

Star Light

By Hal Clement

Fourth of Four Parts

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Parts 2 & 3 were taken from *Analog* and parts 1 and 4 were taken from the NESFA "The Essential Hal Clement Volume 3", the novel version, which is to be the 'definitive' version. The discrepancies are minor, I haven't even been able to spot them.

13: FACT IS STRANGE, FICTION CONVINCING

Barlennan was quite pleased with his speech. He had not told a single falsehood; the worst he could be accused of was fuzzy thinking. Unless some humans were already actively suspicious, there would be no reason for them not to pass on the "theory" to the *Kwembly's* captain, thus telling him the line that Barlennan proposed to follow. Dondragmer could be trusted to play up properly, especially if the hint that Kabremm might not be available for further questioning were transmitted to him. It was too bad, in a way, to spring the "native menace" so long before he had meant to; it would have been much nicer to let the human beings invent it for themselves, but any plan which couldn't be modified to suit new circumstances was a poor plan, Barlennan told himself.

Aucoin was taken very much aback. He had personally had no doubt whatever that Easy was mistaken, since he had long ago written the *Esket* completely off, in his own mind, and Barlennan's taking her opinion seriously had been a bad jolt. The administrator knew that Easy was by far the best qualified person in the station to make such a recognition; he had not, however, expected the Mesklinites themselves to be aware of this. He blamed himself for not paying much more attention to the casual conversation between human observers (especially Easy) and the Mesklinites over the past few months. He had let himself get out of touch, a cardinal administrative sin.

He could see no reason for denying Barlennan's request, however. He glanced at the others. Easy and Mersereau were looking expectantly at him; the woman had her hand on the microphone selector in her chair arm as though about to call Dondragmer. Her husband had a half-smile on his face which puzzled Aucoin slightly for a moment, but as their eyes met Hoffman nodded as though he had been analyzing the Mesklinite's theory and found it reasonable. The planner hesitated a moment longer, then spoke into his microphone.

"We'll do that right away, Commander." He nodded to Easy, who promptly changed her selector switch and began talking. Benj returned just as she started, obviously bursting with information, but he restrained himself when he saw that a conversation with the *Kwembly* was already in progress. His father watched the boy as Easy relayed the Barlennan theory, and had some difficulty in concealing his amusement. It was so obvious that Benj was swallowing the idea whole. Well, he was young, and several of his elders

seemed a bit uncritical too.

"Barlennan wants your thoughts on this possibility, and especially any more information you may have obtained from Kabremm," concluded Easy. "That's all—no, wait." Benj had caught her attention. "My son has come back from the aerology lab, and seems to have something for you."

"Mr. McDevitt has made one run with the new measures added to the earlier data and is making a second now," Benj said without preamble. "According to the first, he was right about the reason for the melting and freezing of your lake, and the nature of the clouds which Stakendee has encountered. The chances are better than even that condensation from these will increase, and make the stream near you bigger. He suggests that you check very carefully, as he mentioned before, the time the clouds reach the *Kwembly*. As he guessed, they are evaporating from adiabatic heating as the air carrying them comes down the ground slope. He says that the later they are in getting to you, the worse the flood will be when it does. I don't see why myself, but that's what the computer implies. He said to be sure to remind you that this was just another tentative calculation, just as likely to be wrong as any of the earlier ones. He went into a long speech about all the reasons he couldn't be sure, but you've heard it already."

Dondragmer's answer commenced almost on the light-echo; he could not have spent more than a second or two after the end of Benj's report in deciding what to say.

"Very well, Benj. Please tell Barlennan that his idea sounds reasonable, and at least fits in with the disappearance of my two fliers. I have had no opportunity to get information from Kabremm, if it really was he; I haven't seen him. He hasn't come back to the *Kwembly*. You could tell better than I whether he's still with Stakendee and those who went upstream. I will take precautions on the assumption that the commander is right. If the idea had occurred to me earlier, I certainly would not have sent out practically my entire crew to set up the safety base at the side of the valley.

"However, it may be just as well I did. I see no possibility of freeing the cruiser in any reasonable time, and if Mr. McDevitt is even moderately sure that another flood is on the way we'll have to finish moving out shortly. If a current anything like the one that brought us here hits the *Kwembly* while she's fastened down like this, there'll be pieces of hull scattered for a million cables downstream. When my men come back we'll take one more load of necessary equipment and abandon the ship for the time being. We'll set up on the valley rim, and as soon as life-support equipment is running adequately there I'll start sending crews back here to work on freeing the *Kwembly*, provided the flood isn't obviously on the way. That's a firm basic plan; I'll work out details for covering the work crews with your assistance, and if Barlennan's theory calls for special action I'll take it, but I haven't time to argue the basic decision. I can see moving lights to the north; I assume it's my crew on the way back. I'll turn the set so that you can see them."

The view on the screen wavered, then panned jerkily as the captain nudged the transmitter box through a third of a circle. The result was no improvement, from the human viewpoint; the lighted region around the *Kwembly* where details could not only be seen but compared and interpreted, was replaced by almost total darkness relieved by a few specks of light. It took close, careful watching to confirm Dondragmer's claim that they were moving. Easy was about to ask that the lens be returned to its former position when Benj began talking.

"You mean you've given up all hope of finding Beetchermarlf and Takoorch and the others, and are just going off and leaving them there? I know you have nearly a hundred other people to worry about, but there are times when that seems a pretty thin excuse for not even trying to rescue someone!"

Easy was startled and rather dismayed at her son's choice of words, and almost cut in with a combined rebuke to the boy and apology to Dondragmer. She hesitated, however, in the effort to find words which

would do this without doing violence to her own feelings; these bore a strong resemblance to Benj's. Aucoin and Mersereau had not followed the exchange at all closely, since both were concentrating on Barlennan on the other screen and Benj had uttered his tirade in Stennish. Ib Hoffman showed no expression which the casual observer could have translated, though Easy might have detected traces of amusement if she had been looking at him. McDevitt had just come in, but was too late to catch anything except Easy's facial expression.

The pause went overtime, so they waited for Dondragmer's answer. This revealed no annoyance in tone or choice of words; Easy wished she could see him to judge his body attitude.

"I haven't given them up, Benj. The equipment we plan to take includes as many power units as possible, which means that men will have to go under the hull with lights to get as many of them as they can from the unfrozen trucks. Those men will also have orders to search the walls carefully for traces of the helmsmen. If they are found, men will be assigned to chip them out, and I will leave those men on the job until the last possible instant. However, I can't justify putting the entire crew to work breaking ice until there is nothing else to be done to get the cruiser free. After all, it is perfectly possible that they discovered what was going on before the pond froze to the bottom, and were trapped while looking for a hole in the ice somewhere else in the pond."

Benj nodded, his face somewhat red; Easy spared him the need of composing a verbal apology

"Thanks, Captain," she said. "We understand. We weren't seriously accusing you of desertion; it was an unfortunate choice of words. Do you suppose you could aim the communicator back at the lighted space? We really can't see anything recognizable the way it's pointed now."

"Also," McDevitt cut in without allowing a pause to develop at the end of Easy's request, "even though you are planning retrieve the *Kwembly*, do you suppose you could leave a power unit on board to run the lights, and lash the bridge communicator about where it is so we can see the hull? That would not only let us observe the flood if it comes, which I'm almost certain it will in the next three to fifteen hours, but would also give us a chance to tell you whether there was any use looking for the cruiser afterward, and possibly even *where* to hook for it. I know that will leave you with only two communicators, but it seems to me that this would be worth it."

Again, Dondragmer appeared to make up his mind on the spot; his answer emerged from the speaker almost with the sixty-four-second bell.

"Yes, we'll do it that way. I would have had to leave light power anyway, since I wanted crews to come back for work; and as I said, I wanted some sort of safety communication with them. Your suggestion fits that perfectly. I've turned the set back to cover the starboard side, as you no doubt see. I must leave the bridge now; the crew will be back in a minute or two, and I want to assign duties to them as they arrive.

Again, Benj began talking without checking with anyone else.

"Captain, if you're still in hearing when this gets to you, will you wave or signal some way, or have Beetch do it, if you find him alive? I won't ask you to make a special trip back to the bridge to give details."

There was no answer. Presumably Dondragmer had suited up and gone outside the moment he finished speaking. There was nothing for the human beings to do but wait.

Aucoin, with Easy's assistance, had relayed Dondragmer's answer to the Settlement, and received Barlennan's acknowledgment. The commander asked that he be kept up to date as completely as

possible on *Kwembly* matters, and especially on any ideas which Dondragmer might have. Aucoin agreed, asked Easy to relay the request to the captain, and was told that this would be done as soon as the latter reestablished contact.

"All right," nodded the planner. "At least, there's been no mention so far of sending a rescue vehicle. We'll leave well enough alone."

"Personally," retorted Easy, "I'd have dispatched the *Kallqf* or the *Hoorsh* hours ago, when they first froze in."

"I know you would. I'm very thankful that your particular brand of ethics won't let you suggest it to Barlennan over my objections. My only hope is that he won't decide to suggest it himself, because every time I've had both of you really against me I've been talked down." Easy looked at Aucoin, and then at the microphone, speculatively. Her husband decided that distraction was in order, and cut into the thickening silence with a question.

"Alan, what do you think of that theory of Barlennan's?"

Aucoin frowned. He and Easy both knew perfectly well why lb had interrupted, but the question itself was hard to ignore; and Easy, at least, recognized that the interruption itself was a good idea.

"It's a fascinating idea," the planner said slowly, "but I can't say that I think it very probable. Dhrawn is a huge planet, if it can be called a planet, and it seems funny, well, I don't know whether it seems funnier that we'd have met intelligence so quickly or that only one of the cruisers has done so. There certainly isn't a culture using electromagnetic energy; we'd have detected it when we first approached the place. A much lower one, well, how could they have done what seems to have been done to the *Esket's* crew?"

"Not knowing their physical and mental capabilities, quite aside from their cultural level, I couldn't even guess," replied Hoffman. "Didn't some of the first Indians Columbus met wind up in Spain?"

"I think you're stretching resemblances, to put it mildly. There's a practical infinity of things which could have happened to the *Esket* without her running into intelligent opposition. You know that as well as I do; you helped make up some of the lists, until you decided it was pointless speculation. I grant that Barlennan's theory is a little bit more believable than it was, but only a very little."

"You still think I was wrong in my identification of Kabremm, don't you?" said Easy.

"Yes, I'm afraid I do. Furthermore, I just don't believe that we've run into another intelligent species. Don't compare me with the people who refused to believe that dePerthe's rocks were man-made tools. Some things are just intrinsically improbable."

Hoffman chuckled. "Human ability to judge likelihood, you might call it statistical insight, has always been pretty shaky," he pointed out, "even if you skip purely classical examples like Lois Lane. Actually, the chances don't seem to be that low. You know as well as I do that in the very small volume of space within five parsecs of Sol, with only seventy-four known stars and about two hundred sunless planets, what we have found in the way of intelligence: twenty races at about our own stage of development, safely past their Energy Crisis; eight, including Tenebra and Mesklin, which haven't met it yet; eight which failed to pass it and are extinct; three which failed but have some hope of recovery; every one of them, remember, within a hundred thousand years of that key point in their history, one way or the other! That's in spite of the fact that the planets range in age from Panesh's nine billion years or so to Tenebra's maybe a tenth of that. There's more than coincidence there, Alan."

"Maybe Panesh and Earth and the older planets have had other cultures in the past; maybe it happens to

any world every few tens of millions of years."

"It hasn't happened before unless the earlier intelligent races were so intelligent from the beginning that they never tapped their planet's fossil fuels. Do you think man's presence on Earth won't be geologically obvious a billion years from now, with looted coal seams and the beer bottle as an index fossil? I can't buy that one, Alan."

"Maybe not, but I'm not mystical enough to believe that some super-species is herding the races of this part of space toward one big climax."

"Whether you like that Demon Hypothesis or prefer the ESFA Theory doesn't matter. There's certainly more than chance involved, and therefore you can't use the laws of chance alone to criticize what Barlennan has suggested. You don't have to assume he's right, but I strongly urge you to take him seriously. I do."

Dondragmer would have been interested in hearing this discussion, just as he would have appreciated attending the staff meeting of some hours before. However, he would have been too busy for either, even if attendance had been physically possible. With the return of most of his crew (some, of course, had stayed behind to continue setting up the life-support equipment) there was much to oversee and quite a lot to do himself. Twenty of his men were set to helping the trio already chipping ice from the main lock. As many more went under the hull with lights and tools to find and secure any power units not too solidly frozen in. The captain kept his promise to Benj, ordering this group to check most carefully for signs of Beetchermarlf and Takoorch. However, he emphasized the importance of examining the ice walls closely, and as a result the group found nothing. Its members emerged in a few minutes with the two power boxes from the trucks which the helmsmen had used, and two more which had been freed by the action of the heat. The rest, which according to Dondragmer's recollection and the laws of arithmetic must number six, were unapproachable, even though the sailors could make a reasonably well-founded guess as to which trucks they were on.

Meanwhile, the rest of the crew had been entering the cruiser by the available locks: the small one at the bridge, the larger ones through which the fliers were launched and the pairs of one-man-at-a-time emergency traps at the sides near bow and stern. Once inside, each crewman set about an assigned job. Dondragmer had been thinking as well as talking to human beings during their absence. Some packed food to last until the life-support equipment resumed cycling normally; others readied coils of rope, lights, power units and other equipment for transportation.

Many were at work improvising carrying devices; one awkward result of the *Kwembly's* being fusion-powered was a great shortage of wheels aboard. There were tiny pulleys carrying the control cables around cot-nets. These were too small for wheelbarrows or similar devices and Dondragmer had firmly forbidden any dismantling of the vehicle. There was nothing like a fork-lift or even a dolly aboard. Such devices, the former muscle-powered, of course, were known and used on Mesklin for medium-to-long-distance carrying; but there was nothing on the *Kwembly* ~ which could be moved at all which a Mesklinite could not easily carry to

any part of the vehicle without mechanical assistance. Now, with miles to go and the necessity of moving many items complete rather than in pieces, improvisation was in order. Litters and travois were making their appearance. The corridors leading to the main lock were rapidly being stacked with supplies and equipment awaiting the freeing of the exit.

None of the bustle and thumping, however, penetrated the mattress where Beetchermarlf and Takoorch still lay concealed. As nearly as could be judged later, they must have sought this shelter within a very few minutes of the time the resistance heater went into action. The thick, rubbery material of the mattress

itself, which had been so difficult for even a Mesklinite-wielded knife to penetrate, blocked the sounds made by the crackling steam-bubbles around the hot metal and the calls of the workers who entered later. Had these last been forced to communicate with anyone at a distance, their resonant hooting might well have made its way even through that tough material; but there was little for them to say even to each other; they all knew their jobs perfectly well. The slit through which the helmsmen had found their entrance was held tightly enough closed by the elasticity of the fabric so that no light reached them. Finally, the Mesklinite personality trait most nearly described as a combination of patience and fatalism assured that neither Beetchermarlf nor his companion was likely to check outside their refuge until the breathing hydrogen in their suits became a serious problem.

As a result, even if Dondragmer had heard Benj's appeal, there would have been nothing for him to signal. The helmsmen, some three feet above some of their companions and a like distance below many others, were not found.

Not quite all the *Kwembly's* crew were engaged in preparation for the move. When the most necessary aspects of that operation had been arranged, Dondragmer called two of his sailors for a special detail.

"Go to the stream, head northwest and you can't miss it, and go upstream until you find Kabremm and the *Gwelf*" he ordered. "Tell him what we are doing. We will set up a livable site as quickly as we can, you tell him where; you've been there and I haven't. We will set up the human machines so they are looking into the lighted, active portion of that area. That will make it safe for him to bring the *Gwelf* down and land her anywhere outside that area, with no risk of being seen by the human beings. Tell him that the commander seems to be starting the native-life part of the play early, apparently to account for Kabremm's being seen in this neighborhood. He's suggested no details, and will probably stick to the original idea of letting the human beings invent their own.

"When you have seen Kabremm, go on upstream until you find Stakendee, and give him the same information. Be careful about getting into the view field of his communicator; when you think you may be getting near him, shut off your lights every little while and look for his. I'll be in touch with him through the human beings, of course, but not with *that* message. You understand."

"Yes, Sir," the two replied in unison, and were gone.

The hours passed. The main lock was freed and opened, and nearly all the material to be taken was outside when a call came from above. The communicator which had been in the laboratory was now outside, so Dondragmer could be reached directly. Benj was still the speaker.

"Captain, Stakendee reports that the stream he is following is getting noticeably broader and swifter, and that the clouds are becoming rain. I've told him to start back, on my own responsibility." The captain looked up at the still cloudless sky, then westward toward the place where Stakendee's fog might have shown if it had been daylight.

"Thanks, Benj. That's what I would have ordered. We're leaving the *Kwembly* right now before the stream gets too big to cross with the equipment. I have lashed the communicator down to the bridge and will leave the lights on as Mr. McDevitt requested. We'll hope you can tell us that it's safe to come back, before too long. Please report this to Barlennan, and tell him that we will watch as carefully as possible for the natives; if, as he seems to be suggesting, they are using Kabremm as a means of getting in touch with us, I will do my best to set up cooperative relations with them. Remember, I haven't seen Kabremm myself yet, and you haven't mentioned him since the first time, so I'm entirely in the dark about his status so far.

"Be sure to keep me informed of Barlennan's thoughts and plans, as far as you can; I'll do the same from

here, but things may happen too quickly for any possible advance warning. Watch your screens. That's all for now; we're starting."

The captain uttered a resonant hoot which, fortunately for human ears, was not faithfully amplified by the set. The Mesklinites fell into rough line, and within two minutes were gone from the field of view of the bridge communicator.

The other set was being borne near the tail of the line, so the screen far above showed the string of lights bobbing in front of it. Little else could be seen. The nearest sailors, those within two or three yards of the lens, could be made out in reasonable detail as they wound among the boulders with their burdens, but that was all. The line could have been flanked on both sides twenty feet away by a legion of natives, without any human being the wiser. Aucoin was neither the first nor the last to curse Dhrawn's 1500-hour rotation period; there were still over six hundred hours to go before the feeble daylight from Lalande 21185 would return.

The stream was still small when the group splashed through it, though Stakendee's set a few miles west had confirmed the report that it was growing. Benj, noticing this, suggested that the small party also cross so that its members could meet the main body on the other side of the valley. Fortunately he made this suggestion to Dondragmer before acting on his own; the captain, remembering the two messengers he had sent upstream, hastily advised that the crossing be postponed as long as possible so that Stakendee and his men could compare more accurately the size of the stream with what it had been when they had passed the same area earlier. Benj and Easy accepted this excuse. Ib Hoffman, quite aware that the foot party was carrying no time measuring devices and could give no meaningful report on the rate of change, was startled for a few seconds. Then he smiled, privately.

For minutes, which stretched into one hour and then another, there was little to watch. The crew reached and climbed the bare rock sides of the valley at the spot where the first load of equipment had been left, and set about constructing something which might have been called either a camp or a town. Life-support equipment had first priority, of course. It would be many hours yet before any air-suits would need recharging, but the time would come. For organisms as profligate of energy as the Mesklinites, food was also a matter of immediate concern. They set about it quickly and efficiently; Dondragmer, like the rest of the cruiser captains, had given plenty of advance thought to the problem of abandoning ship.

Stakendee's group finally crossed the river and, somewhat later, reached the encampment. The crossing had been approved by Dondragmer after he had received through Benj a message which contained, quite incidentally, the name of one of the messengers the captain had sent from the *Kwembly*.

Consequently no one, either member of the *Kwembly* crew or human being, was able to watch the growth of the ammonia-water stream. It would have been an interesting sight. At first, as the witnesses had reported, it was little more than a trickle running from hollow to hollow on the bare rock in the higher reaches of the river bed, men winding among the boulders lower down. As the drops of liquid in the fog coalesced and settled out more rapidly, tiny new tributaries began to feed into the main stream from the sides, and the stream itself grew deeper and faster. On the bare rock it meandered more violently, overflowing the basins which had originally contained it. Here and there it froze temporarily, as water, supplied by the frozen puddles upstream, and ammonia from the fog, shifted about the eutectic, which was liquid at the local temperature: about 174 degrees on the human Kelvin scale, roughly 71 on that used by the Mesklinite scientists.

Among the boulders, as it neared the *Kwembly*, it accumulated more and more water ice, and the progress grew more complicated. The ammonia dissolved water for a time, the mixture flowing away as the composition entered the liquid range. Then the stream would stop and build up, as Benj had pictured it, like hot wax on a candle, solidifying temporarily from addition of ammonia. Then it would slump away

again as underlying ice reacted with the mixture.

It finally reached the hole which had been melted along the *Kwembly's* starboard side, where the human beings could watch once more. By this time the "stream" was a complex network of alternate liquid, solid, and slush perhaps two miles across. The solid, however, was losing out. While there were still no clouds this far downstream, the air was nearly saturated with ammonia: saturated, that is, with respect to a pure liquid-ammonia surface. The ammonia vapor pressure needed for equilibrium over an ammonia-water mixture is lower; so condensation was taking place on the mostly-water and low-ammonia ice. As it reached the appropriate composition for liquefaction its surface flowed away and exposed more solid to the vapor. The liquid tended to solidify again as it absorbed still more ammonia vapor, but its motion also gave it access to more water ice.

The situation was a little different in the space under the *Kwembly's* hull, but not greatly so. Where liquid touched ice the latter dissolved and slush appeared; but more ammonia diffusing from the free surface at the side melted it again. Slowly, slowly, minute after minute, the grip of the ice on the huge vehicle relaxed so gently that neither the human beings watching with fascination from above nor the two Mesklinites waiting in their dark refuge could detect the change, and the hull floated free.

By now the entire river bed was liquid, with a few surviving patches of slush. Gently, very unlike the flood of a hundred hours or so before when three million square miles of water-snow had been touched by the first ammonia fog of the advancing season, a current began to develop. Imperceptibly to all concerned, the *Kwembly* moved with that current:

imperceptibly because there was no relative motion to catch the eyes of the human beings, and no rocking or pitching to be felt by the hidden Mesklinites.

The seasonal river, which drains the great plateau where the *Kwembly* had been caught, slices through a range of hills, for Dhrawn respectable mountains; the range extends some four thousand miles northwest-southeast. The *Kwembly* had gone parallel to this range for most of its length before the flood. Dondragmer, his helmsmen, his air scouts, and indeed most of the crew had been quite aware of the gentle elevation to their left, sometimes near enough to be seen from the bridge and sometimes only a pilot's report.

The flood had carried the cruiser through a pass near the southeastern end of this range to the somewhat lower and rougher regions close to the edge of Low Alpha before she had grounded. This first flood was a rough, rather hesitant beginning of the new season as Dhrawn approached its feeble sun and the latitude of the sub-stellar belt shifted. The second was the real thing, which would only end when the whole snow plain was drained, more than an Earth year later. The *Kwembly's* first motions were smooth and gentle because she was melted free so slowly; then they were smooth and gentle because the liquid supporting her was syrupy with suspended crystals; finally, with the stream fully liquid and up to speed, it was smooth because it was broad and deep. Beetchermarlf and Takoorch may have been slightly dazed by decreasing hydrogen pressure, but even if they had been fully alert the slight motions of the *Kwembly's* hull would have been masked by their own shifting on the flexible surface that supported them.

Low Alpha is not the hottest region on Dhrawn, but the zone-melting effects which tend to concentrate any planet's radioactive elements have warmed it to around the melting point of water ice in many spots, over two hundred Kelvin degrees hotter than Lalande 21185 could manage unassisted. A human being could live with only modest artificial protection in the area, if it were not for the gravity and pressure. The really hot area, Low Beta, is forty thousand miles to the north; it is Dhrawn's major climate-control feature.

The *Kwembly's* drift was carrying it into regions of rising temperature, which kept the river fluid even

though it was now losing ammonia to the air. The course of the stream was almost entirely controlled by the topography, rather than the other way around; the river was geologically too young to have altered the landscape greatly by its own action. Also, much of the exposed surface of the planet in this area was bed rock, igneous and hard, rather than a covering of loose sediment in which a stream could have its own way.

About three hundred miles from the point at which she had been abandoned, the *Kwembly* was borne into a broad, shallow lake. She promptly but gently ran aground on the soft mud delta where the river fed into it. The great hull naturally deflected the currents around it, and set them to digging a new channel alongside. After about half an hour she tilted sideways and slid off into the new channel, righting herself as she floated free. It was the rocking associated with this last liberation which caught the attention of the helmsmen and induced them to come out for a look around.

14: SALVAGE CREW

It would be untrue to say that Benj recognized Beetchermarlf at first glance. As a matter of fact, the first of the caterpillar like figures to emerge from the river and clamber up the hull was Takoorch. However, it was the younger helmsman's name which echoed from four speakers on Dhrawn.

One of these was on the *Kwembly's* bridge and went unheard. Two were in Dondragmer's encampment a few hundred yards from the edge of the broad, swift river which now filled the valley. The fourth was in Reffel's helicopter, parked close beside the bulk of the *Gwelf*

The flying machines were about a mile west of Dondragmer's camp; Kabremm would go no closer, not wanting to take the slightest chance of repeating his earlier slip. He would probably not have moved at all from the site where Stakendee had found him if the river had not risen. For one thing, he had been fog-bound and had no wish to fly at all. Reffel had been even less eager to move. However, there had been no choice, so Kabremm had allowed his craft to float upward on its own lift until it was in clear air. Reffel hovered as close to the other machine's running lights as he dared. Once above the few yards of ammonia droplets, they could navigate, and had flown toward Dondragmer's lights until the dirigible's commander had decided they were close enough. Letting the *Gwelf* come to the attention of the men in orbit above would have been an even more serious mistake than the one he had made already; Kabremm was still trying to decide what he was going to say to Barlennan about that the next time they met.

Both he and Reffel had also spent some uncomfortable hours before concluding, from the lack of appropriate comment, that Reffel had shuttered his vision set quickly enough after coming within sight of the *Gwelf*

In any event, Dondragmer and Kabremm had at last achieved almost direct communication, and had been able to coordinate what they would say and do if there were any further repercussions from Easy's recognition. One load was off the captain's mind. However, he was still taking steps connected with that mistake.

The cry of "Beetch!" in Benj's unmistakable voice distracted him from one of these steps. He had been checking over his crew for people who looked as much as possible like Kabremm. The job was complicated by the fact that he had not seen the other officer for several months. Dondragmer had not yet had time to visit the *Gwelf* Kabremm would come no closer to the camp for any reason, and Dondragmer had never known him particularly well anyway. His plan was to have all crewmen who might reasonably be mistaken for the *Esket's* first officer appear unobtrusively and casually but frequently in the field of view of the vision sets. Anything likely to undermine the certainty of Easy Hoffman that she

had seen Kabremm was probably worth trying.

However, the fate of the *Kwembly* and his helmsmen had never been very far from the captain's mind in the twelve hours since his cruiser's lights had vanished, and at the sound from the speaker he snapped to full attention.

"Captain!" the boy's voice continued. "Two Mesklinites have just appeared and are climbing up the hull of the *Kwembly*. They came out of the water; they must have been somewhere underneath all the time, even if you couldn't find them. It couldn't be anyone but Beetch and Tak. I can't talk to them until they get to the bridge, of course, but it looks as though we might get your ship back after all. Two men can drive it, can't they?"

Dondragmer's mind raced. He had not blamed himself for abandoning the cruiser, even though the flood had been such an anticlimax. It had been the most reasonable decision at the time and with the available knowledge. By the time the actual nature of the new flood had been clear, and it was obvious that they could have remained in the cruiser with perfect safety it had been impossible to get back. Being a Mesklinite, the captain had wasted no time on thoughts of the "if only?" variety. He had known when he left his vehicle that the chances of getting back were rather small, and when she had drifted downstream intact instead of a shattered ruin they had grown smaller. Not quite to zero, perhaps, but not large enough to take seriously any more.

Now suddenly they had expanded again. The *Kwembly* was not only usable, but his helmsmen were alive and aboard her. Something might be done, if...

"Benj!" Dondragmer spoke as his thoughts reached this point. "Will you please get your technical men to determine as closely as they can just how far from us the *Kwembly* is now? It is perfectly possible for Beetchermarlf to drive her alone, though there are other problems in the way of general maintenance which will keep him and Takoorch busy. However, they should be able to manage. In any case, we must find out whether the distance involved is fifty miles or a thousand. I doubt the latter, since I don't think this river could have carried them so far in twelve hours, but we'll have to know. Get your people at it, and please tell Barlennan what is happening."

Benj obeyed quickly and efficiently. He was no longer overtired, worried, and resentful. With the abandonment of the *Kwembly* twelve hours before he had given up hope for his friend's life and had left the communication room to get some long overdue sleep. He had not expected to be able to accomplish this, but his own body chemistry had fooled him. Nine hours later he had returned to his regular duties in the aerology laboratory. It had been chance alone which had brought him back to the screens within a few minutes of the helmsmen's emergence. He had been sent by McDevitt to collect general data from the other cruisers, but had lingered for a few minutes to watch at the *Kwembly* station. The weather man had come to depend heavily on Benj's knowledge of the Mesklinite language.

The sleep, and the sudden discovery that Beetchermarlf was alive after all, combined to dispose of Benj's lingering resentment of Dondragmer's policy. He acknowledged the captain's request, called his mother to take his place, and headed for the laboratory decks as rapidly as his muscles would take him up the ladders.

Easy, who had also had some sleep, reported Benj's departure and her own presence to Dondragmer, briefed Barlennan as requested, and switched back to the captain with a question of her own.

"That's two of your missing men. Do you think there is still any chance of finding your helicopter pilots?"

Dondragmer almost slipped on his answer, carefully as he picked his words. He knew, of course, where Reffel was, since messengers had been passing steadily between the camp and the *Gwelf* but Kervenser,

to his disappointment, had not been seen by the crew of the dirigible or anyone else. His disappearance was perfectly genuine, and the captain now regarded his chances for survival as even lower than those of the *Kwembly* pair an hour before. It was safe, of course, to talk about this; his slip consisted of failing to mention Reffel at all. The Stennish forms equivalent to "him" and "them" were as distinct as the human ones, and several times Dondragmer caught himself using the former when talking about his lost pilots. Easy seemed not to notice, but he wondered afterward.

"It is hard to judge. I have not seen either one. If he went down in the area now flooded it is hard to see how they could be alive now. It is very unfortunate, not only because of the men themselves but because with even one of the helicopters we might be able to transfer more men to the *Kwembly* and get her back here more easily. Of course most of the equipment could not be carried that way; on the other hand, if it turns out that the two men cannot bring the cruiser back here for any reason, having one of the fliers could make a great difference to *them*. It is a pity that your scientists cannot locate the transmitter which Reffel was carrying, as they can the one on the *Kwembly*."

"You're not the first to feel that way," agreed Easy. The matter had been brought up shortly after Reffel's disappearance. "I don't know enough about the machines to tell why the signal strength depends on the picture brightness; I always thought a carrier wave was a carrier wave; but that seems to be it. Either Reffel's set is in total darkness or it has been destroyed.

"I see your life-support equipment is set up and working."

The last sentence was not entirely an effort of Easy's to change the subject; it was her first good look at the equipment in question, and she was genuinely curious about it. It consisted of scores, perhaps over a hundred, of square transparent tanks covering altogether a dozen square yards, each about a third full of liquid, with the nearly pure hydrogen which constituted Mesklinite air bubbling through it. A power unit operated the lights which shone on the tanks, but the pumps which kept the gas circulating were muscle-driven. The vegetation which actually oxidized the saturated hydrocarbons of Mesklinite biological waste and gave off free hydrogen was represented by a variety of unicellular species corresponding as nearly as might be expected to terrestrial algae. They had been selected for edibility, though not, as Easy had been given to understand, for taste. The sections of the support equipment which used higher plants and produced the equivalent of fruit and vegetables were too bulky to move from the cruiser.

Easy did not know how the non-gaseous items in the biological cycle were gotten into and out of the tanks, but she could see the charging of air suit cartridges. This was a matter of muscle-driven pumping again, squeezing hydrogen into tanks which contained slugs of porous solid. This material was another strictly non-Mesklinite product, a piece of molecular architecture vaguely analogous to zeolite in structure, which adsorbed hydrogen on the inner walls of its structural channels and, within a wide temperature range, maintained an equilibrium partial pressure with the gas which was compatible with Mesklinite metabolic needs.

Dondragmer answered Easy's remark. "Yes, we have just about enough food and air. The real problem is what to do. We have saved very little of your planetological equipment; we can't carry on your work. Conceivably we might make our way back to the Settlement on foot, but we'd have to carry the life-support material by stages. That would mean setting up a camp only a few miles from here, transferring the equipment, recharging the air cartridges after cycling has resumed, and then repeating the process indefinitely. Since the distance to the settlement is about thirty thousand, excuse me, in your numbers about twelve thousand, of your miles, it would take us years to get there: that's no metaphor, nor do I mean your short years. If we're to be any further use to your project, we really must get the *Kwembly* back here."

Easy could only agree, though she could see an alternative which the captain had not mentioned. Of course, Aucoin would disapprove, or would he, under the circumstances? A trained and efficient exploring crew represented quite an investment, too. That might be a useful line to follow.

It was several more minutes before Benj returned with his information, and incidentally with a following of interested scientists.

"Captain," he called, "the *Kwembly* is still moving, though not very fast, something like twenty cables an hour. She is located, or was six minutes ago, 310.71 miles from your transmitter, in our figures. In your numbers and units that's 233,750 cables. There's a small error if there's much difference in elevation. That's great circle distance; we don't have too good an idea of the length of the river, though they have about twenty position readings taken along it since your ship started drifting, so there's a rough river map up in the lab."

"Thank you," came the captain's answer in due course. "Are you in verbal contact with the helmsmen yet?"

"Not yet, but they've gone inside. I'm sure they'll find the communicator on the bridge pretty soon, though I suppose there are other places they'd want to check first. The air must be pretty low in their suits."

This was perfectly correct. It took the helmsmen only a few minutes to ascertain that the cruiser was deserted, and to note that much of the life-support equipment was gone; but this left them with the need to check the air now aboard for contamination with oxygen from outside. Neither of them knew enough basic chemistry to invent a test, and neither was familiar with the routine ones used by Borndender and his colleagues. They were considering the rather drastic procedure of testing by smell when it occurred to Beetchermarlf that a communicator might have been left aboard for scientific reasons, and that the human beings might be of help. There was none in the laboratory, but the bridge was the next most likely spot, and Beetchermarlf's voice was on its way up to the station some ten minutes after the helmsmen had come aboard.

Benj postponed greetings when he heard Beetchermarlf's question, and relayed it at once to Dondragmer. The captain called his scientists and outlined the situation, and for over half an hour the relay was very busy: Borndender explained things, and Beetchermarlf repeated the explanations, then went to the lab to examine material and equipment, then came back to the bridge to make sure of some minor point...

Eventually both parties in the conversation felt sure that the instructions had been understood. Benj, at its pivot point, was nearly sure. He knew enough physics and chemistry himself to judge that nothing was likely to blow up if Beetch made a mistake; his only worry was that his friend might perform the tests sloppily and so miss a dangerous amount of oxygen. Was the risk simply one of poisoning, or did hydrogen oxygen mixtures present other dangers? He wasn't quite sure; hydrogen-oxygen mixtures have other qualities. He remained rather tense until Beetchermarlf returned to the bridge with the report that both tests were complete. The catalyst which disposed of free oxygen by accelerating its reaction with ammonia was still active, and the ammonia-vapor concentration in the ship's air was high enough to give it something to work on. The helmsmen had already removed their air-suits and neither could smell any oxygen, though, as with human beings and hydrogen sulfide, smell is not always a reliable test.

At least, the two could live on board for a time. One of their first acts had been to "hand"-pump the feed tank which kept air bubbling through the life-support medium, and to satisfy themselves that most of the plants were still alive. The next problem was navigation.

Benj told his friend as much as possible about his location, that of the rest of the crew, and the *Kwembly's* present rate and direction of travel. There was no problem about using the information. Beetchermarlf could determine direction easily enough. The stars were visible and he had a perfectly good magnetic compass. Dhrawn's magnetic field was a good deal stronger than Earth's, to the consternation of the scientists who had long since taken for granted a correlation between magnetic field and rotation rate for ordinary planets.

The discussion which produced a detailed operation plan was shorter than the one preceding the oxygen test, though it still involved the long relay. Neither Dondragmer nor the helmsmen had any serious doubts about what to do or how to do it.

Beetchermarlf was far younger than Takoorch, but there seemed no question as to who was in charge aboard. The fact that Benj always signaled Beetch by name, rather than signaling the *Kwembly* formally, may have contributed to the young one's authority. Easy and several of the other human beings suspected that Takoorch, in spite of his willingness to discuss his own past accomplishments, was in no great hurry to take on too much responsibility. He tended to agree with Beetchermarlf's suggestions either at once or after only token arguments.

"We're still adrift, and unless this river has some very funny loops farther down we'll never get any closer to the others with its help," the younger Mesklinite summarized at last. "The first job will be to get paddles on some of the powered trucks. Trying to do it with all of them will take forever; a couple of outboard-row ones aft, and maybe a central one forward should give control. With power available on other drivers we can either pull off or get safely ashore if we run aground. Tak and I will go outside and start work right now. You keep an eye on us as much as you can, Benj; we'll leave the set where it is."

Beetchermarlf did not wait for an answer. He and his companion suited up once more and broke out the paddles which were designed to be pinned onto the treads of the drivers. These had been tested on Mesklin but had never yet been used on Dhrawn; no one really knew how well they would work. Their area was small, since there was little clearance for them above the trucks, and some of that small area was taken up by a plastic shield designed to fold them flat as they were riding forward on the top side of the trucks. However, it had been proved that they would supply some thrust. What this would accomplish remained to be seen; the *Kwembly* was floating higher in the ammonia-water solution of Dhrawn, of course, than she had in the liquid hydrocarbon ocean of the world where she had been made.

Installation of the fins and shields was a long and awkward job for two workers. The pieces could be taken out only one at a time, since there was nowhere to put them down with the cruiser afloat. Safety lines persistently got in the way. Mesklinite pincers are rather less effective handling organs than are human fingers, though this is somewhat offset by the fact that their owner can use all four pairs of them simultaneously and in coordination—he has no asymmetry corresponding to human right- or left-handedness.

The need for artificial lights was still another bother. As it turned out, getting twelve paddles and one shield on each of three drivers took a total of almost fifteen hours. It could, Beetchermarlf assured Benj, have been accomplished in two with four workers on each truck.

By this time the trackers had learned that the *Kwembly* was not getting any farther from the camp, though she was still moving. Apparently she had been caught in an eddy some four miles in diameter. Beetchermarlf took advantage of this when he was finally ready to apply power; he waited until the human analysts could tell him that he was being carried south before he set the three finned trucks running. For some seconds it was not apparent that the power was doing any good; then, very slowly, helmsmen and humans alike saw that the great hull was moving gently forward. The Mesklinites could see from the bridge a feeble excuse for a bow wave; the human beings, looking aft, were able to detect small

ripples spreading back from the sides. Beetchermarlf swung his helm hard over to bring the bow in line with Sol and Fomalhaut. For nearly half a minute he was left wondering whether there would be any response; then the stars began to swing overhead as the long hull swerved majestically. Once started it was hard to stop; he over-controlled many times and for a period of many minutes, sometimes by as much as a full right angle, before getting the feel of the vessel. Then for nearly an hour he managed to hold a southerly heading, though he had no idea of his actual course at first. He could guess from the earlier information that the eddy would be bearing him in the same direction at the start, but then it would presumably carry him eastward.

It was some time, however, before the directional antennae on the shadow satellites and the computers in the station could confirm this guess. About the time they did, the *Kwembly* ran gently aground.

Beetchermarlf instantly shifted drive power to the two trucks farthest forward which had power boxes, letting the paddle-equipped ones idle, and pulled his cruiser out on the shore.

"I'm out of the lake," he reported. "Minor problem. If I travel for any distance on land with the paddles in place I'll wear them out. If it turns out that I'm on an island, or have to go back to the water for any other reason, an awful lot of time will have been wasted taking them off and putting them on again. My first thought is to do some exploring on foot, leaving the ship right here, to get some idea of what the chances of staying ashore may be. It will take a long time, but not nearly as long as waiting for daylight. I'll be glad of advice from you humans or orders from the captain; we'll wait."

Dondragmer, when this was relayed to him, was prompt with his answer.

"Don't go out. Wait until the map-makers up above can decide whether you are on the same side of the river as we are, or not. As I picture the map they've described, there's a good chance that the eddy carried you to the east side, which would be the right bank; we're on the left. If they are even moderately sure of this, get back into the water and head west until they think you're past it, no, second thought. Go until they think you're opposite its mouth, then head south once more. I'd like to find out whether you can travel upstream with any speed at all. I know it will be slow; it may turn out that you can't travel at all in some places along the bank."

"I'll tell Beetch and the map people, Captain," answered Benj. "I'll try to get a copy of their map and keep it up to date down here; that may save some time in the future."

The directional data was not, as it happened, definitive. The location of the *Kwembly* could be established well enough, but the course of the river down which she had come was much less certain. The checks were many miles apart, but sufficient in number to show that the river was decidedly crooked. After some further discussion, it was decided that Beetchermarlf should get back afloat and head westward as close to shore as he could; preferably within sight of it, if the range of his lights and the slope of the lake bottom would permit it. If he could find the river mouth by sight, he was to head up it as Dondragmer had wished; if not, he was to continue along the shore until the men above were reasonably certain that he had passed the river mouth, then turn south.

It did prove possible to keep the shore within range of the *Kwembly's* lights, but it took over two hours to reach the river. This had made a wide westward bend which had been missed in the checks of the cruiser's position during the downstream drift; then it turned again and entered the lake on an eastward slant which presumably caused the counterclockwise eddy. One of the planetographers remarked that you couldn't blame the eddy on Coriolis force because the lake was only seven degrees from the equator and on the south side, at that, of a planet which took two months to rotate.

The delta, which caused the shoreline to turn north briefly, was a warning. Beetchermarlf at the helm and

Takoorch at the port wing of the bridge sent the *Kwembly* groping around the rather irregular peninsula, slowing noticeably several times as the trucks dragged in soft bottom silt, and finally found their way into a clear channel and headed into its current.

This was not swift, but the *Kwembly* still wasn't afloat. The Mesklinites were in no hurry; Dondragmer gave six hours and more to the experiment of fighting the stream. They made about ten miles progress in that time. If that rate could be maintained, the cruiser would be back at the camp by a day or two after midnight, that is, in a week or so by human reckoning.

It was impatience which changed the travel plans. This could not, of course, be blamed on any Mesklinite; it was Aucoin, of all people, who decided that a mile and a half an hour was not satisfactory. Dondragmer did not feel strongly about the matter; he agreed that research might as well be worked into the trip if possible. At the planner's suggestion he sent Beetchermarlf angling westward toward what was presumably the near bank of the river. The land seemed traversable. With some misgiving he had the helmsmen remove the paddles.

Removal proved much easier than installation, since the vehicle was now on dry land. Things could be laid down and life lines were not needed.

Benj, on his next visit to the communication room, found the *Kwembly* cruising smoothly south at about ten miles an hour over flat country, interrupted by an occasional outcropping of rock and studded here and there with scrubby brush, the highest life form so far encountered on Dhrawn. The surface was firm sediment; the planetologists judged the area to be a flood plain, which seemed reasonable even to Benj.

Beetchermarlf was willing to talk as usual, but it could be seen that his attention was not entirely on conversation. Both he and Takoorch were looking ahead as sharply as their eyesight and the *Kwembly's* lights would permit. There was no assurance that the going was safe; without air-scouting, the ten-mile speed was all they dared use. Anything faster would have been overrunning their lights. Whenever other duties, such as air-plant maintenance, had to be performed, they stopped the cruiser and did the work together. One set of eyes, they felt, was not enough for safe travel.

Every now and then, as the hours wore on, whoever was at the helm would begin to feel the treacherous assurance that there could be no danger; that they had, after all, come scores of miles now without having to change heading except to keep the river in sight. A human being would have increased the running speed bit by bit. The Mesklinite reaction was to stop and rest. Even Takoorch knew that when he was feeling tempted to act against the dictates of elementary common sense, it was time to do something about his own condition. Discovering the vehicle halted when he came to the screens on one occasion, Aucoin assumed it was a regular air-maintenance stop; but then he saw one of the Mesklinites sprawled idly on the bridge. The set had been put back in its old location, giving a view forward over the helm. Asking why the cruiser was not traveling, Takoorch simply replied that he had found himself getting casual. The administrator left in a very thoughtful mood.

Eventually, this care paid off, or seemed to.

For some miles the outcroppings of bed rock had been more and more frequent, though generally smaller, closer together, and more angular. The planetologists had been making guesses, futile ones with so little information, about the underlying stratigraphy. The basic surface was still hard-packed sediment, but the watchers suspected that it might be getting shallower, and that some time soon the *Kwembly* might find herself on the same sort of bare rock that formed the substrate at Dondragmer's camp.

The helmsmen occasionally found it necessary now to weave slightly left or right to avoid the rock outcroppings; they even had to slow down a little from time to time. Several times in the past few hours

the planetologists had rather plaintively suggested that the cruiser stop before it was too late, and pick up samples of the sediment she was running over even if the rocks were too big to collect. Aucoin simply pointed out that it would be a year or two before the sample could get up to the station anyway, and refused; the scientists retorted that a year was much better than the time which would be needed if the specimens weren't collected.

But when the *Kwembly* stopped, it was on Beetchermarlf's initiative. It was a minor thing, or seemed to be; the soil ahead seemed a little darker, with a very sharp boundary between it and the surface under the cruiser. The line was not noticeable on the vision screen, but the Mesklinites spotted it simultaneously and, without words, agreed that close examination was in order. Beetchermarlf called the station to inform the human beings and his captain that he and Takoorch would be going outside for a time, and described the situation. Easy, translating the message, was promptly begged by two planetologists to persuade the Mesklinites to bring samples aboard. She assumed that even Aucoin would hardly object under the circumstances, and agreed to ask them when she called back with Dondragmer's clearance.

The captain, this time, approved the sortie, suggesting only that it be preceded by a careful look around from the bridge with the aid of the spotlights. This proved useful. A hundred yards ahead, not too far out of the range of the running lights, a small stream ran across their path and emptied into the river. Sweeping the light to starboard, this tributary could be seen arcing around parallel to the cruiser's path from the north, then reversing its curve somewhat astern of the big vehicle and disappearing to the northwest. The *Kwembly* was on a peninsula some two hundred yards wide and not quite as long, bounded on the east—left—by the main river she had been following and on the other sides by the small tributary. It seemed likely to Mesklinites and human beings alike that the change in soil color which had caught the helmsmen's attention was caused by wetting from the smaller stream, but no one was sure enough of it to cancel the proposed trip outside. Aucoin was not present.

Outside, even with the aid of extra lights, the line of demarcation between the two kinds of soil was much less visible than before. Eye distance, Beetchermarlf judged, was the main cause. The crew scraped up and packaged samples of material from both sides of the line; then they went on to the stream itself. This proved to be a swift-running but shallow brook three or four body-lengths in width, its level an inch or two below the soil through which it was cutting its way. After a brief consultation, the two Mesklinites began to follow it away from the river. They had no way of telling its composition, but a bottle of its contents was secured for later testing.

By the time they reached the spot where it was curving away, even the Mesklinites could see that the stream had not been in existence very long. It was eating with visible speed into its banks, washing the sediment on toward the main river. Now that they were on the outside of its curve, the undercutting of the near bank could be seen and even felt; Beetchermarlf, standing at the edge, felt it crumble suddenly away under him and found himself in the stream.

It was only an inch or so deep, so he took advantage of the occasion to take another sample from its bottom before climbing out. They decided to continue upstream for another ten minutes or so, with Beetchermarlf wading and Takoorch on the bank. Before the time was up they had actually found the source of the watercourse. It was a spring, not half a mile from the *Kwembly*, roiling violently in the center of its basin where an underground source fed it. Beetchermarlf, investigating the middle, was knocked from his feet and carried half a body length by the upward current.

There was nothing in particular to do; they had no camera equipment, no one had seriously suggested that they bring the vision set with them, and there was nothing obvious to be gained by collecting more samples. They returned to the *Kwembly* to give a verbal description of what they had found.

Even the scientists agreed that the best step now was to get the samples back to the camp where

Borndender and his fellows could do something useful with them. The helmsmen eased their cruiser into motion once more.

It approached the stream and nosed through it; the mattress took up the slight dip as the trucks crossed the bottom of the widening valley, and nothing could be felt on the bridge.

Not for another eight seconds.

The hull was rather more than halfway across the little brook when the distinction between solid and liquid began to blur. A slight lurch could be felt on the bridge; it showed on the screen far above as a tiny upward jerk of the few outside features visible.

Forward motion stopped almost instantly, though the drivers kept churning. They could accomplish nothing when completely immersed in slimy mud, which the surface had so suddenly become. There was neither support nor traction. The *Kwembly* settled until the trucks were buried; settled until the mattress was nearly out of sight; settled almost, but not quite, to the level where she would have been literally floating in the semi-liquid muck. She was stopped by two of the rock outcrops, one of which caught her under the stern just aft of the mattress, and the other on the starboard side some ten feet forward of the main lock. There was an ugly scraping sound as the cruiser's hull canted forward and to port, and then came to rest.

And this time, as Beetchermarlf's sense of smell warned him only too clearly, the hull had failed somewhere. Oxygen was leaking in.

15: ESSENCE

"It boils down to this," Aucoin said from the head of the table. "We have the choice of sending down the barge, or not. If we don't, the *Kwembly* and the two Mesklinites aboard her are lost, and Dondragmer and the rest of her crew are out of action until a rescue cruiser such as the *Kalliff* can reach them from the Settlement. Unfortunately, if we do try to land the barge there's a good chance that it won't help. We don't know why the ground gave under the *Kwembly*, and have no assurance that the same thing won't happen anywhere else in the vicinity. Losing the barge would be awkward. Even if we first landed near Dondragmer's camp and transferred him and his crew to the cruiser, we might lose the barge and there is no assurance that the crew could repair the *Kwembly*. Beetchermarlf's report makes me doubt it. He says he has found and sealed the major leaks, but he's still getting oxygen inside the hull from time to time. Several of his life-support tanks have been poisoned by it. So far he has been able to clean them out each time and restock them from the others, but he can't keep going forever unless he stops the last of these leaks. Also, neither he nor anyone else has made any concrete suggestion for getting that cruiser loose from the muck or whatever it's stuck in.

"There is another good argument against landing the barge. If we use remote, live control, there is the sixty-second reaction lag, which would make handling anywhere near the ground really impossible. It would be possible to program its computer to handle a landing, but the risks of that were proved the hard way the first time anyone landed away from Earth. You might as well give the Mesklinites a quick lesson in flying the thing for themselves!"

"Don't try to make that last sound too silly, Alan," Easy pointed out gently. "The *Kwembly* is merely the first of the cruisers to get into what looks like final trouble. Dhrawn is a very big world, with very little known about it, and I suspect we're going to run out of land-cruisers for rescue or any other purpose sooner or later. Also, even I know that the barge controls are computer-coupled, with push-the-way-you-want-to-go operators. I admit that even so, the chances are ten to one or worse that anyone trying a ground-to-ground flight with that machine on Dhrawn without previous experience would

kill himself, but do Beetchermarlf and Takoorch have even that much chance of survival on any other basis?"

"I think they do," replied Aucoin quietly.

"How, in the name of all that's sensible?" snapped Mersereau. "Here all along we've—" Easy held up her hand, and either the gesture or the expression on her face caused Boyd to fall silent.

"What other procedure *which you could conscientiously recommend* would stand any real chance of saving either the *Kwembly* herself, or her two helmsmen, or the rest of Dondragmer's crew?" she asked.

Aucoin had the grace to flush deeply, but he answered steadily enough.

"I mentioned it earlier, as Boyd remembers," he said. "Sending the *Kalliff* from the Settlement to pick them up.

The words were followed by some seconds of silence, while expressions of amusement flitted across the faces around the table. Eventually Ib Hoffman spoke.

"Do you suppose Barlennan will approve?" he asked innocently.

"It boils down to this," Dondragmer said to Kabremm. "We can stay here and do nothing while Barlennan sends a rescue bruiser from the Settlement. I assume he can think of some reason for sending one which won't sound too queer, after he failed to do it for the *Esket*."

"That would be easy enough," returned the *Esket's* first officer. "One of the human beings was against sending it, and the commander simply let him win the argument. This time he could be firmer."

"As though the first time wouldn't have made some of the other humans suspicious enough. But never mind that. If we wait, we don't know how long it will be, since we don't even know whether there's a possible ground route from the Settlement to here. You came from the mines by air, and we floated part of the way.

"If we decide not to wait, we can do either of two things. One is to move by stages toward the *Kwembly*, carrying the life equipment as far as the suits will let us and then setting it up again to recharge them. We'd get there some time, I suppose. The other is to move the same way toward the Settlement to meet the rescue cruiser if one comes or get there on foot if it doesn't. I suppose we'd even get *there*, eventually. Even if we reach the *Kwembly*, there is no certainty that we can repair her; if the human beings have relayed Beetchermarlf's feelings at all adequately, it seems rather doubtful. I don't like either choice because of the wasted time they both involve. There are better things to do than crawl over the surface of this world on foot.

"A better idea, to my way of thinking, is to use your dirigible either to rescue my helmsmen if it is decided to give up on the *Kwembly*, or to start ferrying my crew and equipment over to where she is."

"But that—"

"That, of course, sinks the raft as far as the *Esket* act is concerned. Even using Reffel's helicopter would do that; we couldn't explain what happened to the vision set he was carrying without their seeing through it, no matter what lie you think up. I'm simply not sure that the trick is worth the deliberate sacrifice of those lives, though I admit it's worth the *risk*, of course; I wouldn't have gone along with it otherwise."

"So I heard," returned Kabremm. "No one has been able to make you see the risk of being completely dependent on beings who can't possibly regard us as real people."

"Quite right. Remember that some of them are as different from *each other*, as they are from us. I made up my mind about the aliens the time one of them answered my question about a differential hoist clearly and in detail, and threw in my first lesson in the use of mathematics in science, gratis. I realize the humans differ among themselves as we do; certainly the one who talked Ban out of sending help to the *Esket* must be as different as possible from Mrs. Hoffman or Charles Lackland—but I don't and never will distrust them as a species the way you seem to. I don't think Barlennan really does, either; he's changed the subject more than once rather than argue the point with me, and that's not Barlennan when he's sure he's right. I still think it would be a good idea to lower the sails on this act and ask directly for human help with the *Kwembly*. or at least take a chance on their finding out by using all three dirigibles there."

"There aren't three, any more." Kabremm knew the point was irrelevant, but was rather glad of a chance to change the subject. "Karfrengein and four men have been missing in the *Elsk* for two of this world's days."

"That news hadn't reached me, of course," said Dondragmer. "How did the commander react to it? I should think that even he would be feeling the temptation to ask for human help, if we're starting to lose personnel all over the map."

"He hasn't heard about it, either. We've had ground parties out searching, using trucks we salvaged from the *Esket*, and we didn't want to make a report until it could be a complete one."

"How much more complete could it be? Karfrengein and his men must be dead by now. The dirigibles don't carry life-support gear for two days."

Kabremm gave the rippling equivalent of a shrug. "Take it up with Destigmat. I have troubles enough."

"Why wasn't your flyer used for the search?"

"It was, until this evening. There are other troubles at the mine, though. A sort of ice river is coming, very slowly, but it will soon cover the whole second settlement if it doesn't stop. It's already reached the *Esket* and started to tip it over; that's why we were able to salvage the trucks so easily. Destigmat sent me to follow back up the glacier and try to find out whether it is likely to keep coming indefinitely, or was just a brief event. I really shouldn't have come this far, but I couldn't make myself stop. It's this same river for the whole distance, sometimes solid and sometimes liquid along the way; it's the weirdest thing I've seen yet on this weird world. There isn't a chance of the ice's stopping, and the *Esket* settlement is as good as done for."

"And of course Barlennan hasn't heard about this either."

"There's been no way to tell him. We only discovered the ice was moving just before dark. It was just a cliff a few dozen cables from the mine up to then."

"In other words, we've lost not only my first officer and a helicopter but a dirigible with five men, and as an afterthought the whole *Esket* project, with my *Kwembly* probably on the same list. And you still think we shouldn't end this trickery, tell the human beings the whole story, and get their help?"

"More than ever. If they learn we're having this much trouble, they'll probably decide we're no more use to them and abandon us here."

"Nonsense. No one just abandons an investment like this project; but never mind arguing; it's a futile point anyway I wish—"

"What you really wish is that you had an excuse for leaking the whole barrel to your oxygen-breathing

friends."

"You know I wouldn't do that. I'm quite ready to use my own judgment in the field, but I know enough history to be afraid of making spot-changes in basic policy."

"Thank goodness. It's all right to like some humans, but they're not all like the Hoffman one. You admitted that yourself."

"What it boils down to," Barlennan said to Bendivence, "is that we were much too hasty in sending Deeslenver to the *Esket* with orders to shutter its vision sets. The whole *Esket* question seems to have quieted down, and that will bring it to life again. We're not ready for the main act yet, and won't be for a year or more. I wasn't sorry for the chance to start the human beings thinking along the lines of a native-menace idea, but Destigmat's crew won't be able to play the part until they have a lot more home-made mechanical and electrical equipment, things that the humans know we don't have. Certainly, unless the native menace seems real, the human beings aren't very likely to take the steps we want."

"If there were any way to go after Dee now and cancel his orders, I'd do it. I wish I'd dared let you go ahead with radio experiments, and had a set on the *Deedee* right now."

"It shouldn't be too risky, and I'd be more than glad to work on it," answered Bendivence. "The waves could be detected by the human beings, of course, but if we confined ourselves to brief and rare transmissions and used a simple off-on code they probably wouldn't realize what the source was. However, it's too late to get Deeslenver, anyway."

"True. I wish I knew why no one up there has said another word about Kabremm. The last time I talked to Mrs. Hoffman, I got the impression that she wasn't quite as sure as before that she'd really seen him. Do you suppose she really made a mistake? Or are the human beings trying to test *us*, the way I wanted to do with them? Or has Dondragmer done something to get us off that reef. If she were really wrong, we'll have to start thinking all over again..."

"And what about that other report we've heard no more of, something sliding across the *Esket's* floor?" countered the scientist. "Was that still another test? Or is something really happening there? Remember, we haven't had any contact with that base for over a hundred and fifty hours. If the *Esket* is really being moved by something, we're much too badly out of date to do anything sensible. You know, without saying anything against the *Esket* act, it's an awful nuisance not to be able to trust your data."

"If there's real trouble at the *Esket* we'll just have to trust Dee's judgment," said the commander, ignoring Bendivence's closing sentence. "Actually, even that isn't the chief problem. The real question is what to do about Dondragmer and the *Kwembly*. I suppose he had good reason to leave his ship and let her drift away, but the results have been very awkward. The fact that a couple of his men got left aboard makes it almost more so; if they hadn't been, we could just forget about the cruiser and send out the *Kalliff* to pick up the people."

"Why can't we do that anyway? Didn't the human Aucoin suggest it?"

"He did. I said I'd have to think it over."

"Why?"

"Because there is less than one chance in ten, and probably less than one in a hundred, that the *Kalliff* could get there in time to do those two men any good. The chances are small enough that she could get there at all. Remember that snow field the *Kwembly* crossed before her first flood? What do you suppose that area is like now? And how long do you think two men, competent men, but with no real

technical or scientific training, are going to keep that leaking hull habitable?

"Of course, we could confess the whole act, tell the humans to get in touch with Destigmat through the watch he keeps at the *Esket's* communicators; then they could tell him to send a rescue dirigible."

"That would be wasting a tremendous amount of work, and ruining what still seems a promising operation," Bendivence replied thoughtfully. "You don't want to do that any more than I do; but of course we can't abandon those two helmsmen."

"We can't," Barlennan agreed slowly, "but I just wonder whether we'd be taking too much of a chance on them if we waited out one other possibility."

"What's that?"

"If the human beings were convinced that we could not possibly carry out the rescue, it's just possible, especially with *two* Hoffmans to do the arguing, that they'd decide to do something about it themselves."

"But what could they do? The ship they call the 'barge' will only land here at the Settlement by its automatic controls, as I understand Rescue Plan One. They certainly can't fly it around on this world from out at the orbiting station; if it took them a whole minute to correct any mistake, they'd crash it right away. They certainly can't fly it down personally. It's set up to rescue *us*, with our air and temperature control, and besides Dhrawn's gravity would paint a human being over the deck."

"Don't underestimate those aliens, Ben. They may not be exactly ingenious, but there's been time for their ancestors to think up a lot of ready-made ideas we don't know about yet. I wouldn't do it if I felt there was a real chance of our getting there ourselves, but this way we're not putting the helmsmen in any worse danger than they are already; I think that we'll let the human beings get the idea of making the rescue themselves. It would be much better than giving up the plan."

"What it boils down to," said Beetchermarlf to Takoorch, "is that we somehow have to find time between plugging leaks and cleaning poison out of the air units to convince people that the *Kwembly* is worth salvaging."

"The best way would be to get her going ourselves, though I doubt very much that we can do it. It's the cruiser that's going to set the policy. Your life and mine don't mean very much to the humans, except maybe to Benj, who isn't running things up there. If the ship stays alive, if we can keep these tanks going to supply us with food and air, and incidentally keep from being poisoned by oxygen ourselves, and make real, reportable progress in repairing and freeing the cruiser, *then* maybe they'll be convinced that a rescue trip is worth while. Even if they don't, we'll have to do all those things for our own sakes anyway; but if we can have the humans tell Barlennan that we have the *Kwembly* out and running, and will get her back to Dondragmer by ourselves, it should make quite a few people happy, especially the commander."

"Do you think we can do it?" asked Takoorch.

"You and I are the first ones to convince," replied the younger helmsman. "The rest of the world will be easier after that."

"What it boils down to," said Benj to his father, "is that we won't risk the barge for two lives, even though that's what it's here for."

"Not quite right on either count," Ib Hoffman answered. "It's a piece of emergency equipment, but it was planned for use if the whole project collapsed and we had to evacuate the Settlement. This was always a

possibility; there was a lot that just couldn't be properly tested in advance. For example, the trick of matching outside pressure in the cruisers and air-suits by using extra argon was perfectly reasonable, but we could not be sure there would be no side effects on the Mesklinites themselves; argon is inert by the usual standards, but so is xenon, which is an effective anaesthetic for human beings. Living systems are just too complicated for extrapolation ever to be safe, though the Mesklinites seem a lot simpler physiologically than we are. That may be one reason they can stand such a broad temperature range.

"But the point is, the barge is preset to home in on a beam transmitter near the Settlement; it won't land itself anywhere else on Dhrawn. It can be handled by remote control, of course, but not at this range.

"We could, I suppose, alter its on-board computer program to make it set itself down in other places, at least, on any reasonably flat surface; but would you want to set it down anywhere near your friend either by a built-in, unchangeable program or by long-delayed remote control? Remember the barge uses proton jets, has a mass of twenty-seven thousand pounds, and must put up quite a splash soft-landing in forty gravities, especially since its jets are splayed to reduce cratering." Benj frowned thoughtfully.

"But why can't we get closer to Dhrawn, and cut down the remote-control lag?" he asked, after some moments' thought. Ib looked at his son in surprise.

"You know why, or should. Dhrawn has a mass of 3,471 Earths, and a rotation period of just over fifteen hundred hours. A synchronous orbit to hold us above a constant longitude at the equator is therefore just over six million miles out. If you use an orbit a hundred miles above the surface you'd be traveling at better than ninety miles a second, and go around Dhrawn in something like forty minutes. You'd remain in sight of one spot on the surface for two or three minutes out of the forty. Since the planet has about eighty-seven times Earth's surface area, how many control stations do you think would be needed to manage one landing or lift-off?"

Benj made a gesture of impatience.

"I know all that, but there is already a swarm of stations down there, the shadow satellites. Even I know that they all have relay equipment, since they're all reporting constantly to the computers up here and at any given moment nearly half of them must be behind Dhrawn. Why can't a controller riding one of these, or a ship at about the same height, tie into their relays and handle landing and lift-off from there? Delay shouldn't be more than a second or so even from the opposite side of the world."

"Because," Ib started to answer, and then fell silent. He remained so for a full two minutes. Benj did not interrupt his thinking; the boy usually had a good idea of when he was ahead.

"There would have to be several minutes of interruption of neutrino data while the relays were being preempted," Ib said finally.

"Out of the how many years that they've been integrating that material?" Benj was not usually sarcastic with either of his parents, but his feelings were once more growing warm. His father nodded silently, conceding the point, and continued to think.

It must have been five minutes later, though Benj would have sworn to a greater number, that the senior Hoffman got suddenly to his feet.

"Come on, son. You're perfectly right. It will work for an initial space-to-surface landing, and for a surface-to-orbit lift-off, and that's enough. For surface-to-surface flight even one second is too much control delay, but we can do without that."

"Sure!" enthused Benj. "Lift off into orbit, get your breath, change the orbit to suit your landing spot. and

go back down."

"That would work, but don't mention it. For one thing, if we made a habit of it there *would* be a significant interruption of neutrino data transmission. Besides, I've wanted an excuse for this almost ever since I joined this project. Now I have one, and I'm going to use it."

"An excuse for what?"

"For doing exactly what I think Barlennan has been trying to maneuver us into doing all along: put Mesklinite pilots on the barge. I suppose he wants his own interstellar ship, some time, so that he can start leading the same life among the stars that he used to do on Mesklin's oceans, but he'll have to make do with one quantum jump at a time."

"Is *that* what you think he's been up to? Why should he care about having his own space pilots so much? And come to think of it, why wasn't that a good idea in the first place, if the Mesklinites don't learn how?"

"It was, and there's no reason to doubt that they can."

"Then why wasn't it done that way all along?"

"I'd rather not lecture on that subject just now. I like to feel as much pride in my species as circumstances allow, and the explanation doesn't reflect much credit either on man's rationality or his emotional control."

"I can guess, then," replied Benj. "But in that case, what makes you think we can change it now?"

"Because now, at the trifling cost of descending to the same general level of emotional reasoning, we have a handle on some of man's less generous drives. I'm going down to the planetology lab and filibuster. I'm going to ask those chemists why they don't know what trapped the *Kwembly*, and when they say it's because they don't have any samples of the mud, I'm going to ask them why they don't. I'm going to ask them why they've been making do with seismic and neutrino-shadow data when they might as well be analyzing mineral samples carted up here from every j spot where a Mesklinite cruiser has stopped for ten minutes. If you prefer not to descend to that level, and would rather work with mankind's no-bier emotions, you be thinking of all the heart-rending remarks you could make about the horror and cruelty of leaving your friend Beetchermarlf to suffocate slowly on an alien world parsecs from his home. We could use that if we have to take this argument to a higher authority, like the general public. I don't think we'll really need to, but right now I'm in no mood to restrict myself to clean fighting and logical argument. he "If Alan Aucoin growls about the cost of operating the barge (I think has too much sense), I'm going to jump on him with both feet. Energy has been practically free ever since we've had fusion devices; what costs is personal skill. He'll have to use Mesklinite crews anyway, so that investment is already made; and by letting the barge drift out here unused he's wasting *its* cost. I know there's a small hole in that logic, but if you point it out in Dr. Aucoin's hearing I'll paddle you for the first time since you were seven, and I don't think the last decade has done too much to my arm. You let Aucoin do his own thinking."

"You needn't get annoyed with *me*, Dad."

"I'm not. In fact, I'm not as much annoyed as I am scared."

"Scared? Of what?"

"Of what may happen to Barlennan and his people on what your mother calls 'that horrible planet.'"

"But why? Why now, more than before?"

"Because I'm coming gradually to realize that Barlennan is an intelligent, forceful, thoughtful, ambitious, and reasonably well-educated being, just as my only son was six years ago; and I remember your homemade diving outfit much too well. Come on. We have an astronautics school to get organized, and a student body to collect."

EPILOGUE: LESSONS

At two hundred miles, the barge was just visible as a star-like object reflecting Lalande 21185's feeble light. Benj had watched the vessel as it pulled up to that distance and moved into what its pilot considered a decent station-keeping orbit, but neither he nor the pilot had discussed technical details. It was so handy to be able to hold a conversation without waiting a full minute for the other fellow's answer that Benj and Beetchermarlf had simply chattered.

These conversations were becoming less and less frequent. Benj was really back at work now and, he suspected, making up for lost time. Beetchermarlf was often too far away on practice flights to talk at all, and even more frequently too occupied to converse with anyone but his instructor.

"Time to turn it over, Beetch," the boy ended the present exchange as he heard Tebbetts' whistling from down the shaft. "The taskmaster is on the way.

"I'm ready when he is," came the reply. "Does he want to use your language or mine this time?"

"He'll let you know; he didn't tell me. Here he is," replied Benj.

The bearded astronomer, however, spoke first to Benj after looking quickly around. The two were drifting weightless in the direct-observation section at the center of the station's connecting bar, and Tebbetts had taken for granted that the barge and his student would be drifting alongside. All his quick glance caught was the dull ember of a sun in one direction and the dimly lit disc of Dhrawn, little larger than Luna seen from Earth, in the other.

"Where is he, Benj? I thought I heard you talking to him, so I assumed he was close. I hope he isn't late. He should be solving intercept orbits, even with nomographs instead of high-speed computers, better than that by now."

"He's here, sir." The boy pointed. "Just over two hundred miles away, in a 17.8-minute orbit around the station."

Tebbetts blinked. "That's ridiculous. I don't think this heap of hardware would whip anything around in that time at a distance of two hundred feet, let alone that many miles. He'd have to use power, accelerating straight toward us—"

"He is, sir. About two hundred G's acceleration. The time is the rotation period of Mesklin, and the acceleration is the gravity value at his home port. He says he hasn't been so comfortable since he signed up with Barlennan, and wishes there were some way to turn up the sunlight."

The astronomer smiled slowly.

"Yes. I see. That does make sense. I should have thought of it myself. I have some more practice exercises for him here, but that's about as good as any of them. I should do more of that sort of thing. Well, let's get at it. Can you stay to check my language? I think I have the Stennish words for everything in today's work, and space is empty enough so that his mistakes and mine should both be relatively harmless, but there's no need to take chances.

"It's too bad the *Kwembly* couldn't be salvaged after all," remarked Aucoin, "but Dondragmer's crew is

doing a very good and effective study of the area while they're waiting for relief. I think it was a very good idea to send the Kalliff after them with a skeleton crew and let them work while they waited, instead of taking them back to the Settlement in the barge. That would have been pretty dangerous anyway, until there are practiced Mesklinite pilots. The single landing near the *Kwembly* to get the two helmsmen, and a direct return to space while they were trained, was probably the safest way to do it.

"But now we have this trouble with the *Smof*. At this rate we'll be out of cruisers before we're halfway around Low Alpha. Does anyone know the *Smof's* commander the way Easy knows Dondragmer? You don't, I suppose, Easy? Can anyone give a guess at his ability to get himself out of trouble? Or are we going to have to risk sending the barge down before those two Mesklinites are fully trained?"

"Tebbetts thinks Beetchermarlf could handle a surface landing now, as long as it wasn't complicated by mechanical emergencies," pointed out an engineer. "Personally I wouldn't hesitate to let him go.

"You may be right. The trouble is, though, that we certainly can't land the barge on an ice pack, and not even the barge can lift one of those land-cruisers, even if there were a way of fastening them together without an actual landing. Beetchermarlf and Takoorch may as well continue their training for the moment. What I want as soon as possible, Planetology, is the best direction and distance for the *Smof's* crew to trek if they do have to abandon the cruiser, that is, the closest spot where the barge *could* land to pick them up. If it's close to their present location, don't tell them, of course; I want them to do their best to save the cruiser, and there's no point in tempting them with an easy escape." Ib Hoffman stirred slightly, but refrained from comment. Aucoin, from one point of view, was probably justified. The administrator went on, "Also, is there definite word on the phenomenon that trapped the *Kwembly*? You've had specimens of the mud, or whatever it is, that Beetchermarlf brought up, for weeks now.

"Yes," replied a chemist. "It's a fascinating example of surface action. It's sensitive to the nature and particle size of the minerals present, the proportions of water and ammonia in the lubricating fluid, the temperature, and the pressure. The *Kwembly's* weight, of course, was the main cause of trouble; the Mesklinites could walk around on it, in fact, they did, safely enough. Once triggered by a pressure peak, the strength went out of the stuff in a wave—"All right, the rest can serve for a paper," Aucoin nodded. "Is there any way to identify such a surface without putting a ship onto it?"

"Hmm. I'd say yes. Radiation temperature should be information enough, or at least, it would warn that further tests should be made. For that matter, I wouldn't worry about its ever getting the barge; the jets would boil the water and ammonia out of such a surface safely before touchdown."

Aucoin nodded, and passed on to other matters. Cruiser reports, publication reports, supply reports, planning prospectuses.

He was still a little embarrassed. He had known his own failing, but like most people had excused it, and felt sure it wasn't noticeable. But the Hoffmans had noticed it, maybe others had. He'd have to be careful, if he wanted to keep a responsible and respected job. After all, he repeated firmly to himself, Mesklinites *were* People, even if they looked like bugs.

Ib Hoffman's attention wandered, important though he knew the work to be. His mind kept going back to the *Kwembly*, and the *Smof* and to a well-designed, well-built piece of diving gear which had almost killed an eleven-year-old boy. The reports, punctuated by Aucoin's sometimes acid comments, droned on; slowly Ib made up his mind.

"We're getting ahead," remarked Barlennan. "There was good excuse for taking the vision sets out of the *Kwembly*, since she was being abandoned, so we've been able to work on her with no restrictions. We could use Reffel's helicopter, since the humans think it's lost, too. Jemblakee and Deeslenver seem to

feel that the cruiser can be back in running state in another day." He glanced at the feeble sun, almost exactly overhead.

"The human chemists were certainly helpful about that mud she was in. It was funny how the one who talked to Dee about the stuff kept insisting that he was only guessing, while he made suggestion after suggestion. It's too bad we couldn't tell him how successful most of his ideas were.

"Self-doubt seems to be a human trait, if it's safe to make such a sweeping remark," replied Guzmeen. "When did this news get in?"

"The *Deedee* came in an hour ago, and is gone again. There's too much for that machine to do. It was bad enough when we lost the *Elsh*, and with Kabremm and his *Gwelf* overdue things are piling up. I hope we find him. Maybe the Kalliff will turn up something; he was supposed to be scouting a route to get her to Don's camp, so maybe one of Kenanken's scouts will spot him. He's less than a day overdue, so there's still a chance..."

"And with all this, you say we're ahead?" cut in Guzmeen.

"Sure. Remember, the whole aim of the *Esket* act was to persuade the human beings to let us use space ships. The self-support business was incidental, though useful. We expected to work the local-life myth up to a major menace before we could persuade Aucoin to let us fly, and spend months building up to it. We're far ahead on time, and haven't lost very much, the base at the *Esket* site, of course, and the *Elsh* and its crew, and just possibly Kabremm and his."

"But even Kabremm and Karfrengein aren't exactly expendable. There aren't very many of us. If Dondragmer and his crew don't keep alive until the *Kalliff* reaches them, we'll have taken a really serious loss; at least our dirigible crews weren't our scientists and engineers."

"Don's in no real danger. They can always be picked up by Beetchermarlf in the human space ship—I mean our space ship."

"And if anything goes wrong with *that* operation we're out not only our only spaceship but our only space pilots."

"Which suggests to me," Barlennan said thoughtfully, "that we should try to regain some lost ground. As soon as the *Kwembly* is ready she should start hunting a suitable place and start replacing the *Esket* settlement. Don's scientists should have little trouble finding a good location; Dhrawn seems to be rich in metal ores. Maybe we should have him search closer to here so that communication will be quicker, though.

"We'll have to build more dirigibles; the one we have left isn't nearly enough for the work. Maybe we ought to design bigger ones.

"I've been wondering about that," a technician who had been listening silently up to this point spoke up. "Do you suppose that it would be smart to find out more, tactfully, of course, from the humans about dirigibles? We've never discussed the subject with them; they taught you about balloons years ago, and some of our own people got the idea of using the human power sources with them. We don't know if *they* ever used them at all. Maybe it isn't just bad luck that we've lost two out of our three in such a short time. Maybe there's something fundamentally wrong with the whole idea."

The commander gave a gesture of impatience.

"That's silly. I didn't try to pick up a complete scientific education from the aliens, since it was obviously

going to take too long; but one thing I did gather was that the underlying rules are essentially simple. Once the humans started concentrating on basic rules, they went from sailing ships to space ships in a couple of hundred years. Balloons, powered or not, are simple devices; I understand them perfectly myself. Putting an engine aboard doesn't change that; the same rules have to be working."

The technician eyed his commander thoughtfully, and thought briefly of electron tubes and television circuits before replying.

"I suppose," he said thoughtfully, "that a piece of a tent being blown away by the gale, and a ship being tacked into the wind, are also examples of the same rules at work."

Barlennan didn't want to give an affirmative answer, but he could find nothing better.

He was still trying to shrug off the technician's remark, but only succeeding in growing more and more doubtful of his situation, some twenty hours later when a messenger called him to the communication room. As soon as he entered, Guzmeen spoke briefly into a microphone; a minute later, a human face which neither of them recognized appeared on the screen.

"I am Ib Hoffman, Easy's husband and Benj's father," the stranger began without preamble. "I'm speaking to you two, Barlennan and Dondragmer, alone. The rest of the observing crew here are concentrating on a new emergency involving one of the cruisers. I'm using your language as best I can, with my wife standing by; she knows what I want to say, and will correct me if I slip too badly. I have decided that it is time to clear up some misunderstandings, but I don't plan to tell everyone here about them; you'll see why before I finish, if you don't already. I'm bothered mostly because I hate to call anyone a liar in any language.

"First, Barlennan, my hearty congratulations. I am just about certain that when we turned the barge over to a Mesklinite pilot we fulfilled one of your chief plans, probably well before you meant or expected it to mature. That's fine. I wanted that to happen. Probably you want to make interstellar flights on your own later on, too; that's also fine with me. I'll help.

"You seem to feel that many or most human beings would try to thwart you in this, and I have to admit that some would, though I think we have the most effective one under control now. You can't be sure that I'm being sincere now, for that matter; you're tricky enough yourself to expect it of other people. Too bad. How much you believe of what I say is beyond my control; I still have to say it.

"I don't know how much of the basic situation you set up, but I can guess. I'm nearly sure the *Esket* disappearance was not genuine. I'm uncertain of the real status of the *Kwembly*. You probably know more of Dhrawn than you've reported. I won't say I don't care, because I do; we're here to learn as much as possible about Dhrawn, and what you don't tell us is a loss to the project. I can't threaten you with penalties for breach of contract, since I'm not completely certain you've broken it and am in no position to carry out threats. And in any case have less than no desire to even make threats. I do want to persuade you, though, that it will be better for both of us if we do without secrets. We're at a point where anything less than complete frankness is likely to cost us a lot and cost you everything. To make that point, I'm going to tell you a story.

"You know that human beings breathe oxygen much as you do hydrogen, though being so much larger we need a more complicated pumping system to get it through our bodies. Because of the details of that system, we suffocate if deprived of gaseous, free oxygen within a certain rather narrow range of pressures.

"About three quarters of Earth is covered by water. We cannot breathe under water without artificial equipment, but the use of such equipment is a common human sport. It consists essentially of a tank of

compressed air and a valve system which releases the air to our breathing system as needed; simple and obvious.

"Six of our years ago, when Benj was eleven years old, he made such a device, designing it himself with my assistance. He made the pressure tank and regulator, using ordinary fabricating equipment such as may be found in most home workshops, just as he had made more complex things such as small gas turbines. He tested the parts with my help; they worked perfectly. He calculated how long the air in the tank would last him, and then tested the whole assembly under water. I went along as a matter of common-sense safety, using a commercial diving device.

"I am sure you know the principles of hydrostatics and the gas laws; at least, Easy has given me words for them in your language. You can see that at a certain depth, a lungful of air would have only half its volume at the surface. Benj knew this too, but reasoned that it would still be a lungful as far as oxygen content was concerned, so that a one-hour tank would be a one-hour tank regardless of depth, as long as tank pressure was above that of the water.

"To make a long story short, it didn't. He ran out of air in less than a third of the calculated time, and I had to make an emergency rescue. Because of the quick pressure change and some human peculiarities which you don't seem to share, he was very nearly killed. The trouble turned out to be that the human breathing rate is controlled, not by the oxygen in our blood, but by the carbon dioxide, one of the waste products. To maintain a normal equilibrium of that, we have to run normal *volumes* of air through our lungs, regardless of oxygen content or total pressure; hence, an hour's air supply at normal pressure is only half an hour thirty-three feet under water, a third of an hour at sixty-six, and so on.

"I don't want to insult anyone's intelligence by asking if he understands my point, but I'd like some comment from both of you on that story."

The answers were interesting, both in nature and arrival time. Barlennan's popped from the speaker with very little more than light-travel delay; Dondragmer's came much, much later, and did not overlap with his commander's.

"It is obvious that incomplete knowledge can lead to mistakes," said Barlennan, "but I don't see why that is especially applicable to the present case. We know that our knowledge can't be complete, and that our work here is dangerous for that reason. We have always known it. Why emphasize the point now? I'd much rather hear your report on the cruiser you say is in trouble. You make me suspect that you are leading up gently to the information that I have lost another cruiser because of something its designing engineers didn't know. Don't worry, I won't blame you for that. None of us could foresee everything."

Ib smiled sourly at the revelation of yet another human characteristic.

"That's not just what I had in mind, Commander, though there are valid aspects to what you have just said. I'd like to wait for Dondragmer's answer before I say any more, though."

It was another full minute, a slightly strained one, before the voice of the *Kwembly's* captain arrived.

"Your account is plain enough and you would probably have been briefer had you not meant to imply more. I suspect that your key point is not so much that your son got into trouble through ignorance, but that he did so even under your experienced adult supervision. I would take the implication to be that even though you aliens do not claim omniscience or omnipotence, we are in a certain amount of danger here no matter how closely you supervise and assist us, and we are adding unnecessarily to our danger any time we act on our own, like the student chemist who experiments on his own." Dondragmer had spent much more time at the College than had his commander.

"Right. Just what I meant," said Ib. "I cant..."

"Just a moment," interrupted Easy. "Hadn't you better relay Don's remark to Barlennan first?"

"Right." Her husband gave a one-sentence summary of the captain's speech, and went on, "I can't force any policy on you, and would prefer not to even if I could. I don't expect you to make a complete revelation of everything that's gone on on Dhrawn since you first built the Settlement. In fact, I'd advise strongly against it; I have enough complications up here with the administration as it is. However, if Easy just happened to get an occasional talk with her old friends Destigmat and Kabremm, just as an example, I would have a better idea of what has gone on and be in a better position to keep things running smoothly at this end. I don't expect a spot decision on any matter of major policy change, Commander, but please think it over."

Barlennan, being a sea captain by training and trade, was accustomed to the need for quick decisions. Furthermore, circumstances had already compelled thoughts on similar lines to circulate in his tiny head. Finally, his only really basic policy was to ensure his own survival and that of his crew. He answered Ib promptly.

"Easy may get her talk with Destigmat, but not right away; the *Esket* is a long distance from here. I will also have to wait to tell you all that I'd like to, because I must first hear from you the details of the trouble you mentioned when you first called. You said that another of my cruisers was in trouble.

"Please tell me just what has happened, so I can plan what help to request from you.

Ib and Easy Hoffman looked at each other and grinned in mingled relief and triumph.

But it was Benj who made the key remark. This was later on, in the aerology lab, when they were recounting to him and McDevitt all that had been said. The boy looked up at the huge globe of Dhrawn, and the tiny area where the lights indicated partial knowledge.

"I suppose you think he's a lot safer now, down there."

It was a sobering thought.