suppose you want any. It occurred to me that you might do better by striking an arc at the surface of the ice, which should have enough ammonia to be a fair conductor. If it works sat all, it should work very well-only it may be too hot for any of your men to stay in the neighborhood, and it _would_ have to be controlled carefully. Come to think of it, it would no doubt destroy too much of the bar to let you get the system together again afterward. We'd better stick to simple resistance heating, and be satisfied with melting the ice instead of boiling it."

Katini fell silent, and waited for Dondragmer's answer. Benj was still thinking, and all the others within hearing had their eyes fixed on the captain's screen. His shift of language had attracted even those who might otherwise have waited patiently for a translation.

This was unfortunate from the human viewpoint. Barlennan, later, wrote it off as a stroke of luck.

"All right," Dondragmer's answer finally came. "We will take off the metal bar and try to use it as a heater. I am now ordering men outside to start detaching the small brackets. I will have one of the communicators set up outside so that you can watch as we cut through the conductors, and check everything before we turn on power. We will work slowly, so that you can tell us if we are doing something wrong before it has gone too far. I don't like this situation-I don't like anything when I am so unsure of what is happening and what is likely to happen. I'm supposed to be in command here, and I can only wish I had learned more of your science and technology. I may have an accurate picture as far as it goes, and I'm sure I can trust your knowledge and judgement for the rest, but it's the first time in years I've been so uncertain of myself."

It was Benj who answered, beating his mother by a second.

"I heard you were the first Mesklinite to see the general idea of real science, and that you were the one who did the most to get the College going. What do you mean you wish you had learned more?"

Easy cut in; like Benj, she used Dondragmer's own language.

"You know far more than I do, Don, and you are in command. If you hadn't been convinced by what Katini told you, you wouldn't have given those orders. You'll have to get used to that feeling you don't like; you've just collided with something new again. It's like that time fifty years ago, long before I was born, when you suddenly realized that the science we aliens were using was just knowledge carried on past the common-sense level. Now you have bumped into the fact that no one-not even a commander-can know everything, and that you sometimes have to take professional advice. Calm down, Don!"

Easy leaned back and looked at her son, who was the only one in the room to have followed her speech completely. The boy looked startled, and almost awestruck. Whatever impression she had made on Dondragmer-or would when her words got to him-she certainly had got home to Benjamin Ibson Hoffman. It was an intoxicating sensation for a parent; she had to fight the urge to say more. She was assisted by an interruption, in a human voice.

"Hey! What happened to the helicopter?"

All eyes went to Reffel's screen. There was a full second of silence. Then easy snapped, "Benj, report to Dondragmer while I call Barlennan!"

TO BE CONTINUED