

## Close to Critical by Hal Clement.

SOL, seen at a distance of sixteen light-years, is a little fainter than the star at the tip of Orion's sword, and it could not have been contributing much to the sparkle in the diamond lenses of the strange machine. More than one of the watching men, however, got a distinct impression that the thing was taking a last look at the planetary system where it had been made. It would be a natural thing for any sentient and sentimental being to do, for it was already falling toward the great dark object only a few thousand miles away.

Any ordinary planet would have been glaringly bright at that range, for Altair is an excellent illuminator and was at its best right then: Altair is not a variable star, but it rotates fast enough to flatten itself considerably, and the "planet was in a part of its orbit where it got the maximum benefit from the hotter, brighter polar regions. In spite of this, the world's great bulk was visible chiefly as a fuzzy blot not very much brighter than the Milky Way, which formed a background to it. It seemed as though the white glare of Altair were being sucked in and quenched, rather than illuminating anything.

But the eyes of the machine had been designed with Tenebra's atmosphere in mind. Almost visibly the robot's attention shifted, and the whitish lump of synthetic material turned slowly. The metal skeleton framing it kept

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pace with the motion, and a set of stubby cylinders lined themselves up with the direction of fall. Nothing visible emerged from them, for there was still too little atmosphere to glow at the impact of the ions, but the tons of metal and plastic altered their acceleration. The boosters were fighting the already fierce tug of a world nearly three times the diameter of distant Earth, and they fought well enough so that the patchwork fabrication which held them suffered no harm when atmosphere was finally reached.

The glitter faded out of the diamond eyes as the world's great gas mantle gradually enfolded the machine. It was dropping slowly and steadily, now; the word *cautiously* might almost have been used. Altair still glowed overhead, but the stars were vanishing even to the hypersensitive pickups behind those lenses as the drop continued.

Then there was a change. Up to now, the thing might have been a rocket of unusually weird design, braking straight down to a landing on outboard jets. The fact that the jet streams were glowing ever brighter meant nothing; naturally, the air was growing denser. However, the boosters themselves should *not* have been glowing.

These were. Their exhausts brightened still further, as though they were trying harder to slow a fall that was speeding up in spite of them, and the casings themselves began to shine, a dull red. That was enough for the distant controllers; a group of brilliant flashes shone out for an instant, not from the boosters themselves but from points on the metal girders that held them. The struts gave way instantly, and the machine fell unsupported.

For only a moment. There was still equipment fastened to its outer surface, and a scant half-second after the blowoff of the boosters a gigantic parachute flowered above the falling lump of plastic. In that gravity it might have been expected to tear away instantly, but its designers had known their business. It held. The incredibly

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thick atmosphere—even at that height several times as dense as Earth's—held stubbornly in front of the parachute's broad expanse and grimly insisted on the lion's share of every erg of potential energy given up by the descending mass. In consequence, even a gravity three times that of Earth's surface failed to damage the device when it finally struck solid ground.

For some moments after the landing, nothing seemed to happen. Then the flat-bottomed ovoid moved, separating itself from the light girders which had held the parachute, crawled on nearly invisible treads away from the tangle of metal ribbons, and stopped once more as though to look around.

It was not looking, however; for the moment, it could not see. There were adjustments to be made. Even a solid block of polymer, with no moving parts except its outer traveling and handling equipment, could not remain completely unchanged under an external pressure of some eight hundred atmospheres. The dimensions of the block, and of the circuitry imbedded in it, had changed slightly. The initial pause after

landing had been required for the distant controllers to find and match the slightly different frequencies now needed to operate it. The eyes, which had seen so clearly hi empty space, had to adjust so that the different index of refraction between the diamond and the new external medium did not blur their pictures hopelessly. This did not take too long, as it was automatic, effected by the atmosphere itself as it filtered through minute pores into the spaces between certain of the lens elements,

Once optically adjusted, the nearly complete darkness meant nothing to those eyes, for the multipliers behind them made use of every quantum of radiation the diamond could refract. Far away, human eyes glued themselves to vision screens which carried the relayed images of what the machine saw.

It was a rolling landscape, not too unearthly at first

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glance. There were large hills in the distance, their outlines softened by what might have been forests. The nearby ground was completely covered with vegetation which looked more or less like grass, though the visible trail the robot had already left suggested that the stuff was far more brittle. Clumps of taller growths erupted at irregular intervals, usually on higher ground. Nothing seemed to move, not even the thinnest fronds of the plants, though an irregular crashing and booming registered almost constantly on the sound pickups built into the plastic block. Except for the sound it was a still-life landscape, without wind or animal activity.

The machine gazed thoughtfully for many minutes. Probably its distant operators were hoping that life frightened into hiding by its fall might reappear; but if this were the case they were disappointed for the moment. After a time it crawled back to the remains of its parachute harness and played a set of lights carefully over the collection of metal girders, cables, and ribbons, examining them all in great detail. Then it moved away again, this time with a purposeful air.

For the next ten hours it quartered meticulously the general area of the landing, sometimes stopping to play its light on some object like a plant, sometimes looking around for minutes on end without obvious purpose, sometimes emitting sounds of varying pitch and loudness. This last always happened when it was in a valley, or at least not on the very top of a hill; it seemed to be studying echoes for some reason.

Periodically it went back to the abandoned harness and repeated the careful examination, as though it were expecting something to happen. Naturally, in an environment having a three hundred-seventy-degree temperature, about eight hundred atmospheres pressure, and a climate consisting of water heavily laced with oxygen and oxides of sulphur, things started to happen soon enough; and great interest was shown in the progress of the corrosion

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as it steadily devoured the metal. Some parts lasted longer than others; no doubt the designers had included different alloys, perhaps to check this very point. The robot remained in the general area until the last of the metal had vanished in slime.

At irregular intervals during this time, the surface of the ground shook violently. Sometimes the shaking was accompanied by the crashes which had first greeted the robot's "ears"; at other times it was relatively silent. The operators must have been bothered by this at first; then it became evident that all the hills in the neighborhood were well rounded with no steep cliffs, and that the ground itself was free of both cracks and loose stones, so there was little reason to worry about the effect of quakes on the fabulously expensive mechanism.

A far more interesting event was the appearance of animal life. Most of the creatures were small, but were none the less fascinating for that, if the robot's actions meant anything. It examined everything that appeared, as closely as it possibly could. Most of the creatures seemed to be scale-armored and eight-limbed; some appeared to live on the local vegetation, others, on each other.

With the harness finally gone, the attention of the robot's operators was exclusively occupied by the animals for a long time. The investigation was interrupted a number of times, but this was due to loss of control rather than distraction. The lack of visible surface features on Tenebra had prevented the men from getting a very precise measure of its rotation period, and on several occasions the distant ship "set" as far as the important part of the planet was concerned. Trial and error gradually narrowed down the uncertainties in the length of Tenebra's day, however, and the interruptions in control finally vanished.

The project of studying a planet three times the diameter of Earth looked rather ridiculous when attempted

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with a single exploring machine. Had that been the actual plan, of course it *would* have been ridiculous; but the men had something else in mind. One machine is not much; a machine with a crew of assistants, particularly if the crew is part of a more or less world-wide culture, is something very different. The operators very definitely hoped to find local help—in spite of the rather extreme environment into which their machine had fallen. They were experienced men, and knew something of the ways of life in the universe.

However, weeks went by, and then months, with no sign of a creature possessing more than the rudiments of a nervous system. Had the men understood the operation of the lensless, many-spined "eyes" of the local animals they might have been more hopeful; but as it was most of them grew resigned to facing a job of several lifetimes. It was sheer chance that when a thinking creature finally did turn up it was discovered by the robot. Had it been the other way around—if the native had discovered the machine—history could easily have been very different on several planets.

The creature, when they did see it, was big. It towered fully nine feet in height, and on that planet must have weighed well over a ton. It conformed to the local custom as regarded scales and number of limbs, but it walked erect on two\* of the appendages, seemed not to be using the next two, and used the upper four for prehension. That was the fact that betrayed its intelligence; two long and two shorter spears, each with a carefully chipped stone head, were being carried hi obvious readiness for instant use.

Perhaps the stone disappointed the human watchers, or perhaps they remembered what happened to metals on this planet and refrained from jumping to conclusions about the culture level suggested by the material. In any case, they watched the native carefully.

This was easier than it might have been; the present

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neighborhood, many miles from the original landing point, was a good deal rougher in its contours. The vegetation was both higher and somewhat less brittle, though it was still virtually impossible to avoid leaving a trail where the robot crawled. The men guessed at first that the higher plants had prevented the native from seeing the relatively small machine; then it became apparent that the creature's attention was fully occupied by something else.

It was traveling slowly and apparently trying to leave as little trail as possible. It was also making allowance for the fact that to leave *no* trail was not practicable; periodically it stopped and built a peculiar arrangement consisting of branches from some of the rarer, springy plants and the sharp stone blades which it took hi seemingly endless supply from a large leather sack slung about its scaly body.

The nature of these arrangements was clear, after the native had gotten far enough ahead to permit a close inspection. They were booby traps, designed to drive a stone point into the body of anything attempting to follow hi the creature's footsteps. They must have been intended against animals rather than other natives, since they could easily be avoided merely by paralleling the trail instead of following it.

The fact that the precaution was being taken at all, however, made the whole situation extremely interesting, and the robot was made to follow with all possible caution. The native traveled five or six miles in this fashion, and during this time set about forty of the traps. The robot avoided these without trouble, but several times tripped others which had apparently been set earlier. The blades did no harm to the machine; some of them actually broke against the plastic. It began to look as though the whole neighborhood had been "mined," however.

Eventually the trail led to a rounded hill. The native

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climbed this quickly, and paused at a narrow gully opening near the top. It seemed to be looking around for followers, though no organs of vision had yet been identified by the human watchers. Apparently satisfied, it drew an ellipsoidal object from its sack, examined it carefully with delicate fingers, and then disappeared into the gully.

In two or three minutes it was back, this time without its grapefruit-size burden. Heading down the hill once more, it avoided with care both its own traps and the others, and set off in a direction different from

that of its approach.

The robot's operators had to think fast. Should they follow the native or find out what it had been doing up the hill? The former might seem more logical, since the native was leaving, and the hill presumably was not, but the second alternative was the one they chose. After all, it was impossible for the thing to travel without leaving some sort of trail; besides, night was approaching, so it wouldn't get far. It seemed safe to assume that it shared the characteristic of Tenebra's other animal life, of collapsing into helplessness a few hours after nightfall.

Besides, looking at the hilltop shouldn't take too long. The robot waited until the native was well out of sight, and then moved up the hill toward the gully. This, it turned out, led into a shallow crater, though the hill bore no resemblance to a volcano; on the crater floor lay perhaps a hundred ellipsoids similar to that which the native had just left there. They were arranged with great care in a single line, and except for that fact were the closest things to loose stones that the men had yet seen on Tenebra. Their actual nature seemed so obvious that no effort was made to dissect one.

At this point there must have been a lengthy and lively discussion. The robot did nothing for quite a long time. Then it left the crater and went down the hill, picked its way carefully out through the "mine field" on the trail of the native, and settled down to travel.

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This was not quite as easy as it would have been in the day time, since it was starting to rain and visibility was frequently obstructed by the drops. The men had not yet really decided whether it was better, hi traveling at night, to follow valleys and remain submerged or stick to ridges and hilltops so as to see occasionally; but hi this case the problem was irrelevant. The native had apparently ignored the question, and settled for something as close to a straight line as it could manage. The trail ran for some ten miles, and ended at a clearing before a cave-studded cliff.

Details could not be seen well. Not only was the rain still falling, but the darkness was virtually absolute even to the pickups of the robot. More discussion must have resulted from this; it was two or three minutes after the machine's arrival at the clearing that its lights went on and played briefly over the rock. Natives could be seen standing inside the cave mouths, but they made no response to the light. They were either asleep, in more or less human fashion, or had succumbed to the usual night-torpor of Tenebra's animal life.

No sign of anything above a stone-age culture level could be seen anywhere about, and after a few minutes of examination the robot cut off most of its lights and headed back toward the hill and the crater. It moved steadily and purposefully. Once at the hilltop, several openings appeared hi its sides, and from some of these armlike structures were extended. Ten of the ellipsoids were picked carefully from one end of the line— leaving no betraying gaps—and stowed in the robot's hull. Then the machine went back down the hill and began a deliberate search for booby traps. From these it removed the stone blades, and such of these as seemed in good condition—many were badly corroded, and some even crumbled when handled—disappeared into other openings in the lump of plastic. Each of these holes was then covered by a lid of the same incredibly stable

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polymer which formed the body of the machine, so that no one could have told from outside that the storage places were there.

With this task completed, the robot headed away, at the highest speed it could maintain. By the time Altair rose and began turning the lower atmosphere back into gas, the machine, the stolen weapons, and the "kidnaped" eggs were far from the crater and still farther from the cave village.

## **I. EXPLORATION; EXPECTATION; ALTERCATION**

NICK pushed through the tall plants into the open, stopped, and used several words of the sort Fagin had always refused to translate. He was neither surprised nor bothered to find water ahead of him—it was still early in the morning—it was annoying, however, to find it on each side as well. Sheer bad luck, apparently, had led him straight out along a peninsula, and this was no time for anyone to retrace his steps.

To be really precise, he didn't *know* that he was being followed, of course; but it simply hadn't occurred to him

to doubt that he was. He had spent two days, since his escape, in making as confused and misleading a trail as possible, swinging far to the west before turning back toward home, and he was no more willing than a human being would have been to admit that it might have been wasted effort. True, he had seen not the slightest sign of pursuers. He had been delayed by the usual encounters with impassable ground and wild animals, and none of his captors had caught up; the floating animals and plants which it was never safe to ignore completely had shown no sign of interest in anything behind him; his captors during the time he was with them had shown themselves to be hunters and trackers of superlative skill. Taking all these facts into account, he might have been excused for supposing that the fact of his continued freedom meant

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they weren't following. He was tempted, but couldn't bring himself to believe it. They had wanted so badly to make him lead them to Fagin!

He came to himself with a start, and brought his mind back to the present. Theorizing was useless just now; he must decide whether to retrace his steps along the peninsula, and risk running into his ex-captors, or wait until the lake dried up and chance their catching him. It was hard to decide which was the smaller risk, but there was one check he could make.

He walked to the water's edge, looked at the liquid carefully, then slapped it vigorously. The slow ripples which spread up the edge of the lake and out over its more or less level surface did not interest him; the drops which detached themselves did. He watched as they drifted toward him, settling slowly, and noted with satisfaction that even the largest of them faded out without getting back to the surface. Evidently the lake did not have long to go; he settled down to wait.

The breeze was picking up slowly as the plants awoke to the new day. He could smell it. He watched eagerly for its effect on the lake—not waves, but the turbulent hollows in the surface which would mark slightly warmer bodies of air passing over it. That would be the sign; from then on, the surface would probably drop faster down the lake bed than he could travel. The breeze should keep the air breathable, as long as he didn't follow the water too closely—yes, it couldn't be long now; the very point where he was standing was below the surface level of some parts of the lake. It was drying up.

The difference increased as he waited, the edge of the water slipping back in ghostly fashion. He followed it with caution until a wall of water towered on either side. It began to look as though the peninsula were really a ridge across the lake; if so, so much the better.

Actually, it didn't quite reach. He had to wait for a quarter of an hour at the ridge's end while the rest of the

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lake turned back to air. He was impatient enough to risk breathing the stuff almost too quickly after the change, but managed to get away with it. A few minutes more brought him up the slope to the tall vegetation on the east side of the erstwhile lake. Before plunging among the plants, where he would be able to see nothing but the floaters overhead, he paused a moment to look back across the dry bottom to the point where he had first seen the water—still no pursuers. Another floater or two were drifting his way; he felt for his knives, and slightly regretted the spears he had lost. Still, there was little likelihood of danger from a floater behind him as long as he traveled at a decent speed—and that's what he'd better be doing. He plunged into the brush.

Travel was not too difficult; the stuff was flexible enough to be pushed out of the way most of the time.

Occasionally he had to cut his way, which was annoying less because of the effort involved than because it meant exposing a knife to the air. Knives were getting somewhat scarce, and Fagin was rather tight with those remaining.

The morning wore on, still without sight of pursuers. He made unusually good speed much of the time because of a remarkable lack of wild animals—par for a forty-mile walk being four or five fights, while he had only one. However, he more than lost the time gained when he ran into an area rougher than any he had ever seen. The hills were sharp and jagged instead of rounded; there were occasional loose rocks, and from time to time these were sent rolling and tumbling by unusually sharp quakes. In places he had to climb steep cliffs, either up or down; in others, he threaded his way through frighteningly narrow cracks—with no assurance that there was an opening at the other end. Several times there wasn't, and he had to go back.

Even here he left a trail, the local plant life being what it was; but with that area behind him he found it even harder to justify the feeling that he was being pursued.

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If his ex-captors really followed through that, they deserved to catch him! But still, however often he let his attention cover his rear, no sign of them appeared.

The hours passed, Nick traveling at the highest speed he could maintain. The one fight he had scarcely delayed him at all; it was a floater that saw him from ahead and dropped nearly to ground level in time to intercept him. It was a small one, so small that his arms outreached its tentacles; and a quick slash of one of his knives opened enough of its gas-bladders to leave it floundering helplessly behind him. He sheathed the weapon and raced on with scarcely diminished speed, rubbing an arm which had been touched lightly by the thing's poison.

The limb had ceased to sting, and Altair was high in the sky, when he finally found himself in familiar surroundings. He had hunted before this far from the home valley; rapid as changes were, the area was still recognizable. He shifted course a trifle and put on a final burst of speed. For the first time, he felt sure of being able to deliver a report of his capture, and also for the first time he realized that he had not tried to organize one. Just telling what had happened to him, item by item, might take too long; it was important that Fagin and the rest get away quickly. On the other hand, it would take a pretty complete explanation of the state of affairs to convince the teacher of that fact. Nick unconsciously slowed down as he pondered this problem. He was dragged from this reverie only by the sound of his own name.

"Nick! Is that really you? Where have you been? We thought you'd slept out once too often!"

At the first sound, Nick had reached for his knives; but he checked the movement as he recognized the voice.

"Johnny! It's good to hear proper talk again. What are you doing this far out? Have the sheep eaten everything closer to home?"

"No, I'm hunting, not herding." John Doolittle pushed through the undergrowth into clear view. "But where

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have you been? It's been weeks since you went out, and since we stopped looking for you."

"You looked for me? That's bad. Still, I guess it didn't make any difference, or I'd have known it sooner."

"What do you mean? I don't understand what you're talking about. And what did you mean about it's being good to hear 'proper talk'? What other kind of talk is there? Let's hear the story."

"It's a long one, and I'll have to tell everyone as quickly as possible anyway. Come along home; there's no point telling it twice." He headed toward the valley they both called "home" without waiting to hear any answer. John "trailed" his spears and followed. Even without Nick's implication of trouble ahead, he would not willingly have missed the report. Fresh as he was, though, he had difficulty keeping up with the returned explorer; Nick seemed to be in a hurry.

They met two more of the group on the way, Alice and Tom, who were herding. At Nick's urgent but hasty words they followed toward the village as fast as their charge would permit.

Five more of the group were actually in the village, and Fagin was at his usual station in the center of the ring of houses. Nick called the teacher by name as he came hi sight.

"Fagin! We're in trouble! What do we have for weapons that you haven't shown us yet?"

As usual, there was a pause of a couple of seconds before an answer came back.

"Why, it's Nick. We had about given you up. What's all of this about weapons? Do you expect to have to fight someone?"

"I'm afraid so."

"Who?"

"Well, they seem to be people just like us; but they don't keep animals, and they don't use fire, and they use , different words for things than we do."                    :-

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"Where did you run into these people, and why should we have to fight them?"

"It's a long story, I'm afraid. It will be better if I start at the beginning, I suppose; but we shouldn't waste

any more time than we can help."

"I agree; a complete report will make the most sense to all of us. Go ahead." Nick settled his weight back on his standing legs and obeyed.

"I started south as we decided and went slowly, mapping as I went. Nothing much had changed seriously out to the edge of the region we usually cover in farming and grazing; after that, of course, it was hard to tell whether anything had changed at all recently, or in what way.

"The best landmark I saw by the end of the first day was a mountain, of quite regular conical shape and much higher than any I had ever seen before. I was tempted to climb it, but decided that detail mapping could be accomplished better later on; after all, my trip was to find new areas, not evaluate them.

"I passed to the east of the mountain shortly after sunrise the second day. The wind was remarkably strong in that region and seemed always to blow toward the mountain; I called it Storm Hill on the map. Judging by tile wind, there ought to be a lot of night-growing plants there; any exploration should be planned to get off the hill before dark.

"As far as travel goes, everything was about as usual. I killed enough in self-defense to keep me in food, but none of the animals were at all unusual that day.

"The third morning, though, with the mountain out of sight, I got involved with something that lived in a hole in the ground and reached out an arm to catch things going by. It caught me around the legs, and it didn't seem to mind my spears very much. I don't think I'd have gotten away if I hadn't had help."

"Help?" The startled question came without the pause

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characteristic of the teacher's remarks; it was Jim who asked it. "How could you have gotten help? None of us was down that way."

"So it wasn't one of us—at least, not exactly. He *looked* just like us, and used spears like ours; but when we finally managed to kill the thing in the hole and tried to talk to each other, his words were all different; in fact, it was quite a while before I realized that he was talking. He used the same sort of noises we do for words, but mixed them with a lot of others that we never learned from you.

"After a while I realized that the noises must be talk, and then I wondered why I hadn't thought of such a thing before—after all, if this person wasn't brought up by you, he'd have had to think up his own words for things, and it would be silly to expect them to be the same as ours. I decided to go with him and learn more; after all, this seemed a lot more important than just mapping. If I could learn his talk, he might know a lot more than we could find in months of exploring.

"He didn't seem to mind my trailing along, and as we went I began to catch on to some of his words. It wasn't easy, because he put them together in very strange ways; it wasn't just a matter of learning the noise he used for each object. We hunted together, though, and all the time we were learning to talk together. We didn't travel in a straight line, but I kept pretty good track of our path and can put his village on the map when I get the chance."

"Village?" It was Jim once more who interrupted; Fagin had said nothing.

"That's the only word I know for it. It wasn't at all like ours; it was a place at the foot of a steep cliff, and there were holes all over the face of the stone. Some of them were very small, like the solution holes you can see in any rock; others were very much larger, and there were people living in them. The one I was with was one of them.

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"They were very surprised to see me, and tried to ask me a lot of questions; but I couldn't understand them well enough to give any answers. The one I had traveled with talked to them, and I suppose told how he had met me; but they stayed interested, and a lot of them were always watching me, whatever I did.

"It was getting fairly late in the afternoon when we got to the cliff, and I was starting to wonder about camping for the night. I didn't realize just at first that these people lived in the holes in the rock, and when I finally caught on I wasn't very happy about it. There are even more quakes down that way than around here, I noticed, and that cliff seemed an awfully unhealthy neighborhood. When the sun was almost down, I decided to leave them and camp a little way out on a hilltop I'd found, and then I discovered that they didn't want me to go. They were actually prepared to get rough in order to keep me around. I had learned a few more of their words by that time, though, and I finally convinced them that I wasn't trying to get away

completely, and just wanted to spend the night by myself. There was a surprising amount of firewood around, and I was able to collect enough for the night without much trouble—in fact, some of the little ones helped me, when they saw what I wanted."

"Little ones? Weren't they all the same size?" Dorothy asked.

"No. That was one of the funny things I haven't had time to mention. Some of them weren't more than a foot and a half high, and some of them were nearly twice as tall as we are—nine feet or more. They ah" had the same shape as ours, though. I never found out the reason for that. One of the biggest ones seemed to be telling the others what to do most of the time, and I found that the little ones were usually the easiest to get along with.

"But that's getting off the story. When I built my fires a lot of them watched, but couldn't seem to make anything of it; when I lighted them, there was the biggest

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crowd of astonished people you ever saw. They didn't know anything about fire; that's why there was so much firewood near the cliff, I guess.

"Of course, it had started to rain by the time I lighted up, and it was funny to watch them; they seemed terribly afraid of being outside their holes in the rain, and still didn't want to miss watching the fires. They kept dithering back and forth, but gradually disappeared into their holes. After a while they were all gone, even though some of them stayed long enough to see what the fires did to the rain.

"I didn't see any more of them for the rest of the night. The water didn't get too deep along the face of the cliff, and they were out in the morning as soon as it had dried up.

"I could make a long story out of the rest of the time, but that will have to wait. I learned to talk to them pretty well—the way they put their words together makes a lot of sense once you catch on to it—and got to know them pretty well. The main thing is that they were interested in whatever things I knew that *they* didn't, like fire and keeping herds of animals and raising plants for food; and they wanted to know how I'd learned all these things. I told them about you, Fagin; and maybe that was a mistake. A few days ago their teacher, or leader, or whatever you can call him, came to me and said that he wanted me to come back here and bring you down to the cliff so you could teach all the things you know to his people.

"Now, that seemed all right to me. I judged that the more people you knew who could help in the things you want us to do, the better everything will be." He paused, to give Fagin a chance to answer.

"That's true enough," the voice from the robot agreed after the usual interval. "What went wrong?"

"My answer wasn't worded just right, it seems. I interpreted the proposition as a request, and answered that

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I would gladly come back home and ask you whether you would come to help the cave people. The leader—his name means Swift, in their words; all their names mean something—became angry indeed. Apparently he expects people to do as he says without any question or hesitation. I had noticed that but had been a little slow in applying my knowledge, I fear. Anyway, I didn't see how he could expect *you* to obey his orders.

"Unfortunately, he does; and he decided from my answer that you and the other people of our village would probably refuse. When that happens, his first thought is the use of force; and from the moment I made my answer he began to plan an attack on our village, to carry you away with him whether you wanted to go or not.

"He ordered me to tell hini how to find our village, and when I refused he became angry again. The body of a dead goat that someone had brought in for food was lying nearby, and he picked it up and began to do terrible things to it with his knives. After a while he spoke to me again.

"You see what my knives are doing," he said. "If the goat were alive, it would not be killed by them; but it would not be happy. The same shall be done to you with the start of the new day, unless you guide my fighters to your village and its Teacher. It is too close to darkness now for you to escape; you have the night to think over what I have said. We start toward your village in the morning—or you will wish we had." He made two of his biggest fighters stay with me until the rain started. Even after all the time I'd been there no one ever stayed out of the caves after rainfall, so they left me alone when I lighted my fires.

"It took me a long time to decide what to do. If they killed me, they'd still find you sooner or later and you wouldn't be warned in time; if I went with them it might have been all right, but I didn't like some of the things



Swift had been saying. He seemed to feel things would be better if there were none of your own people left around after he captured you. That seemed to mean that no matter what I did I was going to be killed, but if I kept quiet I might be the only one. That was when I thought of traveling at night; I was just as likely to be killed, but at least I'd die in my sleep—and there *was* a little chance of getting away with it. After all, a lot of animals that don't have caves or fire and don't wake up as early as some of the meat-eaters still manage to live.

"Then I got another idea; I thought of carrying fire with me. After all, we often carry a stick with one end burning for short distances when we're lighting the night fires; why couldn't I carry a supply of long sticks, and keep one burning all the time? Maybe the fire wouldn't be big enough to be a real protection, but it was worth trying. Anyway, what could I lose?"

"I picked out as many of the longest sticks around as I could carry, piled them up, and waited until two of my three fires were drowned by raindrops. Then I picked up my sticks, lighted the end of one of them at the remaining fire, and started off as fast as I could.

"I was never sure whether those people stayed awake in their caves or not—as I said, water doesn't get up to them—but now I guess they don't. Anyway, no one seemed to notice me as I left.

"You know, traveling at night isn't nearly as bad as we always thought it would be. It's not too hard to dodge raindrops if you have enough light to see them coming, and you can carry enough wood to keep you in light for a long time. I must have made a good twenty miles, and I'd have gone farther if I hadn't made a very silly mistake. I didn't think to replenish my wood supply until I was burning my last stick, and then there wasn't anything long enough for my needs in the neighborhood. I didn't know the country at all; I'd started west instead of north to fool any of the cave people who saw me go. As

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a result I got smothered in a raindrop within a minute after my last light went out; and it was late enough by then for the stuff to be unbreathable. I'd kept to high ground all the time, though, so I woke up in the morning before anything had made breakfast of me."

Nick paused, and like the other listeners—except Fagin—shifted himself to a more comfortable position on his resting legs as the ground shook underfoot. "I made a good, wide sweep around to the west, then circled north and east again to get back here. I was expecting to be caught every minute; those people are marvelous hunters and trackers. I traveled for several hours after dark each night, but stopped in time to find wood and build permanent fires before my sticks went out, after the first time. I didn't get caught by rain again, and they never caught up with me. They'll still find the village here sooner or later, though, and I think we ought to move out as quickly as possible."

For a moment there was silence after Nick finished his report; then the villagers began chattering, each putting forth his own ideas without paying much attention to those of his neighbor. They had picked up quite a few human characteristics. This noise continued for some minutes, with Nick alone waiting silently for Fagin to make some comment.

At last the robot spoke.

"You are certainly right about the cave-dwellers finding the village here; they probably know where it is already. They would have been fools to catch up with you as long as they had reason to suppose you were going home. I see nothing to be gained, however, by leaving; they could follow us anywhere we might go. Now that they know of our existence, we're going to meet them in very short order.

"I don't want you people fighting them. I'm rather fond of you all, and have spent quite a long time bringing you up, and would rather not see you butchered. You've

never done any fighting—it's one thing I'm not qualified to teach you—and you wouldn't stand a chance against that tribe.

"Therefore, Nick, I want you and one other to go to meet them. They'll be coming along your trail, so you'll have no trouble finding them. When you meet Swift, tell him that we'll gladly move to his village or let him move to ours, and that I'll teach him and his people all he wants. If you make clear that I don't

know his language and that he'll need you to talk to me, he'll probably be smart enough not to hurt any of us."

"When shall we start? Right away?"

"That would be best, but you've just had a long trip and deserve some rest. Anyway, a lot of the day is gone, and there probably won't be much lost by letting you get a night's sleep before you start. Go tomorrow morning."

"All right, Teacher." Nick gave no evidence of the uneasiness he felt at the prospect of meeting Swift again. He had known that savage for several weeks; Fagin had never met him. Still, the Teacher knew a lot; he had taught Nick virtually all he knew, and for a whole lifetime—at least, Nick's whole lifetime—had been the final authority in the village. Probably everything would come out as Fagin predicted. It might have, too, had not the men behind the robot grossly underestimated the tracking ability of the cave-dwellers. Nick had not even had time to get to sleep beside his watch-fire after lighting up at rainfall when a surprised yell, in Nancy's voice, sounded from a point four fires to his left; and a split second later he saw Swift himself, flanked by a line of his biggest fighters which disappeared around the hill on either side, sweeping silently up the slope toward him.

## II. EXPLANATION; CONCATENATION; RECRIMINATION

"WHAT do you do now?"

Raeker ignored the question; important as he knew the speaker to be, he had no time for casual conversation. He had to act. Fagin's television screens lined the wall around him, and every one showed the swarming forms of the fir-cone-shaped beings who were attacking the village. There was a microphone before his face, with its switch spring-loaded in the open position so that casual talk in the control room would not reach the robot's associates; his finger was hovering over the switch, but he did not touch it. He didn't quite know what to say.

Everything he had told Nick through the robot was perfectly true; there was nothing to be gained by trying to fight. Unfortunately, the fight had already started. Even had Raeker been qualified to give advice on the defense of the village, it was too late; it was no longer even possible for a human being to distinguish the attackers from the defenders. Spears were sailing through the air with blinding speed—nothing merely tossed gets very far in a three-gravity field—and axes and knives flashed in the firelight.

"It's a good show, anyway." The same shrill voice that had asked the question a minute earlier made itself heard once more. "That firelight seems to be brighter than daylight, down there." The casual tone infuriated Raeker, who was not taking the predicament of his friends at all

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casually; but it was not consideration of the identity or importance of the speaker that kept him from losing his temper and saying something unfortunate. Quite unintentionally, the onlooker had given him an idea. His finger stabbed at the microphone button.

"Nick! Can you hear me?"

"Yes, Teacher." Nick's voice showed no sign of the terrific physical effort he was exerting; his voice machinery was not as closely tied in with his breathing apparatus as is that of a human being.

"All right. Fight your way into the nearest hut as quickly as possible, all of you. *Get out of sight of me.* If you can't reach a hut, get behind a woodpile or something like that—below the curve of the hill, if nothing better is possible. Let me know as soon as you've all managed this."

"We'll try." Nick had no time to say more; those in the control room could only watch, though Raeker's fingers were hovering over another set of switches on the complex panel before him.

"One of them's making it." It was the high voice again, and this time Raeker had to answer.

"I've known these people for sixteen years, but I can't tell them from the attackers now. How can you identify them?" He let his glance shift briefly from the screens to the two nonhumans towering behind him.

"The attackers have no axes, only knives and spears," pointed out the speaker calmly. The man hastily turned back to the screens. He could not be sure that the other was right; only three or four axes could be seen, and their wielders were not very clearly visible in the swirling press. He had not noticed any lack of

axes in the hands of the attackers as they came up the hill, in the brief moments after they became visible to the robot and before battle was joined; but there was no reason to doubt that someone else might have. He wished he knew Dromm and its people better. He made no answer to the

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slender giant's comment, but from then on watched the axes which flashed in the firelight. These really did seem to be working their way toward the huts which rimmed the top of the hill. Some failed to make it; more than one of the tools which had so suddenly become weapons ceased to swing as the robot's eyes watched.

But some did get there. For half a minute a four-armed, scaly figure stood at one of the hut doors, facing outward and smashing the crests of all attackers who approached too close. Three others, all apparently injured, crawled toward him and under the sweep of the powerful arms to take shelter in the building; one of these remained in the doorway, crouching with two spears and guarding the axeman from low thrusts. Then another defender battered his way to the side of the first, and the two retreated together inside the hut. None of the cave-dwellers seemed eager to follow.

"Are you all inside, Nick?" Raeker asked.

"Five of us are here. I don't know about the others. I'm pretty sure Alice and Tom are dead, though; they were near me at the beginning, and I haven't seen them for some time."

"Give a call to those who aren't with you. I'll have to do something very soon, and I don't want any of you hurt by it."

"They must either be safe or dead. The fighting has stopped; it's a lot easier to hear you than it was. You'd better do whatever it is without worrying about us; I think Swift's people are all heading toward you. Only a couple are outside the door here; the others are forming a big ring around where I saw you last. You haven't moved, have you?"

"No," admitted Raeker, "and you're right about the ring. One of the biggest of them is walking right up to me. Make sure you are all under cover—preferably somewhere where light won't reach you. I'll give ten seconds."

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"All right," Nick answered. "We're getting under tables."

Raeker counted a slow ten, watching Hie approaching creatures in the screens as he did so. At the last number his fingers tripped a gang bar which closed twenty switches simultaneously; and as Nick described it later, "the world took fire."

It was only the robot's spotlights, unused now for years but still serviceable. It seemed quite impossible to the human watchers that any optical organs sensitive enough to work on the few quanta of light which reach the bottom of Tenebra's atmosphere could possibly stand any such radiance; the lights themselves had been designed with the possibility in mind that they might have to pierce dust or smoke—they were far more powerful than were really needed by the receptors of the robot itself.

The attackers should have been blinded instantly, according to Raeker's figuring. The sad fact slowly emerged that they were not.

They were certainly surprised. They stopped their advance for a moment, and chattered noisily among themselves; then the giant who was in front of the others strode right up to the robot, bent over, and appeared to examine one of the lights in detail. The men had long ago learned that the Tenebran vision organs were involved in some way with the spiny crests on their heads, and it was this part that the being who Raeker suspected must be Swift brought close to one of the tiny ports from which the flood of light was escaping.

The man sighed and shut off the lights.

"Nick," he called, "I'm afraid my idea didn't work. Can you get in touch with this Swift fellow, and try to get the language problem across to him? He may be trying to talk to me now, for all I can tell."

"I'll try." Nick's voice came faintly through the robot's instruments; then there was nothing but an incomprehensible chattering that ran fantastically up and down the

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scale. There was no way to tell who was talking, much; less what was being said, and Raeker settled back un- easily in his seat.

"Couldn't the handling equipment of that robot be used for fighting?" The shrill voice of the Drommian interrupted his worries.

"Conceivably, under other circumstances," Raeker replied. "As it happens, we're too far away. You must have noticed the delays between questions and answers when I was talking to Nick. We're orbiting Tenebra far enough *I* out to keep us over the same longitude; its day is about four Earth ones, and that puts us over a hundred and sixty thousand miles away. Nearly two seconds delay in reflex would make the robot a pretty poor fighter." *t*

"Of course. I should have realized. I must apologize' for wasting your time and interrupting on what must be a very bothersome occasion." *j*

Raeker, with an effort, tore his mind from the scene so far below, and turned to the Drommians.

*j*  
"I'm afraid the apology must be mine," he said. "I knew you were coming, and why; I should at least have appointed someone to do the honors of the place, if I couldn't manage it myself. My only excuse is the emergency you see. Please let me make up for it by helping you now. I suppose you would like to see the *Vinde-matrix*." *i*

"By no means. I would not dream of taking you from this room just now. Anyway, the ship itself is of no interest compared to your fascinating project on the planet, and you can explain that to us as well here, while you are waiting for your agent's answer, as anywhere else. I understand that your robot has been on the planet a long time; perhaps you could tell me more about how you recruited your agents on the planet. Probably my SOD would like to be shown the ship, if someone else could be spared from other duties."

"Certainly. I did not realize he was your son; the *Explanation; Concatenation; Recrimination* 35

message telling us of your visit did not mention him, and I assumed he was an assistant."

"That is perfectly all right. Son, this is Dr. Helven Raeker; Dr. Raeker, this is Aminadorneldo."

"I am delighted to meet you, sir," piped the younger Drommian.

"The pleasure is mine. If you wait a moment, a man is coming to show you over the *Vindematrix*—unless you would rather stay here and join conversation with your father and me."

"Thank you, I would rather see the ship."

Raeker nodded, and waited his silence for a moment or two. He had already pressed the call button which would bring a crewman to the observing room. He wondered a little why the younger being was with his father;<sup>1</sup> presumably he was serving some purpose. It would be easier to talk without him, though, since the two were virtually indistinguishable to Raeker and it would be rather embarrassing to get them mixed up. Both were giants from the human point of view; standing on their hind legs—a highly unnatural attitude for them—they would have towered nearly ten feet tall. Their general build was that of a weasel—or better, an otter, since the slender digits which terminated their five pairs of limbs were webbed. The limbs themselves were short and powerful, and the webs on the first two pairs reduced to fringes of membrane along the fingers—a perfectly normal evolutionary development for intelligent amphibious beings living on a planet with a surface gravity nearly four times that of the earth. Both were wearing harnesses supporting sets of small gas tanks, with tubing running inconspicuously to the corners of their mouths; they were used to an oxygen partial pressure about a third greater than human normal. They were hairless, but something about their skins reflected a sheen similar to that of wet sealskin.

They were stretched in an indescribably relaxed attitude on the floor, with their heads high enough to see

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the screens clearly. When the door slid open and the crewmen entered, one of them came to his feet with a flowing motion and, introductions completed, followed the man out of the compartment. Raeker noticed that he walked on all ten limbs, even those whose webs were modified to permit prehension, though the *Vindematrix*' centrifugal "gravity" could hardly have made it necessary. Well, most men use both legs on the moon, for that matter, though hopping on one is perfectly possible. Raeker dismissed the matter from his mind, and turned to the remaining Drommian—though he always reserved some of his attention for the screens.

"You wanted to know about our local agents," he began. "There's not very much to tell, in one way. The big difficulty was getting contact with the surface at all. The robot down there now represents a tremendous achievement of engineering; the environment is close to the critical temperature of water, with an atmospheric pressure near eight hundred times that of Earth. Since even quartz dissolves fairly readily under those conditions, it took quite a while to design machines which could hold up. We finally did it; that one has been down a little over sixteen of our years. Tin a biologist and can't help you much with the technical details; if you happen to care, there are people here who can.

"We sent the machine down, spent nearly a year exploring, and finally found some apparently intelligent natives. They turned out to be egg-layers, and we managed to get hold of some of the eggs. Our agents down there are the ones who hatched; - we've been educating them ever since. Now, just as we start doing some real exploring with them, this has to happen." He gestured toward the screen, where the huge Swift had paused in his examination of the robot and seemed to be listening; perhaps Nick was having some luck in his selling job.

"If you could make a machine last so long in that environment, I should think you could build something

*Explanation; Concatenation; Recrimination* 37

which would let you go down in person," said the Drom-mian.

Raeker smiled wryly. "You're quite right, and that's what makes the present situation even more annoying. We have such a machine just about ready to go down; in a few days we expected to be able to cooperate directly with our people below."

"Really? I should think that would have taken a long time to design and build."

"It has. The big problem was not getting down; we managed that all right with parachutes for the robot. The trouble is getting away again."

"Why should that be particularly difficult? The surface gravity, as I understand it, is less than that of my own world, and even the potential gradient ought to be somewhat smaller. Any booster unit ought to clear you nicely."

"It would if it worked. Unfortunately, the booster that will unload its exhaust against eight hundred atmospheres hasn't been built yet. They melt down—they don't blow up because the pressure's too high." The Drommian looked a trifle startled for a moment, then nodded in a remarkably human manner.

"Of course. I should have thought. I remember how much more effective rockets are on your own planet than ours. But how have you solved this? Some radically new type of reactor?"

"Nothing new; everything in the device is centuries old. Basically, it's a ship used long ago for deep-ocean exploration on my own world—a bathyscaphe, we called it. For practical purposes, it's a dirigible balloon. I could describe it, but you'd do better to—"

"Teacher!" A voice which even Aminadabarlee of Dromm could recognize as Nick's erupted from the speaker. Raeker whirled back to his panel and closed the microphone switch.

"Yes, Nick? What does Swift say?"

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"In effect, *no*. He wants nothing to do with anything in this village but you."

"Didn't you explain the language problem to him?"

"Yes, but he says that if I was able to learn his words you, who are my teacher, should be able to learn them more quickly. Then he will not have to depend on people he doesn't trust to tell him what you're saying. I hope he's right. He's willing to leave the rest of us here, but you have to go with him."

"I see. You'd better agree, for now; it will at least keep those of you who are alive out of further trouble. It may be that we'll be able to arrange a little surprise for Swift in the near future. You tell him that I'll do what he says; I'll go along with him to the caves—I suppose he'll be starting back there tomorrow, though if he wants to stay longer don't discourage him. When they go, you stay where you are; find everyone who's still alive and get them back in shape—I suppose most of you are injured—and then wait until I get in touch with you. It may be some days, but leave it to me."

Nick was a fairly fast thinker, and remembered at once that Fagin could travel at night without the aid of fire—rain did not suffocate him. He thought he saw what the teacher planned to do; it was not his fault that he was wrong. The word "bathyscaphe" had never been used in his hearing.

"Teacher!" he called, after a moment's thought. "Wouldn't it be better if we moved as soon as we could,

and arranged some other place to meet you after you escape? He'll come right back here sure as rainfall."  
"Don't worry about that. Just stay here, and get things back to normal as soon as possible. I'll be seeing you."

"All right, Teacher." Raeker leaned back in his seat once more, nodding his head slowly.

The Drommian must have spent a good deal of time on Earth; he was able to interpret the man's attitude.

"You seem a great deal happier than you were a few

*Explanation; Concatenation; Recrimination*     **39**

minutes ago," he remarked. "I take it you have seen your way out of the situation."

"I think so," replied Raeker. "I had forgotten the bathyscaphe until I mentioned it to you; when I did recall it, I realized that once it got down there our troubles would be over. The trouble with that robot is that it has to crawl, and can be tracked and followed; the bathyscaphe, from the point of view of the natives down there, can fly. It has outside handling equipment, and when the crew goes down they can simply pick up the robot some night and fly it away from the cliff. I defy Swift to do any constructive tracking."

"Then isn't Nick right? Won't Swift head straight for the village? I should think you'd have done better to follow Nick's suggestion."

"There'll be time to move after we get the robot. If they leave the village before, we'll have a lot of trouble finding them, no matter how carefully we arrange a meeting beforehand. The area is not very well mapped, and what there is doesn't stay mapped very well."

"Why not? That sounds rather strange."

"Tenebra is a rather strange planet. Diastrophism is like Earth's weather; the question is not whether it will rain tomorrow but whether your pasture will start to grow into a hill. There's a team of geophysicists champing at the proverbial bit, waiting for the bathyscaphe to go down so they can set up a really close working connection with Nick's group. The general cause we know—the atmosphere is mostly water near its critical temperature, and silicate rocks dissolve fairly rapidly under those circumstances. The place cools off just enough each night to let a little of the atmosphere turn liquid, so for the best part of two Earth days you have the crust washing down to the oceans like the Big Rock Candy Mountain. With three Earth gravities trying to make themselves felt, it's hardly surprising that the crust is readjusting all the time.

"Anyway, I think we're set up now. It won't be morn-

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ing down there for a couple of days, and I don't see how much can happen until then. My relief will be here soon; when he arrives, perhaps you would like to see the bathyscaphe with me."

"I should be most interested." Raeker was getting the impression that either the Drommians were a very polite race or Aminadabarlee had been selected for his diplomatic post for that quality. He didn't keep it long.

Unfortunately, there was a delay in visiting the bathy- \ scaphe. When Raeker and the Drommian reached the bay where the small shuttle of the *Vindematrix* was normally kept, they found it empty. A check with the watch officer—ship's watch, not the one kept on the robot; the ; organizations were not connected—revealed that it had been taken out by the crewmen whom Raeker had asked • to show Aminadorneldo around.

"The Drommian wanted to see the bathyscaphe, Doctor, and so did young Easy Rich."

"Who?"

"That daughter Councillor Rich has tagging along. Begging the pardon of the gentleman with you, political inspection teams are all right as long as they inspect; but when they make the trip an outing for their offspring—"

"I have my son along," Aminadabarlee remarked.

"I know. There's a difference between someone old enough to take care of himself and an infant whose fingers have to be kept off hot contacts ..." The officer let his voice trail off, and shook his head. He was an engineer; Raeker suspected that the party had descended on the power room in the near past, but didn't ask.

"Have you any idea when the shuttle will be back?" he asked.

The engineer shrugged. "None. Flanagan was letting the kid lead *him* around. He'll be back when she's tired, I suppose. You could call him, of course."

"Good idea." Raeker led the way to the signal room of the *Vindematrix*, seated himself at a plate, and punched

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the combination of the tender's set. The screen lighted up within a few seconds, and showed the face of Crystal Mechanic Second Class Flanagan, who nodded when he saw the biologist.

"Hello, Doctor. Can I help you?"

"We were wondering when you'd be back. Councillor Aminadabarlee would like to see the bathyscaphe, too." The nearly two-second pause while light made the round trip from *Vindematrix* to tender and back was scarcely noticed by Raeker, who was used to it; the Drommian was rather less patient.

"I can come back and pick you up whenever you want; my customers are fully occupied in the 'scaphe." Raeker was a trifle surprised.

"Who's with them?"

"I was, but I don't really know much about the thing, and they promised not to touch anything."

"That doesn't sound very safe to me. How old is the Rich girl? About twelve, isn't she?"

"I'd say so. I wouldn't have left her there alone, but the Drommian was with her, and said he'd take care of things."

"I still think—" Raeker got no further. Four sets of long, webbed, wire-hard fingers tightened on his shoulders and upper arm, and the sleek head of Aminadabarlee moved into the pickup area beside his own. A pair of yellow-green eyes stared at the image hi the plate, and a deeper voice than Raeker had yet heard from Drommian vocal cords cut across the silence.

"It is possible that I am less well acquainted with your language than I had believed," were his words. "Do I understand that you have left two children unsupervised in a ship in space?"

"Not exactly children, sir," protested Flanagan. "The human girl is old enough to have a good deal of sense, and your own son is hardly a child; he's as big as you."

"We attain our full physical growth within a year of

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birth," snapped the Drommian. "My son is four years old, about the social equivalent of a human being of seven. I was under the impression that human beings were a fairly admirable race, but to give responsibility to an individual as stupid as you appear to be suggests a set of social standards so low as to be indistinguishable from savagery. If anything happens to my boy—" He stopped; Flanagan's face had disappeared from the screen, and he must have missed the last couple of sentences of Amina-dabarlee's castigation; but the Drommian was not through. He turned to Raeker, whose face had gone even paler than usual, and resumed. "It makes me sick to think that at times I have left my son in charge of human caretakers during my years on Earth. I had assumed your race to be civilized. If this piece of stupidity achieves its most likely result, Earth will pay the full price; not a human-driven ship will land again on any planet of the galaxy that values Drommian feelings. The story of your idiocy will cross the light-years, and no human ship will live to enter Drommian skies. Mankind will have the richly earned contempt of every civilized race in—"

He was cut off, but not by words. A rending crash sounded from the speaker, and a number of loose objects visible on the screen jerked abruptly toward a near wall. They struck it loudly and rebounded, but without obeying the laws of reflection. They all bounced the same way— in the direction which Raeker recognized with a sinking feeling as that of the tender's air lock. A book flew past the pickup area in the same direction, and struck a metal instrument traveling more slowly.

But this collision went unheard. No more sound came from the speaker; the tender was silent, with the silence of airlessness.

## **111. CEREBRATION; TRANSPORTATION; EMIGRATION**

NICK Chopper stood in the doorway of his hut and thought furiously. Behind him the seven other survivors of the raid lay hi various stages of disrepair. Nick himself was not entirely unscathed, but he was still able to walk— and, if necessary, fight, he told himself grimly. All of the others except Jim and Nancy would be out of useful action for several days at least.

He supposed that Fagin had been right hi yielding to Swift as he had; at least, the savage had kept his word about letting Nick collect and care for his wounded friends. Every time Nick thought of the attack, however, or even of Swift, he felt like resuming the war. It would have given him intense pleasure to remove Swift's scales one by one and use them to shingle a hut in full view of their owner.

He was not merely brooding, however; he was really thinking. For the first time hi a good many years, he was questioning seriously a decision of Fagin's. It seemed ridiculous that the Teacher could get away from the cave village without help; he hadn't been able to fight Swift's people during the attack, and if he had any powers Nick didn't know about that was certainly the time to use them. Getting away at night didn't count; he'd be tracked and caught first thing in the morning.

But wait a minute. What could the cave-dwellers actually *do* to Fagin? The hard white stuff the Teacher was

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covered with—or made out of, for all Nick knew—might be proof against knives and spears; the point had never occurred to Nick or any of his friends. Maybe that was why Fagin was being so meek now, when his people could be hurt; maybe he planned to act more constructively when he was alone.

It would be nice to be able to talk it over with the Teacher without Swift's interference. Of course, the chief couldn't eavesdrop very effectively, since he couldn't understand English, but he would know that a conference was going on, and would be in a pretty good position to block any activity planned therein. If it were practical to get Swift out of hearing—but if that were possible, the whole thing would be solved anyway. The meat of the problem was the fact that Swift *couldn't* be handled.

Of course, it was night, and therefore raining. The invaders were being protected by the village fires, at the moment; however, Nick reflected, no one was protecting the fires themselves. He glanced upward at the thirty- to fifty-foot raindrops drifting endlessly out of the black sky, following one of them down to a point perhaps three hundred yards above his head. There it vanished, fading out in ghostly fashion as it encountered the updraft from the village fires. It was not the drops straight overhead which were troublesome—not to Fagin's village.

Another, larger drop beyond the glowing protective double ring accomplished more. It settled to the ground fifty yards beyond one of the outer fires. The ground had been cooled enough by its predecessors to let it remain liquid, so for a short time it was visible as it drifted toward the blaze under the impulse of the fires' own convection currents. Then radiated heat made it fade out; but Nick knew it was still there. It had been crystal clear, free of suspended oxygen bubbles; it was now pure steam, equally free of combustion's prime necessity. Nick would have nodded in satisfaction, had his head been capable of free movement, when the fire in the path of the invisible

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cloud suddenly began to cool and within a few seconds faded from visibility.

If any of the attackers noticed the incident, they certainly did nothing. None of them moved, and the fire remained out. Five seconds later Nick had his plan worked out

He emerged fully from the hut and walked over to the main fuel magazine. Here he loaded himself with as much as he could carry, and took it back to the building where the wounded were lying. None of the raiders stopped or questioned him; none had spoken to him since the truce had been concluded. Inside the hut, he quickly built and lighted a fire. When it had come to an even glow he lighted a torch from it and walked back to the woodpile. Casually he stuck the cold end of the torch into the pile, as though to illuminate his work; then he made several more trips carrying fuel to the hut, leaving the torch where he had placed it. Eventually the building could hold no more wood, so he ceased his labor.

But he left the torch.

Tenebran wood glows like punk; it does not flame. It took some time for the stick to burn down to its base, and still longer before the increase in brilliancy of the region around the village showed that the main stack had properly caught. Even then, there was no reaction from the invaders. These had gathered into a tight group surrounding the robot, which had remained in its usual position at the center of the village.

By this time, more than half of the peripheral fires were out, most of them in the outer ring. One or two of the inner ring had also been smothered, and Nick began to get an impression of uneasiness from the clustered cave-



dwellers. When the last of the outer fires died, a mutter began to grow from their ranks, and Nick chuckled to himself. Swift just *'might* have a little trouble handling his men as their protection from the rain vanished, and no caves were available. If the muttering continued, the chief

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would certainly have to take some action; and all he could do, as far as Nick could see, would be to ask Nick himself for help. That should put quite a dent in his authority.

But Nick had underestimated the big fellow. From the vicinity of the robot his voice suddenly rapped out a series of orders; and obediently a dozen of his men ran from the outskirts of the group toward one of the fires which was still burning. There, to Nick's disgust, they seized sticks from the small woodpile at its side, lighted their ends, carried the torches to the dead fires, and rekindled these without the slightest difficulty. Evidently the cave-dwellers didn't sleep *all* night in their holes; someone had watched his fire-technique long enough to get at least some of the idea. If they also knew about replenishing . . . They did. More wood was being put on all the fires. Nick noted with satisfaction, however, that it was far too much wood; he wouldn't have to wait too long before the small woodpiles beside each fire were extinguished. The cave-dwellers seemed to have taken the now fiercely glowing main pile as another bonfire; Swift was going to have to do some fast thinking when the reserves disappeared.

This he proved able to do. It was fortunate that Nick had been able to keep awake, for Swift's men did not announce their coming. They simply came.

They were unarmed, rather to Nick's surprise, but they approached the hut door without hesitation, almost as though they expected him to stand aside for them. When he didn't, they stopped, the foremost half a spear's length away. He may have intended to say something, but Nick spoke first.

"What do you want? My friends are all wounded and can't help you. There is no room in the hut. Go to the others, if you want shelter."

"Swift sent us for wood." It was a calm statement, with no "or else" concealed in it, as far as Nick could tell by the tone.

*Cerebration; Transportation; Emigration* 47

"I have only enough to keep my own fire going for the night. You will have to use the other piles."

"They are used up."

"That isn't my fault. You know that wood burns up hi a fire; you shouldn't have put so much on."

"You didn't tell us that. Swift says that you should therefore give us your own wood, which we saw you taking, and tell us how much to use."

It was evident that the chief had seen through at least part of Nick's scheme, but there was nothing to do now but carry it through.

"As I said, I have only enough for this fire," he said. "I shall not give it up; I need it for myself and my friends."

Very much to his surprise, the fellow retreated without further words. Apparently he had gone as far as his orders extended, and was going back for more. Initiative did not flourish under Swift's rule.

Nick watched the group as it rejoined the main crowd and began to push its way through to the chief. Then he turned and nudged Jim.

"Better get up, you and Nancy," he whispered. "Swift can't let this go. I'll fight as well as I can; you keep me in ammunition."

"What do you mean?" Nancy's thoughts were less swift than usual.

"I can't fight them with axes; they'd be through in two minutes. I'm tired and slow. I'm going to use torches—remember what it feels like to be burned? They don't; I warned them about it when I was at their village, and they were always very careful, so none of them has any real experience. They're going to get it now!"

The other two were on their feet by this time. "All right," agreed Jim. "We'll light torches and pass them to you whenever you call. Are you going to poke with the things, or throw them? I never thought of fighting that way."

"Neither did I, until now. I'll try poking first, so give me long ones. If I decide to throw, I'll call for really

short ones—we don't want them throwing the things back at us, and they will if there's enough to hold on to. They're not too stupid for that—not by a long day's journey!"

Jim and Nancy gestured agreement and understanding, and turned to the piles of firewood that almost covered the floor. The fire was burning quite close to the doorway; Nick took his stand once more in the opening, and the other two on either side of the blaze, where they could hand torches to him as rapidly as he might need. Everything was ready when the party returned to the hut.

It was a little larger this time; Swift himself had joined it. They approached to within half a dozen yards, and spoke briefly and to the point.

"If you don't let us in to get the wood, my knives will take care of you. You have seen what I mean."

"I have seen," acknowledged Nick. "That's why I want nothing to do with you. If you come any closer, it is at your own risk."

He had never before seen Swift hesitant or uncertain, but for just a moment now the chief seemed to be running over the implications of Nick's words. Then he was himself again.

"Very well," he said, and swept forward with four spears couched along his forearms.

Nick's battle plan had to be scrapped at the beginning; the spears were longer than his torches. He did succeed in striking their points aside before they touched him, but he could not reach Swift even with the spears out of the way. His hatred of the chief paralyzed his judgment for an instant, and he hurled both his left-hand torches at the giant's chest.

Swift ducked, barely in time. Those behind him were in a close-packed wedge whose central members were unable to dodge quickly enough, and howls of pain arose in several voices as the torches struck and scattered burn-

*Cerebration; Transportation; Emigration* 49

ing coals in all directions. The chief ducked backward to just beyond spear's length, resuming his attack stance.

"Half circle!" he snapped. The warriors obeyed with speed and precision, forming a thin line centered on Nick.

"Now, all at once—get him!" The semicircle contracted, and the spear points came toward the door.

Nick was not too alarmed. None of the attackers was in a position to deliver the upward thrust which would get under scales; stone points were more likely to push him back than to penetrate. If he were pushed back against anything solid, of course, it would be a different story; the real danger at the moment, though, was that several of the fighters would get within knife range at once, and so occupy him that a spearsman could get close enough for long enough to strike from below. For just an instant he hesitated, wondering whether he should throw or strike; then he made up his mind.

"Short ones!" he ordered to the helpers behind him.

Nancy already had several foot-long sticks with their ends in the fire; she had them in his hands instantly, and was lighting others. For perhaps ten seconds Nick did his best to emulate a machine gun. More than half his projectiles missed, but a good many didn't; and after the first three or four seconds another factor complicated the fight. Still burning torches and fragments of glowing wood were being more and more thickly scattered before the doorway, and the attackers were getting involved with these. Feet were even more sensitive to the fire than were scales, and the effect was distracting, to put it mildly. Swift, to do him justice, stayed with his men and fought as hard as any; but at length even he had had enough and withdrew a few yards, limping slightly. Nick laughed aloud as he went.

"Better get your own firewood, Swift, my friend! Of course you won't find any within an hour's walk of the village; we've used it up long ago. Even if you know where the best places to get it are, you won't be able to

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get there and back through the rain. You needn't worry, though; we'll take care of you when you go to sleep. I wouldn't want anything to eat you, friend Swift!"

It was almost funny to watch Swift's fury. His hands tightened on the spear shafts, and he rose to full height on his walking legs, shaking all over with rage. For several seconds it seemed an even bet whether he would hurl the spears or charge the door across the scattered coals. Nick was perfectly ready for either, but was hoping for the latter; the mental picture of Swift with burned feet was! a very attractive one.

But the chief did neither. In the midst of his fury he suddenly relaxed, and the spear points dropped as though he had forgotten them for a moment. Then he shifted the weapons backward until he was holding

them near their j centers of gravity, in "carry" position, and turned away from the hut. Then, seemingly as an afterthought, he turned back and spoke to Nick.

"Thanks, Chopper. I didn't expect that much help. I'd better say good-bye, now; and so had you—to your i Teacher."

"But—you can't travel at night."

"Why not? You did."

"But how about Fagin? How do you know he can?"

"You told me he could do anything you could. You also said he'd agree to do what we said. If he forgets that, or changes his mind, we can thank you for showing us what to do. Do you suppose he'll like the touch of fire any better than we do?" Swift chuckled and strode swiftly back to the main group, bawling orders as he went. Nick began shouting at least as loudly.

"Fagin! Did you hear that? Fagin! Teacher!" In his anxiety he forgot the tune it always took the Teacher to answer, and drowned the robot out for a moment. Then its answer became audible.

"What's the matter, Nick?" It was not possible to tell from the voice that Raeker was not at the other end; *Cerebration; Transportation; Emigration* 51

Nick's people had been given a general idea of the "Teacher" situation, but not all the details, and they thought inevitably of the robot as an individual. This was virtually the first time it had made any difference; the man on watch knew the general picture, of course, having been briefed by Raeker when the latter had gone off duty, but he had not actually been present during Swift's initial attack or the subsequent truce. Consequently, Nick's words did not mean all they might have to him.

"Swift is going to start back for the caves right away; he says he'll use fire on you if you don't go with him. Can you stand that?"

There was a little more than the usual hesitation. No one had ever measured the temperature of a Tenebran fire, and the man on watch was not enough of a physicist to hazard a guess from its radiation output. The main consideration in his mind was the cost of the robot.

"No," he answered. "I'll go along with him."

"What shall we do?"

Raeker's order for the villagers to stay put was one thing he had not mentioned to his relief; he had expected to be back on duty long before the start of the journey. The relief did the best he could under the circumstances.

"Use your own judgment. They won't hurt me; I'll get in touch with you again later."

"All right." Nick carefully refrained from reminding the Teacher of his earlier command; he liked the new one much better. He watched in silence as the invaders, under Swift's orders, collected what torches they could from the nearly spent fires. Then they clustered around the Teacher, leaving an opening in the crowd on the side they wished him to go. It was all done without words, but the meaning was plain enough. The robot swung around on its treads and headed south, the cave dwellers swarming after it.

Nick spent only a few moments wondering whether they'd find more torch wood before using up what they 52

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had. He had turned his mind to other matters even before the cavalcade was out of sight.

He had been given a free hand. Very well, he still felt that leaving the village was best; they would do so as soon as possible. Of course, it wouldn't be possible for a few days, until everyone was able to travel again, but the tune could be spent in planning. There was certainly the question of where to go, and the corollary one of how to get there—Nick began to realize with a shock just what leaving the village, with its lifetime accumulation of property and equipment, would mean—and how to get back in touch with Fagin when the move was accomplished. It was easy to tell oneself that the Teacher could always find them wherever they went; but Nick was mature enough to doubt the omniscience of anyone, including the robot. That meant, then, three problems to solve. Since Nick had no desire to resemble Swift in any way, he postponed solving them until the others would be awake and able to help in the discussion.

The fire lasted until morning, but only just, and only by virtue of Nick's running around the hut rapidly on a number of occasions to stir oxygen into an oncoming mass of dead steam. He got very little sleep after the last of the outer fires went, and that was pretty early hi the night.

Morning brought no relief. The first task normally accomplished was to put a guard on the village herd,

which was penned in a hollow near the village. The depression remained full of water a little later than the surrounding country, so the "cattle" were normally safe from predators until the guards could arrive; but at the moment there simply weren't enough people in condition to guard both herd and village. They suffered several losses that morning as a result, until Nick could round up the reviving creatures by himself and herd them into the village. Then there was the problem of firewood for the next night; he had told the absolute truth to Swift in that respect. Someone had to get it. There was no choice but for the still battered

*Cerebration; Transportation; Emigration* 53

Jim and Nancy to do the job together, dragging as best they could the cart on which they piled their fuel. They had never succeeded in training their cattle to pull the conveyance; the creatures stubbornly refused to budge under any sort of load.

By the second day, most of the others were on their feet if not at full efficiency, and matters were considerably easier. A consultation was held that morning, in which Nick proposed and defended vigorously the notion that they move to the viciously rough country he had crossed during his flight from the cave village. His chief point was the presence of so many spots which could only be approached from a single, narrow point, like a canyon or ridge, and could therefore be defended effectively by a small force. It was Nancy who answered the suggestion.

"I'm not sure that's a very good plan," she said. "In the first place, we don't know that any of the places you describe will still be that way when we get there." A quake lent emphasis and support to her words.

"What if they aren't?" retorted Nick. "There will always be others. I wasn't suggesting any of the specific spots I described, only the general area."

"But how is Fagin to find us? Supposing one of us does get to the cave village and get a message to him, how are we to describe the way to him? We'd have to guide him directly, which would probably interfere with his own plans—you judged, and I think rightly, that he is planning to take advantage of his ability to travel at night without fire."

Nick felt a very human surge of annoyance at this opposition, but remembered Swift in time to keep from yielding to it. He didn't want to be compared with that savage in anyone's mind; besides, there was something to what Nancy was saying, now that he really gave his mind to it.

"What sort of place would you suggest?" he asked.

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"You're right about getting back in touch with Fagin, but I certainly can't think of any place which we will ever defend as easily as those canyons in the west."

"It seems to me that Fagin was right when he said I\* was foolish to fight Swift's people at all," returned Nancy quietly. "I was not thinking of defense; if we have to defend ourselves, we're already out of luck, I fear. What I had in mind was the sea."

"What?"

"You know. You helped map it. Off to the east there's a body of water that isn't water—at least, it doesn't dry up entirely during the daytime. I don't remember just what Fagin called it when we reported it to him—"

"He said he supposed it was mostly sulphuric acid, whatever that is, but he didn't know how to make sure," interjected the still crippled Dorothy.

"—Whatever it is, it stays there, and if we're on the edge of it Fagin can't help finding us if he simply travels along its border. Probably he can travel *in* it for a distance, too, so the cave people can't track him." A hum of approving surprise greeted this notion, and after a few moments of thought Nick gestured agreement.

"All right," he said. "If no one has other ideas, we'll move to the edge of the sea; we can settle on the exact spot after we get there and have looked around. It's a year or two since we mapped the place, and I don't suppose we could trust information that old."

"The next problem is getting there. We'll have to decide how much we can take from the village here, and how we can carry it. I suppose we can start with the wood cart, but I'll bet there are places we won't be able to move it across. No matter how we figure it, there's a lot we'll have to leave behind."

"Then, finally, there's the matter of getting a message to Fagin. That we can leave until we're settled;

there's no point telling him where we are before we know.

"I hope we can travel by tomorrow; in the meantime,

*Cerebration; Transportation; Emigration* 55

the second question is the one to work on. Anyone who has more ideas, let's hear them at any time." They dispersed, each to the tasks of which he was capable.

Jim and Nancy were practically whole again, and were now looking after the cattle. There had been no further losses since they had been able to take over the job. Dorothy was at the wagon, with all the articles they hoped to take stacked around her, arranging and rearranging them in the vehicle. No matter how she packed them, there was more outside than in, and nearly constant discussion and even argument was going on between her and the other members of the group. Each wanted his own belongings to go and it took a good deal of talk to convince some of them that since everything couldn't be taken the losses should be shared.

The argument was still going on, to a certain extent, when the journey started. Nick was beginning to feel a certain sympathy for Swift by that tune; he had discovered that at times it was necessary for a group to have a leader, and that it was not always possible for the leader to reason his followers into the desired action. Nick had had to give his first arbitrary orders, and was troubled by the thought that half his friends must by now be comparing him with Swift. The fact that he had been obeyed should have clarified him on this point, but it didn't.

The cart was perilously overloaded, and everyone except those actually herding had to pull with all his strength. When fighting was necessary, hauling had to be stopped while weapons were snatched up and used. Actually, of course, there wasn't too much fighting; the average Tenebran carnivore wasn't very brainy, but most of them steered clear of such a large group. The chief exception was formed by the floaters, which were more vegetable than animal anyway. These creatures could be downed fairly safely by anyone having a spear longer than their tentacles; but even after their gas bladders

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were punctured they were dangerous to anyone coming within reach of the poisonous appendages. Several animals of the herd were lost when one of the monsters fell almost into it, and two of the party were painfully poisoned on the same occasion. It was some hours before they could walk unaided.

Contrary to Nick's pessimistic forecast, it proved possible to get the wagon all the way to the sea. Late in the second day of travel they reached it, after some hours of threading their way among ever larger pools of quiet, oily liquid.

They had seen such pools before, of course; they formed in hollows in their own valley toward the end of the day—hollows which were lakes of water at sunrise, but only tiny pools of oleum when the day reached its height. These were larger, filling a much bigger fraction of their beds.

The ground was different, too; vegetation was as thick as ever, but underfoot among the stems the ground was studded with quartz crystals. The cattle didn't seem to mind, but the feet of their owners were not quite so tough, and progress became decidedly difficult. Such masses of crystals did occur elsewhere, but usually in isolated patches which could be avoided.

The search for a stopping place was therefore briefer, and perhaps less careful, than it might otherwise have been. They agreed very quickly on a peninsula whose main body was a hill thirty or forty feet above the sea, joined to the mainland by a crystal-studded tombolo a dozen yards in width. Nick was not the only one of the party who was still considering the problem of physical defense; and in addition to its advantages in this respect, the peninsula was roomy enough for the herd. They guided and trundled their belongings down the sea and up the hill, and immediately settled down to the standard business of hunting for firewood. This was plentiful enough, and by dark a very satisfactory supply had been laid in.

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The watch fires were built, one of the herd animals slaughtered and eaten, and the group settled down for the night. It was not until the drops had appeared and the fires had been lighted that anyone thought to wonder what happened to the sea level during the nightly rain.

#### **IV: COMMUNICATION; PENETRATION; ISOLATION**

AMINADABARLEE fell silent, his eyes fixed on the vision screen; and, nasty as the creature had been, Raeker felt sympathetic. He himself would have been at least as unsociable under similar circumstances.

There was no time for pity, however, while there was still hope; too much had to be done.

"Wellenbach! What's the combination of the bathyscaphe?" he snapped.

The communication watch officer reached over his shoulder. "I'll get her for you, Doctor."

Raeker pushed his hand aside. "Wait a minute. Is it a regular set at the other end? An ordinary phone, I mean, or something jury-rigged into the panels?"

"Perfectly ordinary. Why?"

"Because if it weren't and you punched its combination, those kids might open their air lock or something like that in trying to answer. If it's standard in design and appearance, the girl will be able to answer safely."

"I see. She won't have any trouble; I've seen her use the punch-combination sets here."

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"All right. Call them." Raeker tried not to show the uncertainty he felt as the officer punched the buttons.

It was not possible to tell yet just what had happened above Tenebra's atmosphere; *something* had evidently breached the air lock of the tender, but that might or might not have affected the bathyscaphe. If it had, the children were probably dead—though their guide might have had them in space suits, of course. One could hope.

Behind him, Aminadabarlee might have been a giant statue of an otter, cast in oiled gray steel. Raeker spent no time wondering at his own fate if bad news came back through the set and that statue returned to life; all his attention was concentrated on the fate of the youngsters. A dozen different speculations chased themselves through his mind in the few seconds before the screen lighted up. Then it did, and the worst of them vanished.

A human face was looking at them out of it; thin, very pale, topped by a mop of hair which looked black on the screen but which Raeker knew was red; a face covered by an expression which suggested terror just barely held under control, but—a living face. That was the important fact.

At almost the same instant a figure came hurtling through the door of the communications room and skidded to a halt beside the motionless figure of the Drommian.

"Easy! Are you all right?" Raeker didn't need the words to identify Councillor Rich. Neither did Aminadabarlee, and neither did the child in the screen. After the two-second pause for return contact, the terror vanished from the thin face, and she relaxed visibly..

"Yes, Dad. I was pretty scared for a minute, but it's all right now. Are you coming?"

For a moment there was some confusion at the set as Rich, Raeker, and the Drommian all tried to speak at once; then Aminadabarlee's physical superiority made itself felt, and he thrust his sleek head at the screen.

"Where is the other one—my son?" he shrilled.

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She replied promptly, "He's here; he's all right."

"Let me talk to him." The girl left the pickup area for a moment, and they heard her voice but not her words as she addressed someone else. Then she reappeared, with her dark hair badly disheveled and a bleeding scratch on one cheek.

"He's in a corner, and doesn't want to come out. I'll turn up the volume so you can talk to him there." She made no reference to her injury, and, to Raeker's surprise, neither did her father. Aminadabarlee seemed not to notice it. He shifted into his own shrill language, which seemed to make sense to no one else in the room but Rich, and held forth for several minutes, pausing now and then for answers.

At first he received none; then, as he grew more persuasive, a feeble piping came back through the set. Hearing this restored the Drommian's composure, and he talked more slowly; and after a minute or so of this Aminadorneldo's head appeared beside Easy's. Raeker wondered whether he looked ashamed of himself; Drommian facial expressions were a closed book to him. Apparently one of the family had a conscience, anyway, for after a few moments' more talk from the elder one the child turned to Easy and shifted to English.

"I'm sorry I hurt you, Miss Rich. I was afraid, and thought you'd made the noise, and were trying to make me come out of the corner. My father says you are older than I, and that I am to do whatever you say until

I am with him again."

The girl seemed to understand the situation. "It's all right, 'Mina," she said gently. "You didn't really hurt me. I'll take care of you, and we'll get back to your father—after a while." She glanced at the pickup as she added the last words, and Raeker grew tense again. A glance at Councillor Rich confirmed his suspicion; the girl was trying to get something across, presumably without alarming her companion. Gently but firmly Raeker

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took the Drommian's place in the pickup field. Easy r nodded in recognition; she had met him briefly on her own tour through the *Vindemiatrix* some time earlier. ^

"Miss Rich," he began, "we're still a little in the dark f about just what happened down there. Can you tell us? Or is your guide there, to give a report?"

She shook her head negatively at the latter question. "I don't know where Mr. Flanagan is. He stayed hi the tender to have a smoke, I suppose; he told us to be sure not to touch any controls—he must think we're pretty stupid. We stayed away from the board, of course—in fact, after the first look, we stayed out of the control compartment altogether, and looked through the other rooms. They're all observation or bunkrooms, except for the galley, and we were just going to suit up to go back to the tender when a call came from Mr; Flanagan on the set he'd left tuned to suit radio frequency. He said he was at the outer lock, and would open it as soon as he closed the one on the tender—the two ships were so close together we could touch them both at once when we came across—and that we were to, stay absolutely still and not do a thing until he came. 'Mina had just opened his mouth to answer when the jolt came; we were flung against the wall, and I was held there by what felt like three or four G's of acceleration. 'Mina could move around all right, and tried to call Mr. Flanagan on the set, but there was no answer, and I wouldn't let him touch anything else. The acceleration lasted half a minute or ! so, I guess; you can tell better than we can. It stopped | just before you called us."

By this time the communication room was packed with : men. Several of them began to work slide rules, and j Raeker, turning from the set, watched one of these until [ he had finished; then he asked, "Any ideas, Saki?"<sup>1</sup>

"I think so," the engineer replied. "The kid's report | isn't exact, of course, but judging from her estimate of I acceleration and time, and the mass of the bathyscaphe, '

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one full ring of the solid-fuel boosters was touched off somehow. That should give just over four G's for forty seconds—about a mile a second total velocity change. There's no way to tell where the ship is, though, until we get there and home on it; we can't compute, since we don't know the direction of acceleration. I wish the 'scaphe weren't so close to the planet, though."

Raeker knew better than to ask the reason for this, but Aminadabarlee didn't.

"Why?"

The engineer glanced at him, then at the image of the other Drommian in the screen, and then apparently decided not to pull punches.

"Because a one-mile-a-second change in any of a good many directions could put it in an orbit which would enter atmosphere," he said bluntly.

"How long to entry?" cut in Rich.

"Not my pigeon. We'll get it computed while we're under way. My guess would be hours at the outside, though."

"Then why are we standing here talking?" shrilled Aminadabarlee. "Why aren't preparations for rescue being made?"

"They are," returned the engineer calmly. "Only one shuttle was in regular use, but there are others here. One of them is being made ready, and will leave in less than ten minutes. Dr. Raeker, do you want to come?"

"I'd just add mass without being useful," Raeker replied.

"I suppose the same could be said for me," said Rich, "but I'd like to come if there's room. I certainly don't

want to hamper the work, though."

"It will be better if you don't," admitted Sakiiro. "We'll keep in touch with this ship and the 'scaphe, though, so you'll know what's happening." He ran from the room.

Aminadabarlee had quite obviously meant to insist upon going; after Rich's words, however, he could hardly

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do that. He relieved his feelings by remarking, "No one but a fool human being would have had takeoff boosters attached to an uncompleted ship."

"The bathyscaphe is complete, except for final circuit checks and connections," another engineer replied calmly, "and the boosters were for landing as well as takeoff. As a matter of fact, they were not supposed to be connected until the last moment, and it will not be possible to tell what actually fired them until we salvage the ship. Until then, assigning blame is very much a waste of time." He stared coldly at the Drommian, and Rich stepped into the breach. Raeker had to admit the fellow was good at his job; it had seemed a virtual certainty that the big weasel was going to clean the human beings out of the room, but Rich had him calmed down below boiling point in four or five minutes.

Raeker would have liked to hear the details, but he was occupied with the radio. The children on the bathyscaphe had heard, without understanding completely, most of the engineers' statements; and Raeker found himself doing his best to keep up their morale. They were, perfectly reasonably, frightened half to death. It wasn't as hard as he'd thought it might be, though; he hadn't talked long before he realized that the girl was doing exactly the same thing. He couldn't decide whether it was for the benefit of her father or her nonhuman companion, but his respect for the youngster went even higher.

The rescue ship was well on the way by this time, and as the minutes clicked by the hopes of everyone on all three vessels began to mount. If the 'scaphe were in an orbit that did not touch Tenebra's atmosphere, of course, there was no danger; food and air equipment were aboard and had been operating for some time. On a straight chance basis, it seemed to Raeker that the probabilities were at least three to one that this was the case, though he was no ballistician. The computer on the rescue boat was kept busy grinding out possible orbits; the worst

*Communication; Penetration; Isolation* 63

seemed to call for atmospheric contact within three-quarters of an hour of the accident; and if this didn't occur within a little over two hours, it wouldn't.

There were view ports in the 'scaphe, and Easy was able to recognize some stars; but while this told them roughly which side of the planet she was on, the lack of precision measurements at her command made the information useless. At that time, there was only one side she *could* be on.

It was sixty-seven minutes after the accident that Easy reported acceleration. By that time, even Aminadabarlee knew all the implications of the fact. The rescue boat was "there," in the sense that it was within half a diameter of Tenebra and nearly motionless with respect to the planet—perfectly useless, as far as the trapped children were concerned. The engineers could get a fix on the 'scaphe's transmitter and locate it within a few miles; but they couldn't compute an interception orbit inside Tenebra's atmosphere. No one knew enough about the atmosphere. The certain thing was that no interception whatever could be accomplished before the 'scaphe was so low that rockets could not be used—atmospheric pressure would be too high for them. Sakiiro reported this to the *Vindematrix* within a minute of Easy's information; then, before Aminadabarlee could start to speak, he turned to the set which he had on the depth-boat's frequency.

"Miss Rich. Please listen carefully. Your acceleration is going to get much worse over the next few minutes; I want you to strap yourself in the seat before the control panel, and do what you can about your companion."

"None of the seats fit him," the girl answered.

"His normal weight is four G's," Rich cut in from the *Vindematrix*.

"He'll be taking more than that; but he'll probably be able to stand it, in that case. Just tell him to lie down. Now, Miss Rich—"



## CLOSE TO CRITICAL

"Call me Easy; it'll save time."

"Tell me what you recognize on the board in front of you."

"Not much. Light switches are labeled over on the left. The communicators are top center; air-lock controls under a guard near the light switches; about two square feet of off-on relay buttons, labeled with letters, that don't mean anything to me—" She let her voice trail off, and Saki nodded.

"All right. Now, near the top of the board, to the right of the communicators, you'll see an area about six inches square marked 'Hunt.' Have you found it?"

"Yes; I see it."

"Make sure the master toggle at its lower left corner says 'Off.' Then put the three in the group labeled 'Aero' in the 'On' position. Then make sure that the big one marked 'D.I.' is off. Do you have that?"

"Yes, sir."

"Now be sure you're strapped in. What you've been doing is to tie in a homing radio which is tuned to the transmission of the robot on the ground to the aerodynamic controls of the 'scaphe. I don't dare have you use any power, but with luck the autopilot will glide you down somewhere in the general vicinity of that robot. You don't have to worry about burning up hi the atmosphere; the ship is designed for a power-off entry. It's a big planet, and if we can narrow down your landing area to even a five-hundred-mile radius it will be a big help in picking you up. Do you understand?"

"Yes. I'm strapped in the seat, and 'Mina is lying down."

"All right. Now reach up to the 'Hunt' region you've just been setting, and snap on the master switch. I hope you're not prone to motion sickness; it will be rough at first, I expect."

Sakiro from the rescue boat and the group in the message room of the *Vindematrix* watched tensely as *Communication; Penetration; Isolation* 65

the girl's hand went up and out of the pickup field. They could not see her actually close the switch, and to the surprise of the engineers they could not detect very easily the results of the act. They had expected the girl to be jammed into her seat by an abrupt acceleration change; but things proved not nearly so bad.

"I can feel it," Easy reported. "The ship is rolling— now the planet is on our left side—and I'm a little heavier in my seat—now we're leveling out again, and 'Down' is forward, if this panel is at the front of the room."

"It is," replied the engineer. "You should now be headed toward the robot, and will be slowing down until you're doing about five hundred miles an hour with respect to the air around you. The braking will be jerky; the ship had throw-away speed brakes to take it down through the heat barrier. Stay strapped in."

"All right. How long will it take?"

"A couple of hours. You can stand it all right."

Rich cut in at this point.

"Suppose the machine passes over your robot's location before getting rid of its speed, Mr. Sakiro? What will the autopilot do? Try to dive in at that point?"

"Certainly not. This is a vehicle, not a missile. It will circle the point at a distance which doesn't demand more than an extra half-G to hold it in the turn. If necessary, it will try to land the ship; but we should be able to avoid that."

"How? You don't expect Easy to fly it, do you?"

"Not in the usual sense. However, when she's down to what we can call 'flying' speed, the main buoyancy tanks of the 'scaphe should be full of the local atmosphere. Then I'll tell her how to start the electrolyzers; that will fill them with hydrogen, and the ship should float, when they're full, at an altitude where boosters can be used.

Then she and her young friend can trim the ship so that

## CLOSE TO CRITICAL

she's hanging nose up, and fire the rest of the boosters. We can be waiting overhead."

"I thought you said the boosters weren't connected to the control panel yet!"

Sakiro was silent for a moment.

"You're right; I'd forgotten that. That complicates the problem."

"You mean my kid is marooned down there?"

"Not necessarily. It's going to call for some tight maneuvering; but I should think we could rig boosters on

this boat so as to be able to reach the 'scaphe when it's floating at its highest. The whole design object, remember, was for the thing to float high enough for hydroferron boosters to work; and if they'll work on one frame, they'll certainly work on another."

"Then you can rescue her." The statement was more than half a question. Sakiiro was an honest man, but he had difficulty in making an answer. He did, however, after a moment's hesitation, staring into the face of the middle-aged man whose agonized expression showed so clearly on his screen.

"We should be able to save them both. I will not conceal from you that it will be difficult and dangerous; transferring an engineer to the outside of the 'scaphe to finish up wiring, while the whole thing is floating like a balloon, from a rocket hanging on booster blasts, will present difficulties."

"Why can't you transfer the kids to the rescue ship?"

"Because I'm pretty sure their space suits won't stand the pressure at the 'scaphe's floating height," replied Sakiiro. "I don't know about Drommian designs, but I do know our own."

"Mr. Sakiiro." Easy's voice cut back into the conversation.

"Yes, Easy."

"Is there anything more I can do? Just sitting here doesn't seem right, and—it scares me a little."

*Communication; Penetration; Isolation* 67

Rich looked appealingly at the engineer. As a diplomat, he was an accomplished psychologist, and he knew his daughter. She was not hysterical by nature, but few twelve-year-olds had ever been put under this sort of stress. He himself was not qualified to suggest any reasonable occupation to hold her attention; but fortunately Sakiiro saw the need, too.

"There are pressure gauges to your left," he said. "If you can give us a running report on their readings, while your friend tells us when he can first detect signs of dimming in the stars, it will be of some help. Keep it up unless you get too heavy to be able to watch easily; that may not be too long."

Rich looked his thanks; if Aminadabarlee was doing the same, no one was able to detect the fact. For long minutes the silence was broken only by the voices of the children, reading off numbers and describing the stars. Then Easy reported that the ship was banking again.

"All right," said Sakiiro. "That means you're about over the robot. From now until your speed is killed, you're going to have to take better than three and a half gravities. Your seat folds back on its springs automatically to put you in the best position to stand it, but you're not going to be comfortable. Your friend can undoubtedly take it all right, but warn him against moving around. The ship's traveling fast in an atmosphere, and going from one air current to another at a few thousand miles can give quite a jolt."

"All right."

"The stars are getting hazy." It was Aminadorneldo.

"Thanks. Can you give me another pressure reading?"

The girl obliged, with detectable strain in her voice. Until the last turn had started, the 'scaphe was in relatively free fall; but with its rudimentary wings biting what little there was of the atmosphere in an effort to keep it in a turn the situation was distinctly different.

#### **CXUSE TO CRITICAL**

Why the vehicle didn't go into a frame-shattering series of stalls, none of the engineers could see; the turn had started at a much higher speed than had been anticipated by the designers of the machine. As it happened, the whole process was almost incredibly smooth—for *a* while.

Sakiiro, with no really objective data to go on, had about concluded that the vessel was down to gliding speed and was going to describe the location of the electrolysis controls to Easy when the motion changed. A series of shuddering jars shook the ship. The girl's body was held in the seat by the straps, but her head and limbs flapped like those of a scarecrow in a high wind; the young Drommian for the first time failed to stay put. The jolting continued, the thuds punctuated by the girl's sobs and an almost inaudibly high-pitched whine from Aminador-neldo. The elder Drommian rose once more to his feet and looked anxiously at the screen.

The engineers were baffled; the diplomats were too terrified for their children to have had constructive ideas even had they been qualified otherwise; but Raeker thought he knew the answer.

"They're hitting raindrops!" he yelled.

He must have been right, it was decided afterward; but the information did not really help. The

bathyscaphe jerked and bucked. The autopilot did its best to hold a smooth flight path, but aerodynamic controls were miserably inadequate for the task. At least twice the vessel somersaulted completely, as nearly as Raeker could tell from the way the Drommian was catapulted around the room. Sheer luck kept him out of contact with the control switches. For a time the controls were useless because their efforts were overridden—a rudder trying to force a left turn will not get far if the right wing encounters a fifty-foot sphere of water, even though the water isn't much denser than the air. Then they were useless because they lacked enough grip on the atmosphere; the ship had given up enough kinetic energy to

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the raindrops to fall well below its stalling speed—low as that was, in an atmosphere seven or eight hundred times as dense as Earth's at sea level. By that time, of course, the ship was falling, in the oldest and simplest sense of the word. The motion was still irregular, for it was still hitting the drops; but the violence was gone, for it wasn't hitting them very hard.

The rate of fall was surprisingly small, for a three-G field. The reason was simple enough—even with the outside atmosphere filling most of its volume, the ship had a very low density. It was a two-hundred-foot-long, cigar-like shell, and the only really heavy part was the forty-foot sphere in the center which held the habitable portion. It is quite possible that it would have escaped serious mechanical damage even had it landed on solid ground; and as it happened, the fall ended on liquid.

Real liquid; not the borderline stuff that made up most of Tenebra's atmosphere.

It landed upside down, but the wings had been shed like the speed brakes and its center of gravity was low enough to bring it to a more comfortable attitude. The floor finally stopped rocking, or at least the Drommian did—with the vision set fastened to the ship, the floor had always seemed motionless to the distant watchers. They saw the otterlike giant get cautiously to his feet, then walk slowly over to the girl's chair and touch her lightly on the shoulder. She stirred and tried to sit up.

"Are you all right?" Both parents fairly shrieked the question. Aminadorneldo, his father's orders in mind, waited for Easy to answer.

"I guess so," she said after a moment. "I'm sorry I bawled, Dad; I was scared. I didn't mean to scare 'Mina, though."

"It's all right, kid. I'm sure no one can blame you, and I don't suppose your reaction had much to do with your friend's. The main thing is that you're in one piece,

*V* CLOSE TO CRITICAL

and the hull's intact—I suppose you'd be dead by now if it weren't."

"That's true enough," seconded Sakiiro.

"You've had a rough ride, then, but it should be over now. Since you're there, you might take a look through the windows—you're the first non-natives ever to do that directly. When you've seen all you can or want to, tell Mr. Sakiiro and he'll tell you how to get upstairs again. All right?"

"All right, Dad." Easy brushed a forearm across her tear-stained face, unfastened the seat straps, and finally struggled to her feet.

"Golly, when are they going to cut the power? I don't like all these G's," she remarked.

"You're stuck with them until we get you away from there," her father replied.

"I know it. I was just kidding. Hmm. It seems to be night outside; I can't see a thing."

"It is, if you're anywhere near the robot," Raeker replied, "but it wouldn't make any difference to your eyes if it were high noon. Even Altair can't push enough light for human eyes through that atmosphere. You'll have to use the lights."

"All right." The girl looked at the board where she had already located the light switches; then, to the surprised approval of the engineers, she made sure from Sakiiro that these *were* the ones she wanted. Saki admitted later that his hopes of rescuing the pah\* soared several hundred per cent at that moment.

With the lights on, both children went over to the windows.

"There isn't much to see," called Easy. "We seem to have splashed into a lake or ocean. It's as smooth as glass; not a ripple. I'd think it was solid if the ship weren't partly under it. There are big foggy globes drifting down, yards and yards across, but they sort of fade out

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just before they touch, the surface. That's every bit I can see."

"It's raining," Raeker said simply. "The lake is probably sulphuric acid, I suppose fairly dilute by this time of night, and is enough warmer than the air so the water evaporates before it strikes. There wouldn't be any waves; there's no wind. Three knots is a wild hurricane on Tenebra."

"With all that heat energy running around?" Rich was startled.

"Yes. There's nothing for it to *work* on—I use the word in its physical sense. There isn't enough change in volume when the atmosphere changes temperature, or even changes state, to create the pressure differences you need for high winds. Tenebra is about the calmest place you'll find inside any atmosphere in the galaxy."

"Does that jibe with your remarks about earthquakes a while ago?" It was a measure of Aminadabarlee's revived confidence that he could talk of something besides the stupidity of human beings.

"No, it doesn't," admitted Raeker, "and I'll have to admit, Easy, that there is a possibility that you *will* encounter some waves if you float there long enough. However, you won't be able to call them weather, and they won't carry you to any more interesting places. I'm afraid you've seen about all you can expect to, young lady; you may as well come up and be properly rescued." "All right. Only I'd like to know just what's going to make this thing float, and whether the trip up will be as rough as the one down was."

"It won't. You'll go up vertically, and much more slowly. You're going to ride a balloon. The atmosphere there is mostly water, with enough ions loose to make it a decent conductor. The largest part of your hull is divided into cells, and each cell further divided in two by a flexible membrane. Right now, those membranes are squeezed flat against one wall of each cell by atmospheric

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pressure. When you start the electrolysis units, some of the water will be decomposed; the oxygen will be piped outside the hull, but the hydrogen will be released on the other side of the membranes and gradually drive the air out of the cells. The old bathyscaphe used the same idea, only it didn't need the membranes to keep the two fluids from diffusing into each other."

"I see. How long will it take to make enough gas to lift us?"

"I can't tell; we don't know the conductivity of the atmosphere. Once you start things going, there's a bank of ammeters above the switches for each individual cell; if you'll give me their reading after things start, I'll try to calculate it for you."

"All right. Where are the— Oh, here; you labeled them decently. Upper right, a bank of twelve toggles, with a gang bar and a master?"

"That's it. You can see the meters above them. Close the lot, hit the master, and give the readings."

"All right." The thin arm reached up and out of the field of vision, and everyone could hear the switches click.

Easy pulled her hand back to her lap, settled back into the chair under her three hundred pounds of weight, eyed the dials one after another, and said, "The readings are all zero. What do I do now?"

#### V. PEREGRINATION; CONSIDERATION; ESTIVATION

NICK had chosen a fire on the landward side of the hill, so he was the first to have to consider the sea-level problem. In the home valley, of course, the water at night had never gotten more than thirty or forty feet deep; slow as the runoff was, enough always escaped at the valley foot to keep the village itself dry. He knew, from Fagin's lectures, that the water which flowed away must eventually reach something like a sea or lake; but not even Fagin had stopped to think of what would happen then—naturally enough; the surface of Earth's oceans compared to the volume of an average day's rainfall doesn't correspond to much of a sea-level rise, to put it mildly.

On Tenebra, the situation is a trifle different. There is no single giant sea basin, only the very moderate-sized lake beds, which are even less permanent than those of Earth. What this difference could mean in terms of "sea" level might possibly have been calculated hi advance, but not by any of Nick's people.

At first, there was nothing to worry about. The great, cloudy drops drifted into sight from far above, settled downward, and faded out as the radiation from the fires warmed them a trifle. Then they came lower, and lower, until they were actually below the level of the hilltop on all sides.

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Once a sharp quake struck and lasted for half a minute or more, but when Nick saw that the spit of land joining the hill to the shore was still there, he put this from his mind. Something much more unusual was starting to happen. At home, raindrops which touched the ground after the latter had been cooled down for

the night flattened into great, foggy half-globes and drifted around until a fire obliterated them; here they behaved differently. Drops striking the surface of the sea vanished instantly and by Nick's standards, violently. The difference in pressure and temperature made the reaction between oleum and water much less noticeable than it would be in an Earthly laboratory, but it was still quite appreciable.

After each such encounter, it could be seen that further raindrops falling on the same area faded out a little higher than usual for a few minutes; Nick judged correctly that some heat was being released by the reaction.

He had been watching this phenomenon for some time, interrupted twice by the need to relight his fire when a particularly close drop smothered it, when he noticed that the hill was not an island. This startled him a trifle, and he turned all his attention to the matter. The quake hadn't done it; he particularly recalled seeing the tombolo intact after the shaking was done. It didn't take him too long to conclude that if the land wasn't sinking, the sea must be rising; and a few minutes' close watch of the shore line proved that something of that sort was happening. He called the others, to tell them of what he had seen, and after a few minutes they agreed that the same thing was happening on all sides of the hill.

"How far will it come, Nick?" Betsey's voice was understandably anxious.

"I don't see how it can get this high," Nick<sup>1</sup> answered. "After all, it hasn't risen as much as the water in our own valley would have by this time of night, and this hill is nearly as high as the village. We're safe enough."

It got a little harder to stick to this belief as the hours

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passed and the sea grew higher. They could see the pools on shore swell and overflow into the main body; as time went on, more than one great river formed, carrying runoff from no one knew what drainage area. Some of the rivers were frightening, their centers as high or higher than the hill itself before they spread out and merged with the sea. By this time the violence of water-meeting-acid had subsided; the sea, at least near the shore, was pretty dilute.

Of course, "near the shore" might be too casual a statement. No one on the hilltop could tell for certain just where the shore was now. The route they had followed was deep under the acid sea, and the only evidence that dry land existed was the rivers which still came into view above sea level.

The island that had been a hill shrank steadily. The cattle seemed unperturbed, but were driven inside the ring of fires. Then this had to be drawn in—or rather, others had to be built closer to the hilltop; and at last people and animals huddled together behind a single ring of glowing heat, while the sea bulged upward at their feeble protection. The raindrops were clear now; they had fallen from high enough levels to lose their suspended oxygen, and inevitably the last fires succumbed. Their heat had for many minutes past been maintaining a hollow in the surface of the sea; and as they cooled, the ocean reclaimed its own. Seconds after the last spark died every living being on the hilltop was unconscious, and a minute later only a turbulent dimple in the surface of the sea showed where the slightly warmer hilltop was covered. Nick's last thought was to the effect that at least they were safe from animals; they would be uncovered long before anything could get at them.

Apparently he wasn't quite right. When they woke up the next morning and brushed the thin frost of quartz crystals from their scales, all the people were there, but the herd seemed to have diminished. A count confirmed

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this; ten cattle were gone, with only a few scales left behind. It was fortunate that the animals were of a species whose scale armor was quite frail, and which depended more on its breeding powers to survive; otherwise the meat-eaters who had come in the night might have made a different choice. The realization that things lived in the sea came as a distinct shock to the entire party. They knew just about enough physical science to wonder where any such creature got its oxygen.

But the new situation called for new plans,

"There seems to be a catch in the idea of telling Fagin just to hunt along the seashore until he finds us,"

Nick commented after breakfast. "The seashore doesn't stay put too well. Also, we can't afford to stay near

it, if we're going to lose eight or ten per cent of our animals every night."

"What we'll have to do is some more mapping," commented Jim. "It would be nice to find a place protected by sea but which *doesn't* get submerged every night."

"You know," remarked Nancy in a thoughtful tone, "one could find a rather useful employment for this place right here, if the proper people could be persuaded to visit it." Everyone pondered this thought for a time, and the tone of the meeting gradually brightened. This *did* sound promising. Idea after idea was proposed, discussed, rejected, or modified; and two hours later a definite—really definite—course of action had been planned.

None of it could be carried out, of course, until it was possible to get off the island, and this was not for a dozen hours after sunrise. Once the tombolo appeared, however, everyone went into furious activity. The herd—what was left of it—was driven ashore and on inland by Betsey and Oliver. Nick, making sure he had his axe and fire-making equipment, started inland as well, but in a more southerly direction. The other five fanned out from the base of the peninsula and began mapping the countryside for all they were worth. They

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were to determine as closely as possible how much of the area was submerged by the sea at its highest and make their report no later than the second night following. The group was then to pick a more suitable campsite to the north of the previous night's unfortunate choice. They were to settle at this point, and send a pair of people each morning to the base of the peninsula until either Nick returned or ten days had passed; in the latter event, they were to think of something else.

Nick himself had the task of contacting Fagin. He alone of the group was just a trifle unclear on how he was to accomplish his job. Tentatively, he planned to approach the cave village at night, and play by ear thereafter. If Swift's people had gotten into the habit of moving around at night with torches, things would be difficult. If not, it might be easy—except that his own approach would then be very noticeable. Well, he'd have to see.

The journey was normal, with enough fights to keep him in food, and he approached the cliff on the evening of the second day. He had circled far around to the west in order to come on the place from the cliff top; but even so he halted at a safe distance until almost dark. There was no telling where hunting parties might be encountered, since there was a path up the cliffs in nearly constant use by them.

As darkness fell, however, Nick felt safe in assuming that all such groups would be back at their caves; and checking his fire-lighting equipment once more, he cautiously approached the cliff top. He listened at the edge for some time before venturing to push his crest over, but no informative sounds filtered up and he finally took the chance. The cliff was some three hundred fifty feet high at that point, as he well knew; and he realized that even a single spine would be quite visible from below by daylight. It might be somewhat safer now, since no fires appeared to have been lighted yet.

When he finally did look, there was nothing to see.

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There *were* no fires, and it was much too dark for him to see anything without them.

He drew back again to think. He was sure the village and its inhabitants lay below, and was morally certain that Fagin was with them. Why they had no fires going was hard to understand, but facts were facts. Perhaps it would be safe to try to sneak up to the village in the dark—but the rain would come soon, and that would be that.

Then he had another idea, found some small wood, and went to work with his fire-making tools, a drill and spindle made from tough wood. He rather expected some response from below when he got a small blaze going, since it lighted up the sky more effectively than daylight; but nothing happened until he executed the next portion of the idea, by tossing a burning stick over the edge of the cliff. Then everything happened at once.

The light showed Fagin, standing motionless fifty yards from the foot of the cliff. It showed an otherwise empty expanse of rock and vegetation; the people were in their caves, as usual. That, however, was only temporary.

With the arrival of the fire, a rattle of voices erupted from the caves. Evidently, if they ever slept, they

weren't doing it yet. After a moment Swift's tones made themselves heard above the others.

"Get it! Get wood to it! Don't just stand there as if you were wet already!" A crowd of figures emerged from the rock and converged on the glowing twig; then they spread out again, as though they had all realized at once that no one had any wood and it would be necessary to find some. Plants were wrenched up from the ground by a hundred different hands and carried, or sometimes thrown, toward the spark. Nick was far more amused than surprised when it went out without anyone's succeeding in lighting anything from it, and was only academically curious as to whether it had burned out of its own or been smothered by its would-be rescuers. His attention was not allowed

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to dwell on the problem for long; Swift's voice rose again over the disappointed babble.

"There's a glow on top of the cliff, and that's where the fire came from! Someone up there still has some; come and get it!" As usual, obedience was prompt and unquestioning, and the crowd headed toward the trail up the cliff. Nick was a trifle surprised; it was close to rainfall time and the cave dwellers were carrying no fire. Something drastic must have happened, for them to overcome their lifelong habit of keeping to the caves at night. However, it was hardly the time to speculate on that subject; the cave men were seeking fire, and Nick happened to have all that there was around at the moment.

It took him about five seconds to dream up the rest of his idea. He lighted a stick at his small blaze and started toward the head of the trail from below, lighting all the plants he could reach as he went. When he reached the trail he tossed aside the nearly spent torch he had been using, made himself another which he hoped was small enough to shield with his body, and headed on along the cliff top. If the cave men were satisfied to take some fire, well enough; if they wanted him too, perhaps they'd look along the fire trail he had laid, which would lead them in the wrong direction. He wasn't really hopeful about this, knowing their skill at tracking, but anything seemed worth trying once.

He kept on along the cliff top, toward a point some two miles away where the cliff broke gradually away to the lower level. He was out of direct view from the head of the trail when Swift reached it, but did not let that fact slow him down. Once at the broken-rock region he picked his way carefully down, dodging boulders loosened by a sharp quake, and started back, hiding his little torch as well as he could from anyone overhead. Fifteen minutes after the disturbance had started he was beside Fagin, apparently unnoticed by any of Swift's people.

"Teacher! Do you hear me? It's Nick."

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"I hear you, all right. What are you doing here? Did you start this fuss? What's going on, anyway?"

"I threw the fire down the cliff, yes; I had to make sure you were here. The rest was a by-product. I'm here because we've found a way to get you out of Swift's hands without having to worry about his getting hold of you again afterward."

"That's encouraging. I thought I had a way, too, but troubles have arisen in that direction. I need badly and quickly all the help I can get, and I can't see Swift being very helpful for some time. Let's hear your idea."

Nick described the doings of his people since Fagin had been kidnapped, and dwelt particularly on the geography of the spot where they had spent their first night at the sea.

"We assume," he said, "that you can live under the sea the way you can in rain; so we thought if you fled to this hill, and Swift followed you, he'd be trapped there at night; and while he was asleep you could take away all the weapons of his people—which would be a help anyway, since we're getting so short—and if we couldn't figure out anything else to do with him, just shove him downhill to a point which stays submerged all day."

"Would he last long in such a place?"

"Probably not, as there are animals in that sea that ate some of our cattle; but who cares? He didn't mind killing Tom and Alice, and would have done the same to the rest of us if he'd felt it necessary."

"How about the rest of his people?"

"They helped him. I don't care what happens to them."

"Well, I see your point, but I don't entirely share your view. There are reasons which might make you feel differently, but I can't go into them yet."

"Your plan, if it really rates the name yet, has some good points, but it also has some weak ones. If this place of

yours is a day and a half's journey from here even for you, I'm not at all clear how I can keep ahead of Swift  
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long enough to let me reach it; remember, you can travel faster than I. Also, now that you've brought them back the fire they'd lost, I'll be very surprised if it's as easy to get away at night as it would have been before."

"What do you mean? They brought fire with them from our village."

"They brought it, but didn't know how to make one fire except from another. They let what they had go out during the day after we arrived, and have been fireless ever since. They've been doing their best to teach me their language so I could show them how to make more, but I'm having a lot of trouble—for one thing, I can't make some of their shriller noises. Swift's been remarkably patient, though, I must say. Now he'll be even easier to get along with, I should imagine; but he certainly won't be easier to get away from."

"Then maybe I shouldn't have come, Teacher. I'm sorry."

"I'm not. My original plan for getting in touch with you again has already failed, so if you hadn't come we'd be in even worse shape. All I meant was that we have some heavy planning to do before we're out of this mess. You'd probably better get away for a few hours at least, while I think; there's no point hi having you caught by Swift, too."

"But how will I get back again? They have fire, now—for that matter, as soon as they come back they'll know I've been here, and probably start tracking me. I'd probably still be in sight, even if I started now; it's beginning to rain, and I can't travel without a torch, and that will be visible for miles. I was expecting you to come with me right away."

"I see your trouble, but don't quite know what to do about it. It's hard to believe that Swift won't be back here in the next few minutes." Fagin paused, as though in thought; Nick of course did not know that such pauses really meant a tense conference among several men a

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hundred and sixty thousand miles away. "Look, Nick. There's a good deal of burnable material around, right?"

"Yes."

"And there is only one path from the cliff top, and that a narrow cleft?"

"Yes, not counting the way around—a good four miles."

"Hmph. I could wish it were longer. Do you think you can build a fire big enough to block the foot of that path for a while, so as to delay them while we get going? You'll have to work fast; they must be coming back by now, I should think, unless they're still looking for you on top."

"I'll try." Nick could see that this was no time for theorizing. "Someone's probably looked over the edge and seen me by now, but there's nothing to lose. If I don't catch up to you, head east-northeast until you reach the sea, then follow along its daytime shoreline until you meet the others. I'll do what I can to interfere with Swift's trackers; you'd better get going now."

Nick didn't wait for a reply; he was already racing toward the foot of the cliff trail, gathering fuel as he went. His torch was nearly gone, but he started a rough heap of wood a few yards inside the cleft, and managed to get it burning. Then he hunted around madly, tossing every bit of combustible matter he could find into the four-yard-wide crack.

A raindrop came squeezing its way down the gully and vanished as it neared the fire, but it was early enough in the evening for there still to be a good deal of oxygen in it. Nick was pleased; evidently no torch-bearing cave dwellers were yet on the path, or the drop would have been destroyed much sooner. That gave so much more time.

With the pile big enough to satisfy him, he set off along Fagin's trail. Even Nick could follow it, a five-foot-wide track of flattened and crumbled vegetation, except where it led through hollows already filling with liquid

*Peregrination; Consideration; Estivation* 83

water. He could have gone through these with his torch, since the liquid was still fairly safe to breathe, but he chose to detour around. Even so, he caught up with Fagin within a mile.

"Keep going," he said. "I'm going to do a little trail erasing." He applied his torch to a bush beside the trail, and to the crushed, brittle material on the track itself; then he started in a wide arc to the north, setting fire to every bush he passed. Eventually, a glowing belt of radiance extended from Fagin's trail almost east of the cave



village around to the track down which the robot had been brought from the north. Nick thought he could hear excited voices from the caves, but wasn't sure. He raced northward at the top of his speed for another mile, and started another series of fires there. They should be visible from the cliff, too; and perhaps the cave dwellers would come out and search along the route to the old village rather than start tracking right away.

Then he raced back to intercept Fagin's trail, shielding his torch with his body in the hope that its glow would not be seen from the cliff. He found the trail with little trouble, though Fagin was sensibly keeping to the valleys as much as possible, and finally caught up with the Teacher. Fagin heard his report, and approved.

"It's probably the best you could have done," he said. "I'll be surprised if we get through the night without having company, though."

"So will I," admitted Nick.

In spite of this pessimism, the hours passed without any sign of pursuit. Nick's higher speed allowed him to keep up with the robot, even though he had to detour puddles which the machine took in its stride. The raindrops grew clear, and correspondingly dangerous; puddles and lakes larger, deeper, and harder to avoid as the bottom of Tenebra's atmosphere gradually underwent its nightly change in phase.

"Even with your staying on dry land and leaving such

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an open trail, they must be having trouble following by now," remarked Fagin during one of the brief spells when they were together. "A lot of the places where you went must be well under water by now, and they can't be boiling them off with torches at this hour; the water's too clear to let them get away with it. I'm starting to feel a little happier about the whole situation."

"I'm not," said Nick.

"Why not?"

"The pools are getting very big, and some of the valleys ahead are long and deep. I remember the night before last there were some pretty big rivers emptying into the sea. If we meet one of those, and I don't see how we can help it, we're stuck."

"On the contrary, that seems to me the best thing that could happen. Swift can't follow through a river."

"Neither can I."

"Not under your own power. I can carry you, and it's pretty safe; we haven't met any creatures in sixteen years capable of living, or at least being active, in clear water— though I must admit I've always been expecting it."

"There were some in the ocean."

"That isn't water, for the most part, except late at night. Anyway, I think we needn't worry about ocean life. You've made me happier than I've been for some time; let's look for one of these rivers."

"All right. I hope you're right." Nick was accustomed enough to being knocked out by oxygen-free water, but somehow didn't like the idea of being carted around like a sack in that state; If Fagin thought it was all right, though . . .

It looked for a while as though he needn't have worried. With the common perversity of the inanimate, once a river was wanted, none could be found. They kept on their original course, knowing the futility of zigzagging over unknown ground, and got closer and closer to the sea;

*Peregrination; Consideration; Estivation* 85

but they actually reached it, not too many hours before day, without finding a river.

They had reached the "shore" far south of the region where the others awaited them; Nick had selected their course so that there would be no question of which way to turn when they reached the coast. He had mapped enough to know what measuring uncertainties could mean.

Without hesitation, therefore, he directed Fagin to follow the "shore" to the left. They were, of course, far inland from the hill which Nick had planned to use to trap Swift, but that was the least of their troubles at the moment. The chief annoyance was the lack of a river; a second one, which made itself apparent an hour or so after they reached the sea, was the appearance behind them of a distinct glow of light. There was no question what it was; the sun just didn't get that distinct, or even that bright.

"They're gaining on us. I wonder how long my fires delayed them?" muttered Nick when the glow caught his eye. Fagin had not seen it yet, apparently, and Nick saw nothing to be gamed in calling his attention to it. He just looked that much more intensely for a river ahead.

The robot finally spotted the light as well, and understood its meaning as clearly as had Nick.

"If they get too close before we find a river, you'd better go on ahead at your best speed; you can probably outrun them."

"What will you do?"

"Go into the ocean."

"Why not take me with you? Won't that be as good as a river?"

"Not according to your own statement. I don't want you eaten right out of my arms, and I'm not very well suited to fighting things off if they attack."

"That's true. I guess your idea is best, then."

As it turned out, though, they didn't have to use it. By the time the glow of Swift's torches had resolved itself into

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separate points of light, and it could be seen that the cave dwellers were overhauling Fagin and his pupil at a rate that promised a scant hour of further freedom, a bulge had appeared on the landscape ahead; and in another minute or two this had taken on the shape of a low, rounded ridge snaking across the countryside. It had the dark hue of clear water; and well before they reached it there was no doubt that it was a river. Since it reached above Nick's crest, there was no way of telling its width; but it must certainly be wide enough to drown any torches Swift's people might be carrying.

Straight to its edge Fagin and Nick went. Ordinarily such a mass of clear water would be a frightening sight as it oozed slowly by toward the sea; but tonight neither of them felt afraid of it. Nick tossed his torch into it with a carefree gesture, noted with actual glee the way the glow died abruptly from its end, made sure his weapons and fire-drill were securely attached to his harness, and turned to the Teacher.

"All right, I'm ready."

The white bulk of the robot slid toward him, and four appendages extended from openings in its smooth carapace. Gripping devices on the ends of these clamped firmly, but not painfully, onto two of Nick's arms and his walking legs, picked him up, and draped him over the machine's back.

"All right, Nick," said Fagin. "Relax. I'll get to high ground as quickly as I can on the other side and dodge raindrops, so you shouldn't be out long. Just relax." Nick obeyed the injunction as well as he could as the machine slid into the river.

His body heat boiled a considerable volume of the liquid into gas as they entered; but the gas was oxygen-free and its physical state made no difference to Nick. He lost consciousness within half a minute.

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Swift's warriors reached the spot where the trail entered the river fifteen minutes later. The chief was not philosophical enough to put the incident down to experience.

## **VI. INFORMATION; NAVIGATION; OBSERVATION**

"HOW much of a lead will that give you, Doctor?"

Raeker answered without taking his eyes from the robot's screens. "Presumably the rest of the night, and a trifle more—however long it takes that river to dry up after sunrise. It's twenty hours or so to sunrise."

"Maybe the plants will grow enough to hide the robot's trail in that time; will they?"

"I'm afraid I have no idea."

"After observing the life of this planet for sixteen years? Really, Doctor, I should have supposed you'd know something in that time."

"In all sixteen of those years I never had occasion to note just what kind of vegetation is on the north bank of this river," Raeker retorted a trifle impatiently, "and all I know from Nick about Swift is that he's a good tracker; I have no quantitative information as to just how good. Really, Councillor, I know you have been living in Hell the last three weeks; but if you can give only destructive criticism I can say that you won't be helping her much. You're getting to sound like Aminadabarlee."

"I'm glad you mentioned that." Rich did not sound at all offended. "I know, Doctor, that it is difficult for you

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to bear up under Drommian mannerisms; they are a rather impulsive race, -and while they are very courteous by their standards, those standards are not quite identical to ours. Aminadabarlee is an unusually restrained member of his race; that is why he holds the position he does; but I must suggest very strongly

that you check your natural impulse to answer sharply when he gets insulting, as he occasionally does. There is no point in straining his capacity for tolerance. I assure you most solemnly that if he loses his self-control sufficiently to make an emotional report to Dromm, every word he has said about the results to Earth would be literally fulfilled. There wouldn't be a war, of course, but the result of a ninety per cent—or even a fifty per cent—cut in Earth's interstellar trade would be fully as disastrous as any war. You must remember that to most of the races we know, Earthmen and Drommians are equally alien; they are both 'creatures from the stars,\* and what one race says about the other would have quite a ring of authority to most of them. This may sound a trifle exaggerated to you, but this little situation is potentially the most ticklish political and diplomatic affair that has occurred in my lifetime."

That actually took Raeker's eyes from the screen for a moment.

"I didn't realize that," he said. "Also, I'm afraid I must admit that it will make no difference in my efforts to rescue Easy and 'Mina; I was doing my best already."

"I believe that, and I'm grateful; but I had to tell you about the other matter. If Aminadabarlee weren't here it wouldn't have been necessary; but since you can't in decency avoid seeing him, it's very necessary that you understand him. Whatever he says, however intolerant or impatient or downright insulting he may be, you must keep your own control. I assure you he won't take your calmness as a sign of fear; his people don't think that way. He'll respect you the more for it—and so will I."

"I'll do my best," promised Raeker, "but right now I'll

*Information; Navigation; Observation* 89

be just as glad if he doesn't come in for a few hours. I'm busy juggling Nick across the river, and if you want to regard Nick as *my* child you won't be too far wrong. I don't mind talking as long as everything is going all right, but if I stop hi the middle of a sentence don't be surprised. Have you been talking to the kids?"

"Yes. They're bearing up pretty well. It's lucky that Drommian is there; I'm afraid Easy would have let go all over the place if she didn't feel responsible for her 'Mina. He seems to feel that she's keeping everything in hand, so for the moment there's no morale problem. Did I tell you that Mr. Sakiro found that some of the inspection ports had been left open on the bathyscaphe, so that the electrolysis leads were undoubtedly corroded by outside atmosphere? He has some idea of getting your people down there to do a repair job."

"I know. That's all I can think of at the moment, too; but to do that means I have to find *them*, and *they* have to find the 'scaphe. It's some comfort that the kids can stay alive almost indefinitely down there; the machine will keep them in food, water, and air."

"That's true; but Easy won't last forever under three gravities."

Raeker frowned. "I hadn't thought of that. Have you any medical information on how long she's likely to hold out?"

"None at all. The problem has never come up for such a young person. Adults have stood it for a good many months, I know."

"I see. Well, I should think you'd have a good excuse to be nastier than Aminadabarlee, at that rate. The gravity won't bother his youngster."

"No, but something else will. The synthesizers in the bathyscaphe produce human food."

"So what? Isn't Drommian metabolism like ours? They breathe oxygen, and I've seen them eat our food here on the *Vindematrix*"

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"In general, yes; in detail, no. Their vitamin requirements are different, though they do use fats, carbohydrates, and proteins as we do. 'Mina will almost certainly start suffering from vitamin deficiency diseases if he stays there long enough; and like me, his father has no exact medical information."

Raeker whistled, and the frown stayed on his face. Rich thought for a moment that something had occurred on Tenebra to worry him, but the screens still showed nothing but river bed. The stream must have been fully a mile wide, judging by the time it was taking to cross it. The diplomat remained silent, and watched while the robot forged ahead and, finally, out on the far side of the great watercourse.

It was still raining, of course, and without Nick's torch it was necessary to use a spotlight to locate descending raindrops. After about ten minutes in normal air, Nick began to revive; and when he was once again himself,

and had found and kindled a torch, the journey went on as before, except for the lack of anxiety over Swift's whereabouts.

Shortly after this, the relief operator appeared. Raeker didn't want to leave the controls, since the situation below was still rather ticklish, but he knew there was really no choice. The human being didn't live who could maintain decent alertness through a whole Tenebran night. He brought the other man up to date and, with several backward glances, left the observation room.

"I don't think I can sleep for a while," he remarked to Rich. "Let's go back to communications and see how Easy's making out."

"She was asleep a couple of hours ago," replied the girl's father. "That's why I came to see what you were up to. No harm in checking, though." He added after a moment's silence, "I like to be there when she wakes up."

Raeker made no comment.

Nothing further had happened, according to the com-

*Information; Navigation; Observation* 91

munication watch officer, but the two settled down in view of the bathyscaphe screen. No one had much to say.

Raeker was more than half asleep when Easy's voice came from the set.

"Dad! Are you there?" Rich might have been as drowsy as Raeker, but he answered instantly.

"Yes, dear. What is it?"

"We're moving. Mina's still asleep, and I didn't want to wake him, but I thought I'd better tell you."

"Tell everything you can to Dr. Raeker; he's here, and knows Tenebra better than anyone else."

"All right. You remember the first night we landed I thought we were on solid ground and the lake was getting deeper, don't you?"

"Yes, Easy. We decided that the rain was diluting the acid in which you had fallen, so its density was going down and you weren't floating so high."

"That's right. After a while the side windows were covered so we couldn't even see the rain, and each night before morning the top one is covered too; we're entirely under water."

"That's using the word a bit loosely, but I see what you mean. In that case you can't see out at all, I should think; how do you know you're moving tonight?"

"We can see, with the lights on; we're at the bottom of the lake or ocean or whatever it is, and the lights show the rocks and some funny things I suppose are plants. We're going by them slowly, sort of bouncing, and the ship is rocking a little from time to time. I can hear the scrapes and bumps whenever we touch."

"All right. I can't see that it's anything in particular to worry about, though I'd like to know why the change from the last five nights. When daylight comes the extra water will evaporate and you'll float again as usual, assuming you're still in the lake or sea. If, as seems rather likely, you're being carried down a river, you may find yourselves stranded on dry land somewhere when it dries up."

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At least you'll have a more interesting landscape to watch tomorrow, if that's the case.

"The only problem we have here is locating you. If you're going to start drifting around every night, directing our people to you is going to be hard, to say the least. You'll have to give us every bit of information you can on your surroundings, so we can pass it on to Nick and his friends. You were very smart to call us just now, the moment you discovered you were moving."

"Thanks, Doctor. We'll keep our eyes open. I want to meet your friend Nick."

"We're doing our best to see that you do. If, as we hope, you landed within a few dozen miles of the robot, the chances are you're being washed toward the same ocean that gave him trouble a couple of nights ago; we have reason to suspect that oceans don't get very large on Tenebra, at least by Earthly standards, so getting you together may not take too long."

"Maybe I'd better stay awake for a while, so as to report to you if anything special happens, and then let Mina take a watch while I sleep."

"That sounds perfect. We'll always have someone listening up here." Raeker opened the mike switch and turned to Rich. The diplomat was eyeing him intently.

"How much of that was for Easy's morale, and how much for mine?" he asked.

"I made it sound as good as possible," admitted Raeker, "mostly for the kids. However, I didn't lie. I'm

reasonably sure I can get my crew to the 'scaphe before too long; I admit I'm less sure what they can do after they find it. We really haven't the slightest idea of the conditions on the outside of that machine, remember; we'll have to wait for Nick's report before we decide what instructions to give him."

Rich stared hard at the biologist for a moment, then relaxed slightly. "That sounds reasonable," he said. If he had planned to say any more, he wasn't given the chance.

*Information; Navigation; Observation* 93

"It doesn't sound reasonable to me!" The shrill voice needed no identification. "Every human being in this place is dithering a lot of nonsense about teaching a bunch of savages to rewire a machine two thousand years ahead of their culture, and then risk not only a human but a Drommian life on their having done it properly. It's the sheerest nonsense I ever heard. It's hard to believe that anyone over three years old would fail to realize that nothing but another bathyscaphe has the slightest chance of making the rescue, but I haven't heard a single word about such an activity. I suppose men put the expense before the lives involved."

"I haven't heard of any messages proposing such an activity going to Dromm, either," snapped Raeker. "I've heard that it has an industrial capacity at least equal to Earth's, and it's not a parsec farther from Altair. I suppose Drommians don't bother to repair situations that they feel are someone else's fault, whether lives are involved or not."

None of the human beings present could tell just how Aminadabarlee reacted to this; Rich gave him no time to say anything.

"Dr. Raeker, you're forgetting yourself," he said sharply. "If Councillor Aminadabarlee will come with me, I will discuss with him any points of value which may have been hidden in your words, as well as the very valuable suggestion he made himself. If you have any more courteous thoughts to add, get them to me. Please come, sir." The diplomats stalked out, and the watch officer glanced uneasily at Raeker.

"You don't talk to Drommians like that," he ventured at last.

"I know," replied Raeker. "Rich was telling me, a little while ago. I didn't like to do it, but it seemed to me that Rich needed something to take his attention off his kid."

"You're taking a chance. That fellow could easily turn his whole race so anti-Earth that every human trader out-

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side the solar system would be forced out of business."

"So everyone seems to feel," replied the biologist a trifle uneasily. "I couldn't really believe that things were that critical. Maybe I was a little hasty. Anyway, Rich will be busy for a while, and so will the Drommian; let's concentrate on getting those kids out of trouble. I'll keep my nose out of interracial diplomacy after this."

"Frankly, that relieves me. How about that suggestion—building a new 'scaphe?"

"I'm no engineer," retorted Raeker, "but even I have a pretty good idea how long that would take, even with the experience from the first one to help. I *am* a biologist, and my considered opinion is that both those youngsters would be dead before another bathyscaphe could be made ready. If Rich and the Drommian want to try it, I wouldn't discourage them; the new machine will be useful, and I might even be wrong about the time factors. However, I believe seriously that we will have to run this rescue along the lines already planned."

"And the Drommian was right about those?"

"You mean, that we plan to get Nick's people to make the repairs? Yes. It's not as ridiculous as Aminadabarlee makes it sound. I've been bringing those people up for nearly sixteen years; they're as intelligent as human beings, judging by their learning rate, and they could certainly splice a few wires." The officer looked doubtful.

"As long as they splice the *right* wires," he muttered. "What will they use for insulation?"

"There's a glue they make—I showed them how, after some experiment—from animal scales. We'll have to make sure it's a nonconductor, but I'm not greatly worried about that."

"Even though you think there's sulphuric acid in their body fluids?"

"I said, not *greatly* worried," admitted Raeker. "The main problem right now is bringing the parties

together.

*Information; Navigation; Observation* 95

You're sure you can't get me a closer fix on the robot and the 'scaphe?"

"Quite sure. They're putting out different wave lengths, and I have no means of finding the dispersion factor of the planet's atmosphere in that part of the spectrum, let alone getting the precise depth of the atmosphere itself or cutting down the inherent uncertainty of radio directional measurements. The chances, as I told you, are about fifty-fifty that the two are within forty miles of each other, and about nine out of ten that they're not over a hundred miles apart. Better than that I can't do, without radiations neither machine is equipped to transmit."

"All right. I'll just have to get information from Easy, and try to match it in with Nick's maps. At least, they don't have to get too close under our guidance; Nick will be able to see the 'scaphe's lights for miles." The officer nodded, and the two fell silent, watching the live screen. Nothing could be seen in it; if Easy was awake, as she had said she would be, she was not in the control room. Occasionally the men could hear a faint bumping or scraping sound; presumably the ship was still being carried with a current, but no landmark had attracted the girl's attention as being worth reporting.

Raeker finally went to sleep in his chair. The officer stayed awake, but the only message he received was to the effect that Easy was going to sleep and Aminador-neldo was taking over the watch. Nothing excited him, either, it seemed; the speaker remained silent after the human girl signed off.

For hour after hour the bathyscaphe bumped merrily on its way. Sometimes it stopped for a moment, sometimes for minutes on end; always the journey resumed, as vagaries in the current dislodged it from whatever barred its path. Easy woke up again, and attended to the problem of breakfast. Later she prepared a rather unappetizing dinner—so she said, anyway. Aminadorneldo was polite about it, blaming the deficiencies on the synthe-

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sizers. There's not too much one can do with amino acids, fats, and dextrose, even if vitamin powders are available for seasoning. Tenebra's long night wore on; Raeker served another watch in the robot's control room, bringing Nick and Fagin to a point which he believed was fairly close to the rest of the party from the village. A single night on a planet which takes nearly a hundred hours to rotate can become rather boring—though it doesn't have to be, Raeker thought wryly, as he recalled the one when Swift had made his raid.

Things looked up after sunrise—unfortunately, since he was getting sleepy again. Nick definitely recognized the ground over which they were passing, and stated flatly that they would meet his friends in another two hours; Raeker's relief arrived, and had to be given an extremely detailed briefing; and a message came from the communications room that the bathyscaphe seemed to have stopped.

"Will you please ask Lieutenant Wellenbach if he can have visual communication rigged up between his office and this room?" Raeker asked the messenger who brought this information. "It begins to look as though I'll have to be talking to the bathyscaphe and my pupils at the same time in the near future."

"Certainly, sir," replied the messenger. "There'll be no particular difficulty about that, I'm sure."

"All right. I'm going up to the comm room now to hear Easy's report; I'll come back here when the set is rigged."

"But shouldn't you get some sleep, Doctor?" asked his relief.

"I should, but I can't afford to for a while. You stay on duty after I come back, and stop me if I start to do anything really silly."

"All right." The graduate student shrugged his shoulders. Raeker knew he was not being very sensible, but he couldn't bring himself to leave the scenes of action at

*Information; Navigation; Observation* 97

the moment. He headed for the communication chamber at top speed.

Rich and Aminadabarlee were there. The human diplomat had apparently calmed his Drommian colleague down, at least for the time being, since Raeker's entry produced no fireworks. Easy was speaking as the biologist came in, and he said nothing until she had finished.

". . . minutes since we last moved. It's no lighter outside, but we're not being rocked so hard; I think the

current is weaker. It's after sunrise, if I've been keeping track of time properly, so I guess the water's boiling away." She paused, and Raeker made his presence known.

"I take it, Easy, that neither you nor 'Mina saw any living creatures in the water while you were drifting."

"Nothing but plants, or what I guess were plants."

"How about right now?"

"Still nothing."

"Then my guess is you haven't yet reached the ocean. There were definitely animals there, according to Nick— of course, I suppose they might be frightened by your lights. Would you be willing to put them out for five minutes or so, then turn them on suddenly to catch anything which might have approached?"

"All right, as long as you don't mind the control room lights on. There aren't any windows here, so they shouldn't matter. I'd be afraid to turn them out; I might hit the wrong switch in the dark when it was time to turn them on again."

"You're quite right. I never thought of that."

"I've thought of a lot of things the last three weeks, down here."

For an instant the light-hearted mask she had been holding for the benefit of her young companion slipped a trifle, and all the men saw a miserable, terrified twelve-year-old whose self-control was near its limit. Rich bit his lip and clenched his fists; the other human beings avoided his eyes, Aminadabarlee showed no emotion;

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Raeker wondered whether he felt any. Then the mask was back in place, and the merry-hearted youngster they had all known before the accident turned to the Drommian child.

" 'Mina, will you go to the window in the big lab? Call when you're there, and I'll turn off the outside lights."

"All right, Easy." The long body crossed the men's field of view and vanished again. Then his piping voice came from the other room, and the girl's fingers flicked the light switches.

"Is it dark outside now, 'Mina?"

"Yes, Easy. I can't see anything."

"All right. Tell me if you do; we'll keep it dark for a while. Dr. Raeker, is 'Mina's father there?"

"Yes, Miss Rich." Aminadabarlee answered for himself.

"Perhaps you'd better tell me and Dr. Raeker how long it takes your people's eyes to get used to the dark." Not for the first time, Raeker wondered what combination of heredity and upbringing had given Rich such an amazing child. He had known students ten years her senior whose minds would have been lagging far behind— she was thinking of important points sooner than Raeker himself, and he didn't have her worries.

. . .

He brought his mind back to the present when she called his name.

"Dr. Raeker, 'Mina couldn't see anything. Maybe five minutes wasn't enough for your sea animals to get over their scare, of course."

"Maybe," admitted Raeker. "Maybe they're just not interested in the bathyscaphe, for that matter.

However, I think we'll assume for the present that you haven't reached the sea yet. It will be interesting to see whether you're in a lake or stranded high and dry when the rain evaporates this morning. In either case, get us as complete a description of the country around as you possibly can."

*Information; Navigation; Observation* 99

"I know. We'll do our best."

"We're rigging up an arrangement that will let you talk more or less directly to Nick, when you're in a position to give him directions, so you won't have to trust my relaying of your reports. It should be ready soon."

"That's good. I've wanted to talk to him myself ever since I saw you in the robot control room. It looked like fun. But can't I talk to him without going through you, if he finds me? Doesn't this ship have outside mikes and speakers?"

"Oh, yes. Mr. Sakiro will tell you how to turn them on. This is for the time before he finds you."

"All right. We'll call you again as soon as the water's gone. 'Mina's hungry, and so am I." Raeker sat back

and dozed for a few minutes; then he realized that he, too, was hungry, and took care of the situation. By this time he really wanted to sleep; but a call on the intraship system informed him that the communication equipment he had requested was ready for use. Sleepy or not, he had to try it out, so he went back to the robot control room. It was a good many hours before he left it again.

Nick and Fagin had just rejoined their friends at the new camping spot, and Nick was bringing the others up to date on events. Naturally, Raeker had to listen carefully; there was always the chance that Nick had seen things in a different light from the human observer. It had been known to happen; a human education had not given the Tenebrates human minds.

This time Nick's report showed no signs of such difference, but Raeker had still to learn what the others had done. Since this, as Nick had planned, involved a great deal of mapping, some hours were spent hearing the various reports. It was customary for the maps to be shown to the robot for photographing in the *Vindematrix*; then each was explained in detail by the one who had drawn it, since not all the information could be crowded onto the paperlike leaves or summarized in conventional

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mapping symbols. These verbal accounts were recorded as spoken, and as a rule immediately pre-empted by the geological crew. Since the present area was very peculiar in that it lay close to the sea and was largely submerged each night, a great deal of time was spent in bringing the men's maps and charts up to date.

Too much time, in fact.

Raeker's relief had not received, perhaps, a really clear idea of the current danger from Swift; and Raeker himself had not given the matter a thought since his return to the observation room. Neither had thought to advise Nick to have anyone on the lookout for danger, and it was sheer chance that the danger was spotted in time.

Jane was telling her tale, and everyone else was listening and comparing her map with his own, when Betsey caught sight of something. It was just for an instant, and some distance away, showing among the shrubs on a hilltop. She knew the Teacher could not have seen it; she was aware that her own vision equipment had superior resolving powers to his, though she didn't know the terminology. Her first impulse was to shout a warning, but fortunately before she yielded to it she got a better glimpse of the thing on the hill. That was enough for identification. It was a creature just like herself; and since all of Fagin's community was standing around the teacher, that meant it must be one of Swift's warriors. How he had gotten there so soon after things dried up she couldn't guess at the moment.

Speaking softly so as not to interrupt Jane, she called to Nick and John, who were closest.

"Don't make any move that would let him know you see him, but one of the cave men is watching us from the hill three quarters of a mile west-north-west. What should we do about it?"

Nick thought tensely for a moment.

"Just one is all I see. How about you?"

"Same here."

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"You've been around here, and I haven't. Is it possible to go down the south or east side of this hill we're on and make a long circuit so as to get on the other side of him without being seen?" Both John and Betsey thought for several seconds, reconstructing in their minds the regions they had mapped in the last day and a half. They spoke almost together, and in almost the same words.

"Yes, from either side."

"All right, do it. Leave the group here casually— you'd both better go together; the herd is on the south side of the hill, and I would judge that some of the beasts are in his line of vision. You can go down and drive them around out of his sight, and we'll hope he thinks you're just doing an ordinary herding job. Once you and the cattle are out of his sight, get around behind him as best you can, and bring him here,



preferably alive. I'd like to know how he got here so soon, and so would Fagin, I'm sure."

"Are you going to tell him, or the others?"

"Not yet. They'll act more natural if they don't know. Besides, there are still a couple of reports to be given, and Fagin never likes that to be interrupted, you know."

"I know he usually doesn't, but this seemed a sort of special case."

"Special or not, let's surprise him with your prisoner. Take axes, by the way; they seemed to impress those folks a lot, and maybe he'll give up more easily."

"All right." John and Betsey pulled up their resting legs and started casually downhill toward the herd.

None of the others appeared to notice them, and Nick did his best to imitate their attitude as the two scouts disappeared from sight.

## vii. ACQUISITION; INQUISITION; INSTRUCTION

NEITHER Raeker nor his assistant paid any attention to the departure of John and his companion. They were much too busy operating cameras and recorders, for one reason. Easy and her companion could now watch the group on the surface indirectly, but neither of them was familiar enough with the routine activities of Fagin's pupils to notice anything out of the ordinary. Besides, they were paying very close attention to the geographical reports, in the somewhat unreasonable hope of being able to recognize part of the land described.

For the bathyscaphe was now high and dry. The river down which it had been carried had vanished with the coming day, and the ship had rolled rather uncomfortably—though, fortunately, very slowly—to the foot of a hillock which Easy had promptly named Mount Ararat. The children were having a little trouble, since they had not only had their first visual contact with natives, via the observation room of the *Vindematrix*, but also their first look at the solid surface of Tenebra—if one excepts the bottom of a lake and a river. They were covering both scenes as well as they could, one at the windows while the other was at the plate, but each was trying to keep the other filled in verbally on the other part, with confusing results. Their shouted words were coming through to Raeker and the others in the observation room, and were

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adding their little bit to the confusion there. Raeker didn't dare cut them off, partly for reasons of their own morale and partly because it was always possible that the one at the windows would have something material to report. He hoped the recording of the native reports would be intelligible to the geologists.

Jane finished her account, was asked a question or two by Raeker on points he had not fully taken in, and then settled back to let Oliver show his map. Raeker's assistant photographed it, Raeker himself made sure that the recording tape was still feeding properly, and the two relaxed once more—or came as close to relaxation as the local confusion permitted. Raeker was almost ready to decide that he needn't stay, and to catch up on his overdue sleep.

He had not actually said anything about it, though, when the cave scout caught sight of John. Within three seconds after that, the biologist lost all intention of leaving.

The scout reacted practically instantaneously. He had been crouching as low in the vegetation as his anatomy permitted; now he leaped to his walking legs and started traveling. John was south and west of him, Fagin and the rest south and east; he headed north. Immediately Betsey rose into view in that direction, and he stopped in momentary confusion. Nick, who had never lost sight of the fellow's crest since Betsey had first pointed him out, interpreted the situation correctly even though he could not see John and Betsey. He sprang to his walking legs, interrupting Oliver unceremoniously, and began issuing orders. The others were surprised, but reacted with relatively little confusion; and within a few seconds the whole group was streaming down the hillside toward the point where the cave dweller had vanished, leaving the human observers to shout futile questions through the speakers of their robot. Seeing that words were useless, Raeker started the robot in the same direction as his pupils, and used language which made Easy raise her eyebrows as the machine

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was steadily left further and further behind. Nick and his friends disappeared over the hilltop where the scout had been hiding, and not even their shouts could be heard over Raeker's voice in the control room.

It was Easy who turned his words into more constructive channels, less because she was shocked than because she was curious.

"Dr. Raeker! Did I hear one of them say that there was a cave dweller to catch? How did one get there so soon? I thought you said you'd left them behind at that river." Her question was so exactly the one Raeker had been asking himself that he had nothing to say in reply for a moment; but at least he stopped talking, and had the grace to turn slightly red.

"That's what it sounded like to me, Easy. I don't know the way they found us any more than you do; I have always supposed this was a long way outside their home grounds, so I don't see how they could have known a short cut around the river—for that matter, I don't see how there could be such a thing; that river was over a mile wide. We'll have to wait until Nick and the others come back; maybe they'll have a prisoner we can question. I suppose that's his idea; I think he said 'catch,' not 'kill.' "

"That's right; he did. Well, we'll be able to see them in a minute or two, when the robot gets up this hill, unless they've gone over another one in the meantime."

It turned out that they hadn't; the human watchers had a very good view of the chase, not that it was much to see. The valley into which the cave scout had fled was almost entirely ringed with the low, rounded hills so typical of much of Tenebra; John and Betsey had managed to get to the tops of two of these before being seen, so that they had a considerable advantage on the cave dweller when it came to running. He had made one or two attempts to race out through the wide gaps between Betsey and John and between them and the main group, but had seen after only a few moments on each dash that he was being

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headed off. When the robot came in sight he was standing near the center of the valley while Fagin's people closed in slowly around him. He was rather obviously getting ready for a final dash through any gap that might present itself, after his pursuers were close enough to have sacrificed their advantage of elevation. He might also be planning to fight; he was two feet taller than Nick and his friends, and had two efficient-looking short spears.

Nick seemed to have picked up a smattering of military tactics, not to mention diplomacy, however. He halted his people a good fifty yards from the big cave dweller, and spread them out into an evenly spaced circle. With this completed to his satisfaction, he shifted to Swift's language.

"Do you think you can get away from us?"

"I don't know, but some of you will be sorry you tried to stop me," was the answer.

"What good will that do you, if you are killed?" The scout seemed unable to find an answer to this; in fact, the very question seemed to startle him. The matter had seemed so obvious that he had never faced the task of putting it into words. He was still trying when Nick went on, "You know that Fagin said he was willing to teach Swift whatever he wanted to know. He doesn't want fighting. If you'll put your spears down and come to talk with him, you won't be hurt."

"If your teacher is so willing to help, why did he run away?" the other shot back. Nick had his answer ready.

"Because you had taken him away from us, and we want him to teach us too. When I came to your caves to get him, he came with me to help me get away. He carried me through the river, where I could not have gone alone. When you first attacked our village, he wanted us to talk to you instead of fighting; but you gave us no chance." He fell silent, judging that his antagonist would need time to think. However, another question came at once.

"Will you do anything your Teacher tells you?"

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"Yes." Nick didn't mention the times he had hesitated about obeying Fagin's commands; quite honestly, he didn't think of them at that moment.

"Then let me hear him tell you not to harm me. He is coming now. I will wait here, but I will keep my weapons, until I am sure I won't need them."

"But you don't know his language; you won't know what he's telling us."

"He learned a few of our words while he was with us, though he couldn't say them very well. I think I can ask him if he is going to hurt me, and I'll know if he says yes or no." The scout fell silent and stood

watching the approach of the robot, still keeping a firm grip on his spears with two hands each. He was ready to stab, not throw.

Even Raeker could see that readiness as the robot glided into the circle, and felt a little uneasy; he would be a good two seconds slow in reacting to anything that happened. Not for the first time, he wished that the *Vin-demiatrix* were orbiting just outside Tenebra's atmosphere, with three or four relay stations to take care of horizon troubles.

"What's happened, Nick? Is he going to fight?"

"Not if you can convince him it isn't necessary," replied Nick. He went on to give a precis of the scout's recent statements. "I don't quite know what to do with him myself, now that we have him," he finished.

"I wouldn't say you really had him, yet," was Raeker's dry rejoinder, "but I see the problem. If we let him go, Swift will be on us in a matter of hours, or in a day or so at the outside. If we don't, we'll have to keep a continuous watch on him, which would be a nuisance, and he might get away anyway. Killing him would of course be inexcusable."

"Even after what happened to Alice and Tom?"

"Even then, Nick. I think we're going to have to put this fellow to a use, and face the fact that Swift will know where we are. Let me think." The robot fell silent, though

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the men controlling it did not; plans were being proposed, discussed, and rejected at a great rate while the natives waited. Easy had not been cut off, but she offered no advice. Even the diplomats, able to hear from the communication room which they still haunted, kept quiet for once.

The cave dweller, of course had been unable to follow the conversation between Nick and the Teacher, and after the first minute or so of silence he asked for a translation. Somehow he managed to make the request in such a way that Nick felt he was repairing an omission rather than granting a favor when he provided the requested information.

"Fagin is deciding what is best to do. He says that we must not kill you."

"Have him tell me that himself. I will understand him."

"One does not interrupt the Teacher when he is thinking," replied Nick. The cave dweller seemed impressed; at least, he said nothing more until the robot came back on the air.

"Nick." Raeker's voice boomed into the dense atmosphere, "I want you to translate very carefully what I have to say to this fellow. Make it word for word, as nearly as the language difference will allow; and think it over yourself, because there will be some information I haven't had time to give you yet."

"All right, Teacher." Everyone in the circle switched attention to the robot; but if the scout in the center realized this, he at least made no effort to take advantage of the fact. He, too, listened, as intently as though he were trying to make sense out of the human speech as well as Nick's translation. Raeker started slowly, with plenty of pauses for Nick to do his job.

"You know," he began, "that Swift wanted me at his place so that I could teach him and his people to make fires, and keep herds, and the other things I have already taught my own people. I was willing to do that, but Swift

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thought, from something Nick said, that my people would object, so he came fighting when it wasn't necessary.

"That's not really important, now, except for the fact that it delayed something important to Swift as well as to us. Up until now, all I've been able to give is knowledge. I was the only one of my people here, and I can never go back where I came from, so that I couldn't get more things to give.

"Now others of my people have come. They are riding in a great thing that they made; you haven't any words for it, since I never gave them to Nick's people and I don't think Swift's people have any such things. It was something we made, as you make a bucket or a spear, which is able to carry us from one place to another; for the place from which I came is so far away that no one could ever walk the distance, and is far above so that only a floater could even go in the right direction. The people who came were going to be able to come and go in this machine, so that they could bring things like better tools to all of you, taking perhaps things you were willing to give in exchange. However, the machine did not work

quite properly; it was like a spear with a cracked head. It came down to where you live, but we found that it could not float back up again. My people cannot live outside it, so they aren't able to fix it. We need help from Nick's people and, if you will give it, from yours as well. If you can find this machine in which my friends are caught, and learn from me how to fix it, they will be able to go back up once more and bring things for you all; if you can't or won't, my people will die here, and there will not even be knowledge for you—for some day I will die, too, you know.

"I want you to take this message to Swift, and then, if he will let you, come back with his answer. I would like him and all his people to help hunt for the machine; and when it is found, Swift's people and Nick's can help in

*Acquisition; Inquisition; Instruction* 109

fixing it. There won't need to be any more fighting. Will you do that?"

Nick had given this talk exactly as it came, so far as his knowledge of Swift's language permitted. The scout was silent for half a minute or so at the end. He was still holding his spears firmly, but Raeker felt that his attitude with them was a trifle less aggressive. It may have been wishful thinking, of course; human beings are as prone to believe the things they wish were true as Drommians are to believe what occurs to them first.

Then the scout began asking questions, and Raeker's estimate of his intelligence went up several notches; he had been inclined to dismiss the fellow as a typical savage.

"Since you know what is wrong with your friends and their machine, you must be able to talk to them some way."

"Yes, we—I can talk to them."

"Then how is it you need to look for them? Why can't they tell you where they are?"

"They don't know. They came down to a place they had never seen before, and floated on a lake for five days. Last night they drifted down a river. They were at the bottom, and couldn't see where they were going; and anyway they didn't know the country—as I said, they never saw it before. The river is gone now, and they can see around, but that does no good."

"If you can hear them talk, why can't you go to them anyway? I can find anything I can hear."

"We talk with machines, just as we travel. The machines make a sort of noise which can only be heard by another machine, but which travels very much farther than a voice. Their machine can talk to one in the place where I came from, and then that one can talk to me; but it is so far away that it can't tell exactly where either of us is. All we can do is let them tell us what sort of country they can see; then I can tell you, and you can start hunting."

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"You don't even know how far away they are, then."

"Not exactly. We're pretty sure it's not very far—not more than two or three days' walk, and probably less. When you start looking for them we can have them turn on their brightest lights, like these—" the robot's spots flamed briefly—"and you'll be able to see them from a long distance. They'll have some lights on anyway, as a matter of fact."

The cave dweller thought for another minute or so, then shifted the grip on his spears to "trail." "I will give your words to Swift, and if he has words for you they will be brought. Will you stay here?"

The question made Raeker a trifle uneasy, but he saw no alternative to answering "yes." Then another point occurred to him.

"If we did not stay here, would it take you long to find us?" he asked. "We noticed that you got to this side of the river and into sight of our group much more quickly than we had expected. Did you have some means of crossing the river before day?"

"No," the other replied with rather surprising frankness. "The river bends north not far inland from the place where you walked through it and goes in that direction for a good number of miles. A number of us were sent along it, with orders to stop at various points, cross as soon as it dried up, and walk toward the sea to find traces of you."

"Then others presumably crossed our trail—all those who were stationed farther south—and located us."

"No doubt. They may be watching now, or they may have seen you attack me and gone off to tell Swift."

"You knew about the bend in the river. Your people are familiar with the country this far from your caves?"

"We have never hunted here. Naturally, anyone can tell which way a river is going to flow and where there are likely to be hills and valleys."

"What my people call an eye for country. I see. Thank

*Acquisition; Inquisition; Instruction* 111

you; you had better go on and give the message to Swift before he arrives with another crowd of spears to avenge the attack on one of his men."

"All right. Will you answer one question for me first? Sometimes you say 'I' and sometimes 'we' even when you obviously don't mean yourself and these people here. Why is that? Is there more than one of you inside that thing?"

Nick did not translate this question; he answered it himself.

"The Teacher has always talked that way," he said. "We've sometimes wondered about it, too; but when we asked him, he didn't explain—just said it wasn't important yet. Maybe Swift can figure it out." Nick saw no harm in what he would have called psychology if he had known the word.

"Maybe." The scout started south without another word, and the rest of the group, who had long since broken their circle and gathered around the teacher, watched him go.

"That sounded good, Dr. Raeker. Should we keep the spot lights on just in case, from now on?" Easy Rich's voice broke the silence.

"I wouldn't, just yet," Raeker said thoughtfully. "I wish I could be sure I wanted Swift to find you, instead of merely wanting to keep him from attacking us,"

"What?" Aminadabarlee's voice was shriller, and much louder, even than usual. "Are you admitting that you are using my son as bait to keep those savages away from your little pet project down there? That you regard those ridiculously shaped natives as more important than a civilized being, simply because you've been training them for a few years? I have heard that human beings were cold-blooded, and scientists even more so than the general run, but I would never have believed this even of human beings. This is the absolute limit. Councillor Rich, I must ask your indulgence for the loan of our speedster; I am going to Dromm and start our own rescue work. I have

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trusted you *men* too long. I am through with that—and so is the rest of the galaxy!"

"Excuse me, sir." Raeker had come to have a slightly better grasp of the problem the Drommian represented. "Perhaps, if you do not trust me, you will at least listen to Councillor Rich, whose daughter is in the same situation as your son. He may point out to you that the 'ridiculous natives' whose safety I have in mind are the only beings in the universe in a position, or nearly in a position, to rescue those children; and he may have noticed that I did not tell the savage even the little I heard of Easy and 'Mina's description of the country around them. I am sure we will appreciate your planet's help, but do you think it will possibly come in time? Before the human girl is permanently injured by extra gravity, and your son has exceeded your race's time limit under vitamin and oxygen deficiency? I am not asking these questions to hurt you, but in an effort to get the best help you can give. If there is anything more you can do than keep your son's courage up by staying where he can see and hear you, please let us know."

Rich's face was visible behind the Drommian's in the jury-rigged vision screen, and Raeker saw the human diplomat give a nod and an instantly suppressed smile of approval. He could think of nothing to add to his speech, and wisely remained silent. Before Aminadabarlee found utterance, however, Easy came in with a plea of her own.

"Don't be angry with Dr. Raeker, please; 'Mina and I can see what he's doing, and we like Nick, too."

Raeker wondered how much of this was true; he wasn't as sure himself as he would like to have been of what he was doing, and the children had not yet talked directly to Nick, though they had been listening to him and his people for a couple of hours. Easy, of course, was a diplomat's daughter. Raeker had learned by now that her mother had died when she was a year old, and she had traveled with her father ever since. She seemed to be

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growing into a competent diplomat in her own right. "It doesn't really matter if Swift does find us," she went on. "What can he do to hurt us, and why should he want to?"

"He threatened to use fire on the robot if it didn't come with him to the cave village," retorted the Drommian, "and if he does the same to the 'scaphe's hull when you fail to tell him something he wants to know, you'll be in some trouble."

"But he knew that Fagin didn't speak his language, and was very patiently teaching it during the three weeks or so it was in his power; why should he be less patient with us? We're perfectly willing to teach him anything we know, and we can talk to him with less trouble than Dr. Raeker could—at least, there won't be the delay."

A burst of shrill sound from Aminadorneldo followed and, presumably, supported Easy's argument; Aminada-barlee cooled visibly. Raeker wondered how long it would last. At least, things were safe politically for the moment; he turned his attention back to Tenebra and to Nick.

That worthy had started his group back toward the original meeting place, with two running ahead—the herd had been unprotected quite long enough. Nick himself was standing beside the robot, apparently waiting for comment or instructions. Raeker had none to give, and covered with a question of his own.

"How about it, Nick? Will he come back? Or more accurately, will Swift go along with us?"

"You know as well as I."

"No, I don't. You spent a long time with Swift and his people; you know him if any of us do. Was I right in playing on his desire for things we could bring him? I realize he wanted to know about things like fire, but don't you think it was for what he saw could be done with it?"

"It seems likely," admitted Nick, "but I don't see how it's possible to be sure of what anyone's thinking or what he's going to do."

"I don't either, though some of my people keep try-

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ing." The two started after the rest of the group, scarcely noticing the minor quake that snapped a few of the mor£ brittle plants around them. Nick almost unthinkingly gathered firewood as he went, a habit of years which had developed in the old village after the more accessible fuel near the hilltop had been exhausted. He had quite a stack in his four arms by the time they rejoined the others. This was piled with the rest; the herd was checked and the strays brought back together; and then Fagin called a meeting.

"You all heard what I told Swift's man, about the machine which was stranded somewhere here with some of my people in it. If it is not found and fixed shortly, those people will die. You know as well as I that rescue of people in danger is of more importance than almost anything else; and for that reason, we are going to drop all other activities, except those needed actually to stay alive, while we look for that ship.

"I will give you a description, as completely as possible, of the place where they are. We'll check all our maps for similarity—I'll help you there; I can do it faster—and then you'll go out in pairs to check all likely spots. If we don't find them, mapping will proceed as rapidly as possible, to the exclusion of all other scientific activities.

"For the rest of today, Betsey and Nick will take care of camp and herd; search teams will be Oliver and Dorothy, John and Nancy, and Jim and Jane. I will assign an area to each of the teams as soon as the maps have been checked; in the meantime, you might all be gathering firewood for tonight." The group scattered obediently.

The geologists in the *Vindematrix* had for some time been matching, or trying to match, Easy's not too complete description of the bathyscaphe's environs; they had come up with four or five possible locations, none of which made them really happy. However, when a sixth possibility was finally settled on, Raeker called the exploring teams back to the robot and assigned two of the hope-

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ful areas to each team. These were all in the general direction of the old village, naturally, since the mapping had gone on radially from that point in the two or three years the cartography project had been going. They were all on the nearer side of that region, however, since the men who had done the matching had been influenced by the realization that the 'scaphe must have drifted seaward on the night that it moved. It seemed likely, therefore, that a day to go, a day to explore, and a day to return would suffice for

this step of the plan. By that time, Swift might be back with his people, and the rate of search could be stepped up. That was why Nick had been kept behind at the camp site; he might be needed as an interpreter.

The instructions were heard, the villagers' own maps were checked, weapons were examined, and the parties set out. Nick and Betsey, standing beside the robot, watched them go; and far away, Raeker finally left the observing room to get some sleep. The diplomats stayed awake, chatting with their children as the latter described the animals which came into sight from time to time. In this relatively dull fashion the rest of the ship's day, a night, and part of another day were spent, while the search teams plodded sturdily toward their assigned areas.

This was the twenty-seventh ship's day since the accident to the bathyscaphe, the afternoon of the seventh day as far as Nick and his people were concerned. The children were understandably impatient; both fathers had to explain again and again how small were their chances of being found at the very beginning of the search. On this day, at least, human and Drommian were in remarkably close accord. In spite of this unity of effort, however, the children tended to spend more and more time at the windows as the day drew on, and from time to time even Easy brought up the subject of using the spotlights to guide the searchers who should be approaching. Her

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father kept reminding her that Raeker had advised against it; but eventually Raeker withdrew his objection.

"It'll make the kid feel more a part of the operation," he said in an aside to Rich, "and I can't see that there's much, if any, more chance of Swift's sighting them than of our own people's doing it at the moment. Let her play with the lights."

Easy happily made full use of the permission and the bathyscaphe blazed far brighter than daylight—since daylight was utter darkness to human eyes—at Tenebra's surface. Rich was not too happy about the permission; it seemed to him encouraging the youngster in her unreasonable hope of an early rescue, and he feared the effects of disappointment.

"Listen to them," he growled. "Yelling to each other every time something moves within half a mile. If they could see any farther it would be still worse—thank goodness they're using their eyes instead of the photocells of the robot. That'll last until they get sleepy; then they'll start again when they wake up—"

"They should be under water by then," pointed out Raeker mildly.

"And drifting again, I suppose. That's when everything will go to pieces at once, and we'll have a couple of screaming kids who'll probably start hitting switches right and left in the hope some miracle will bring them home."

"I don't know about the Drommian, but I think you do your daughter a serious injustice," replied Raeker.

"I've never known much about kids, but she strikes me as something pretty remarkable for her age. Even if you can't trust her, you'd better not let her know it."

"I realize that, and no one trusts her more than I do," was the weary answer. "Still, she *is* only a kid, and a lot of adults would have cracked before now. I can name one who's on the edge of it. Listen to them, down there."

Aminadorneldo's piercing tones were echoing from the speaker.

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"There's something on this side, Easy! Come and see this one."

"All right, 'Mina. Just a minute." Easy's small form could be seen for an instant on the screen, passing through the control room from one side of the ship to the other, calling as she went, "It's probably another of those plant-eating things that are about as big as Nick's people. Remember, the ones we want stand up on end."

"This one does. Look!"

"Where?" Aminadorneldo must have been pointing; there was a moment of silence; then the girl's voice, "I still don't see anything; just a lot of bushes."

"It looked just like Nick. It stood beside that bush for a moment and looked at us, and then went away. I saw it."

"Well, if you were right, it'll come back. We'll stand here and watch for it."

Rich looked at Raeker and shook his head dismally.

"That'll—" he began, but got no further. His sentence was interrupted by a sudden shriek from the speaker, SO' shrill that for a moment neither of them could tell who had uttered it.

### **VIII. RADIATION; EVAPORATION; ADVECTION**

JOHN and Nancy made steady progress into the west. Their journey so far had not been particularly difficult, though most of it had been made over ground not yet

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surveyed. They had fought with floaters and other carnivores a reasonable number of times, eaten the fruits of their victories when they felt hungry enough, and talked more or less incessantly. The talk was mostly speculation; they had learned more about the nature of their Teacher in the last few days than in the preceding sixteen years, but what they had learned seemed only to give rise to more questions. They were young enough to be surprised at this; hence the steady conversation, which was interrupted only by their reaching a region which seemed to match part of their map.

"We must have kept our direction pretty well," Nancy said after comparing the hills around them to those indicated on the sheet. "We were trying to hit the mapped region about here," she pointed, "and seem to be only a dozen miles to the north. Oliver mapped this place; it hasn't changed enough to be really doubtful. We can head south, and be sure of ourselves in a few more miles."

"All right," agreed John. "You know, even if we are still a good many miles from either of our search areas, it wouldn't actually hurt to keep our eyes open for the machine."

Nancy sent the ripple that passed for a shrug flickering down her scales. "It's hardly worth making a special effort. We'll be able to see it miles away, if it's as bright as Fagin said. I think we'd better concentrate on the map, just now, until we're sure we're where we're supposed to be."

"Fagin would have had something to say about that sentence," muttered John, "but I suppose you're right. Let's get on."

Two miles, twenty-five minutes, one brief fight, and one longish quake later they were in a position to feel sure of themselves. Uniform as the solution-molded surface of Tenebra was, and rapid as its changes were, the present region matched the maps too closely to be coincidence. They spent a few minutes deciding whether it would be better to start gathering firewood for the night which was

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not too many hours away or move closer to their first search area so as to waste less time in the morning, settled on the second alternative, and went on.

Nightfall was even closer when they stopped simultaneously. Neither needed to speak, since it was quite evident to both that they had seen the same thing. Far to the south and somewhat to the west a light was shining. For several seconds they stood looking at it. What they could see was not particularly brilliant—it was just enough to be noticeable; but light other than daylight on Tenebra can be explained only in a certain very few ways. So, at least, Fagin's students supposed.

After a moment's staring, they got out the maps once more and tried to judge where the source of the light might be. This was difficult, however, because it was next to impossible to estimate the distance. The source itself was not directly visible, just the glow which fires, spotlights, and Altair itself produced in Tenebra's soupy envelope. The direction was plain enough, but it seemed likely that the actual source was either outside mapped territory altogether or in the poorly covered region Nick had done during the trip which had discovered the cave village. It seemed equally likely that they could not possibly reach the place before rainfall, but after the briefest of discussions they agreed to start out.

The going was normal at first, but it gradually got rougher. This agreed with what they remembered of Nick's report on his trip. They also recalled his mention of a life form which lived in holes and was dangerous to passers-by, but they encountered no sign of it just then. The light kept getting brighter, which was encouraging, but for several hours they failed to get any better idea of what was making it.

Then they began to get an impression that it was coming from a point above their level, and after another half hour they were both quite sure of this. The fact was hard to understand; Fagin had said that the bathyscaphe

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couldn't fly because it was broken, and there had been no mention of a hill—at least, not of anything unusual in that respect—in the description of the machine's environment. As a matter of fact, they recalled, it had been stated to lie at the *foot* of a hill.

Then John remembered Nick's tale of a remarkably high hill in the region, and the two got out their maps once more. It seemed possible though far from certain, after careful checking, that the light was on the hill; but if that were the case it seemed to dispose of any remaining chance that they had found the bathyscaphe. Since the only other possibility they could envision was that Swift's people were there with a fire, a slight problem developed.

It would be raining before long, and travel without torches would be impossible. If the area ahead were actually a camp of Swift's cave dwellers, approaching it with torches would simply be asking for capture. Of course, the chief might have accepted Fagin's offer, so that they would technically be allies; but from what John and Nancy knew of Swift they didn't want to take the chance. From one point of view, there was no reason to approach at all, since they were searching for the bathyscaphe rather than scouting the cave men; but this phase of the matter didn't occur to either of them. If it had, they would probably have insisted that they weren't *sure* the light wasn't from the crippled machine. Anyway, they kept trying to plan a method of approach to the light.

It was Nancy who finally worked it out. John didn't like the plan and didn't trust it. Nancy pointed out truthfully that she knew more physics than he did, and even if he didn't know what she was talking about he ought to take her word for it. He replied, equally truthfully, that he might be a mathematician rather than a chemist but even he knew enough about rain not to accept ideas like hers uncritically. Nancy finally won her point by the simple process of starting toward the light alone, giving John the choice of coming or staying behind. He came.

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Raeker would have liked to hear that argument. He had named the little creatures who had emerged from the stolen eggs quite arbitrarily, and still had no idea of the actual gender of any of them. Nancy's display of a human-feminine characteristic would have been fascinating if not very conclusive.

John watched the sky uneasily as they strode onward. Inwardly he knew perfectly well that the rain was not due for a while yet; but the mere fact of Nancy's defiance of the phenomenon made him abnormally conscious of it. By the time the first drops actually appeared far above, they were close enough to the light to see that something lay between them and the actual source—it was shining from behind a barrier of some sort, presumably a hill.

"Should we go over, or around?" John asked, when this fact became evident. "If we go up, we'll run into the rain sooner."

"That's a good reason for doing it," retorted Nancy. "If it is the cave people they won't be expecting us from that direction, and you'll see all the sooner that I'm right. Besides, I've never been up a really high hill, and Nick said this one was two or three hundred feet tall—remember?"

"I remember, but I'm not as sure as you seem to be that this is the hill he was talking about."

"Look at your map!"

"All right, I know we're close to it, but his notes were pretty rough; you know that as well as I do. There never was time to make a decent map of the country he covered, after he got back. We've been fighting or moving practically ever since."

"All right, you needn't make a thesis out of it. Come on." She led the way without waiting for an answer. For some time there was no appreciable rise in the general ground level, though the number of ordinary hillocks remained about as usual. The first implication that Nancy might be right about the nature of the hill

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was a change in the nature of the ground underfoot. Instead of the usual feldspar-rich granitic rock, heavily pitted with solution cavities, a darker, much smoother material became predominant. Neither of them had ever seen fresh lava, since Nick had brought back no specimens, and it took time for their feet to get used to it.

The rain was getting very close to the surface now. There was no difficulty in dodging drops, since there was more light coming from ahead than Altair gave at high noon; the trouble was that Nancy was not bothering to dodge them. Theoretically she was right enough; they were still cloudy with oxygen bubbles, and her body heat turned them into perfectly breathable air, but it took a while for John to follow her example. Habits are as hard to break for Tenebrates as for human beings.

Gradually the slope of the dark rock began to increase. They *were* on a hill, and the light was close ahead, now. Rocks were silhouetted sharply against it, not more than a mile in front. Nancy stopped, not because of the rain but to take a final look around; and it was then that they both noticed something else.

In the first place, the raindrops were not falling straight; they were drifting horizontally as they descended, drifting in the same direction as the two were traveling. That was reasonable when one stopped to think; they had known about convection and advection currents almost as long as they could remember. It was the speed that was remarkable; the drops were heading toward the fire at a good two miles an hour. The air current that impelled them could actually be *felt*—and that was a major hurricane, for Tenebra. If the thing ahead was a fire, it was a bigger fire than Fagin's pupils had ever lighted or ever seen.

"If Swift lighted that, he must have touched off a whole map section," remarked John.

Nancy turned to him abruptly. "Johnny! Remember what happened last night, when Nick got the Teacher away from the caves? He *did* light fires over a good part

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of a section! Do you suppose they could still be burning, and have spread like this?"

"I don't know." John stood still and thought for a moment or two. Then he referred to the map, easily legible in the brilliant light. "I don't see how it could be," he said at length. "We're a lot closer to the caves than we were this morning, but not that close. Besides, the clear rain late at night should have put any fire out if there was no one to tend it."

"But if it were big enough, maybe it would stir up the air so there was always enough oxygen for it—feel this wind on our backs. Have you ever known anything like it?"

"No. Maybe you're right. We can go on and see, though; I still think it's more likely to be Swift. Are you still going to try that idea of yours?"

"Of course. It's all the better, with the wind carrying the drops as fast as this."

"I hope you're as right as you are reasonable." The two went on, somewhat more slowly since it was necessary to follow a rather tortuous path to keep their goal in sight among the drops. These were now reaching the surface in great numbers and remaining liquid, except for those parts most closely exposed to the body heat of the two travelers. It took a little longer than might have been expected, therefore, to get within two hundred yards of the rocks ahead, which from the absence of anything but light beyond them appeared to mark the top of the bill. At this point, Nancy decided that stealth was in order; so she brought the scary part of her plan into operation.

Finding an exceptionally large and still cloudy rain drop drifting downward at no great distance, she deliberately placed herself so as to be enveloped by it as it landed. Naturally, the bottom portion of the fifty-foot spheroid was obliterated at once by her body heat; but further descent of the drop finally hid her from view. The great, foggy blot of liquid began to follow the general pat-

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tern of activity of the others, moving slowly toward the light; and Nancy did her best to follow. This was not as easy as it might have been, even though the gas around her was perfectly breathable, since with no view of her surroundings it was nearly impossible to judge the rate of drift of the raindrop. The wind was some help, but not enough, and several times John could see her outline as she came too close to the edge of the volume of fog. He stayed where he was, not considering it cowardly to see how the experiment turned out before he tried it himself.

In one sense, the trial was a perfect success; that is, Nancy remained conscious as long as the drop lasted. In another, however, there was something lacking. This lay in the failure of the drop to last long enough. Suffering the assault of heat radiation both from Nancy within and the fire ahead, the thing abruptly faded out in a final surge of turbulence, leaving her in full view.

This turned out to be less of a catastrophe than it might have been. For three or four seconds after the

vanishing of her concealment Nancy stood perfectly still; then she called out, making no effort to direct her voice away from the light ahead, "Johnny! Here, quick!"

Her companion leaped forward, taking a little but not much less care to dodge raindrops, and came to a halt at her side.

She had stopped perhaps five yards from the edge of a nearly vertical-sided pit, fully two miles across. Her first few seconds of silence had been spent in telling herself how lucky she was that her shelter had not lasted a few seconds longer; then the blast of radiant heat coming from the floor of the crater, a scant hundred feet below, forced her to admit the matter was hardly one of luck. It could be seen from this vantage point that no raindrops at all approached the area except those which drifted up the slope of the hill from outside. The floor glowed visibly all over, and numerous patches were of almost dazzling brilliance. These last looked suspiciously like liquid, though

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the liquid possessed a remarkably sharp and well-defined surface.

Raeker, or even Easy, would have recognized a volcano at once; but the phenomenon was completely outside the experience and education of Fagin's pupils. Raeker had noted, in passing, Nick's earlier reference to the conical shape of the high hill he had reported; the geologists had also paid some attention to it, and even placed it on the list of things to be investigated more fully; but that was as far as matters had gone. Nick had said nothing to suggest that the thing was active—or rather, nothing the men had recognized as such evidence; he *had* mentioned wind. As a matter of fact, it had not been nearly so violent when he had passed, some three terrestrial months before. Only its size and shape had been worthy of note.

"You know," John remarked after some minutes of silence, "this would be a wonderful place for a village. We wouldn't need to keep fires going."

"How about food?" countered Nancy. "The plants growing on this dark rock are different from the ones we're used to; maybe the cattle wouldn't eat them."

"That would be easy enough to find out—"

"Anyway, that's not the assignment just now. This light obviously isn't what we're looking for, though I admit it's interesting. We'd better get on with the job."

"It's raining," John pointed out, "and there was no suggestion that we should search through the night as well as by day. This would seem a perfect place to sleep, at least."

"That's true enough—" Nancy's agreement was interrupted suddenly. Some three hundred yards to their left, a segment of the pit's edge about fifty yards long and ten or fifteen deep cracked loose with a deafening roar and plunged downward. In that gravity even Tenebra's atmosphere was an ineffective brake, and a good ten or fifteen thousand tons of well-cemented volcanic detritus made its way effortlessly through the red-hot crust of nearly

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solid lava at the foot of the ledge. The results left no doubt about the liquid state of the hotter material—or would have left none had the two explorers still been watching. They weren't; they were on their way downhill in the direction from which they had come before the mass of rock was completely detached. Even as he ran, John had time to feel lucky that the incident had waited to happen until Nancy had agreed with him about what a good camping spot the place was. Needless to say, he did not mention this aloud. Even John was not bothering to dodge raindrops at the moment, much less talk on irrelevant subjects. They covered nearly a mile down the slope before stopping. The light was still quite ample to permit reading the maps, and it took only a few minutes to convince them both that this was indeed the tall, conical hill which Nick had reported. With this settled, however, neither could quite decide what to do about it. The natural urge was to return to the camp to report the phenomenon to Fagin; against this, however, lay the fact that they had another assignment to complete, which involved life and death.

"This can wait a day," John pointed out. "We can perfectly well camp right here, search our areas tomorrow, and then go back as was planned. We can't drop everything for one new discovery."

"I suppose not," agreed Nancy with some slight reluctance, "but we certainly can't camp here. There isn't enough fuel for a dozen hours on this black stone, to say nothing of the rest of the night; and the raindrops

are starting to get clear."

"That I had noticed," replied John. "We'd better get going, then. Just a minute; there's enough here to make a torch. Let's get one started; we may be a little pressed for time later."

Nancy agreed with this observation, and ten minutes later they were on their way once more with John carry-

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ing a glowing torch and Nancy the material for two more, all that the vegetation within convenient reach afforded. They headed toward a region which their maps showed as having slightly higher hills than usual, so as to avoid finding themselves in a lake bed before morning. Both were becoming a trifle uneasy, in spite of Nick's earlier success at all-night travel; but they were distracted once more before getting really worried.

Again a light showed ahead of them. It was harder to perceive, since the brilliance from behind was still great, but there was no doubt that a fire of some sort was on one of the hilltops ahead of them.

"Are you going to sneak up on this one the way you did on the other?" queried John.

Nancy glanced at the now dangerously clear raindrops and did not condescend to answer. Her companion had expected none, and after a moment asked a more sensible question.

"What about this torch? If we can see that fire, anyone near it can see us. Do you want to put it out?"

Nancy glanced upward—or rather, shifted her attention in that direction by a subtle alteration in the positions of her visual spines, which acted rather like a radio interferometer system, except that they were sensitive to much shorter wavelengths. "We'd better," she said. "There's plenty of light to dodge the drops."

John shrugged mentally and tossed the glowing piece of wood under a settling raindrop. The two slipped up toward the distant light.

It was an ordinary fire this time, they could see as they approached. Unfortunately, there was no one visible near it, and the vegetation was not dense enough to hide anyone of ordinary size unless he were deliberately seeking to use it for the purpose. This suggested possible trouble, and the two explorers circled the hill on which the blaze stood with the most extreme caution, looking for traces of whoever had been there in the past few hours. Not

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having the tracking skill of the cave dwellers, they found no signs of people. After two full circuits and some low-voiced discussion, they were forced to conclude that either whoever made the fire was still on the hill but remarkably well hidden, or else the fire itself had been started by something a trifle unusual. The latter hypothesis would probably not have occurred to them had it not been for their recent experience with the volcano. There seemed no way, however, to decide between the possibilities by reason alone. Closer investigation was in order and, with a constant expectation of hearing the sharp voice of Swift echoing about them, they set to it. Very carefully, examining every bush, they went up the slope. The climb bore some resemblance to a scientific experiment, in that its completion eliminated both of the hypotheses and left them completely without ideas for a moment. It was only for a moment however; as the two loomed up beside the small fire, which had quite obviously been laid by intelligent hands, a shout sounded from the next hilltop, three hundred yards away.

"John! Nancy! Where did you come from?" The startled investigators recognized simultaneously the voice of Oliver and the fact that they had been a little hasty in eliminating possibilities; obviously they had missed a trail, since neither Oliver nor Dorothy could fly. Neither said anything about it aloud; each decided in private that the different vegetation of the area was responsible.

When Oliver and his companion came back to the fire from the separate hilltops to which they had taken on sighting John's torch, it quickly transpired that they, too, had seen the light of the volcano and had come to investigate it. Their adventures had been very similar to those of John and Nancy, except that neither of them had tried hiding in raindrops. Oliver and Dorothy had been an hour or so ahead of the others, and had found a good supply of fuel, so they were well set for the night.

"I'll bet Jim and Jane will be with us before the night's

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over," remarked Nancy when both parties had completed the exchange of information. "Their search areas were even closer to this place than yours, Oliver, and unless they went 'way off course coming across country they must have seen the big light, too."

"Maybe they thought it was better to stick to their assigned job," remarked John.

"Isn't investigating bright lights part of the job?" retorted his partner. "As for me, if they're not here in an hour or two I'm going to start worrying about them. This fire-hill couldn't possibly be missed or ignored, and you know it."

No one had a suitable answer for this, but no one was really impressed by the reasoning, since they had all spent some time in discussion before coming to check the mountain. At any rate, the hours passed without the predicted appearance. If Nancy was worrying, she failed to show it; certainly none of the others were. It was a very quiet night, and there was nothing to worry about. The hours were passing, but that was normal; the light was getting brighter, but there was the peculiar hill to account for that; the rain was decreasing, but the hill might account for that, too. The fire was using up its fuel with unusual speed, but there was plenty of fuel. Doubtless the wind was responsible—none of them had ever experienced such a wind, and an air current one could actually *feel* would no doubt do many queer things. The four explorers stood by their fire and dozed, while the wind grew fiercer.

### **IX. DEDUCTION; EDUCATION; EXPERIMENTATION**

"DADDY! Dr. Raeker! 'Mina's right; it's Nick!" Easy's voice was close to hysteria. The men glanced at each other, worried frowns on their faces. Rich gestured that Raeker should do the answering, but his expression pleaded eloquently for care. Raeker nodded, and closed his own microphone switch.

"Are you sure it's actually Nick, Easy?" he asked in as matter-of-fact a voice as he could manage. "He's supposed to have stayed at the camp, you know. There are six others actually searching, supposedly in pairs; do you see two of them, there?"

"No," replied Easy in a much calmer voice. Her father sank back in his chair with a thankful expression on his face. "There was only one, and I saw him just for a second. Wait—there he is again." Raeker wished he could see the girl's face, but she was shouting her messages from one of the observing chambers and was well out of pickup range of the vision transmitter. "I can still see only one of them, and he's mostly hidden in the bushes—just his head and shoulders, if you can call them that, sticking up. He's coming closer now. He must see the 'scaphe, though I can't tell where he's looking, or what he's looking with. I'm not sure whether he's the same size, but he certainly is the same shape. I don't see how you'd ever tell them apart."

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"It isn't easy," replied Raeker. "After a few years, you find there are differences in their scale and spine arrangements something like the differences in human faces. Maybe you can tell me what this one is wearing and carrying; that should be a lot easier to describe."

"All right. He has a sort of haversack slung over what would be his right hip if he had any hips; it's held by a strap running up around the other side of his body, over the arms on the left. The front of the sack has a knife hanging from it, and I think there's another on a sort of complex strap arrangement on the other side, but he's been working toward us at an angle and we haven't had a good look at that side. He's carrying four spears that look just like the ones Nick and his people had, and the more I see of him the more he looks like them."

"Does he have an axe, or anything looking like one?" asked Raeker.

"If he has, it's hanging from his straps at the left rear, where we can't see it."

"Then I'm afraid you're going to have to make good on your claim that you can get on all right with Swift's people. Mine carry only two spears, and the search teams took their axes with them. If that were one of our searchers he'd have an axe in one of his left hands, almost certainly. That means we'll have to change our plans a bit; we were hoping our folks would find you first. That's just luck; I suppose this is some hunter of Swift's. They'd hardly have had time to get an organized search going, even if he decided to run one on his own."

"Isn't it going to be a long time before any of your search teams get back to the camp?" asked Easy after some seconds of thought.

"I'm afraid so; over a week of our time. Swift's answer should be back to Nick before then, though."

"I wish the time didn't stretch out so on this darned four-days-for-one world. Didn't I hear you say you'd

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learned a little of Swift's language during the time he had the robot at his caves?"

"We did. Not very much, though; it's extremely hard for a human being to pronounce. We recorded a lot of it; we can give you the sounds, and as much as we could get of the meaning, if you think it will be any help. It'll help time to pass, anyway."

Easy's face appeared in the screen, wearing an impish expression.

"I'm sure it will be very helpful. Won't it, Daddy?"

Even Rich was grinning. "It will, Daughter. She'll learn any language she can pronounce nearly as fast as you can give it to her, Doctor." i i "Really? I've never heard her talk anything but English to her young friend there."

"What human being can pronounce Drommian? She understands it as well as I do, though."

"Well, I wouldn't bet very much that she could pronounce Tenebran, either. It's got some sort of pitch-inflected grammar, and a lot of the pitch is above human vocal range. Of course, she's young and female, but I'll bet she confines herself to understanding."

"You may be right. Hadn't we better get back to the matter in hand? What's that native doing now, Daughter?"

"He's walking around, thirty or forty yards from the 'scaphe, looking it over, I suppose. If he's seen us through the ports he hasn't shown any sign of it. He's still alone—I guess you're right, Dr. Raeker; I remember you sent your people out in pairs, and if anything had happened to one of a pair the other would surely report back to camp before going on with the search."

"I'm not sure you're right there, but I *am* certain it's one of Swift's people," replied Raeker. "Tell us when and if he does anything new."

"He is now. He's going out of sight the way he came. He definitely doesn't carry an axe; we've seen all sides of him now. He's getting hard to see; there's less of him

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visible above the bushes, and he's getting out of range of our lights. Now he's gone."

Raeker glanced at a clock, and did some rapid mental arithmetic. "It's about four hours to rainfall. Easy, did you say whether he was carrying a lighted torch, or fire in any form?"

"He definitely wasn't. He could have had matches, or flint and steel, or some such fire-making apparatus in his pouch, of course."

"Swift's people don't know about them. Nick's group makes fire by friction, with a bow-drill, but I'm sure the others haven't learned the trick yet. They certainly hadn't yesterday—that is, three or four ship's days ago. Anyway, the point I'm trying to get at is that if the one you saw had no fire, he was presumably within about four hours march, or not too much more, of Swift's main group; and, they'd almost have to be either at their caves or near the line between those caves and the point where Nick and the robot took to the river last night. He may be even closer, of course; you'd better keep your eyes open, and let us know immediately if the main body shows up. That . would give us a still closer estimate."

"I understand. We'll look out for them," replied Easy. "While we're watching, how about getting out those Ian- ; guage tapes you have? The sooner we start listening to them, the more good they'll probably do us."

Raeker agreed to this, and the next few hours passed without any particular incident. Nightfall, and then ram-fall, arrived without any further sign of natives; and when the drops grew clear the children stopped expecting them. They ate, and slept, and spent most of their waking hours trying to absorb what little Raeker had gleaned of Swift's language. Easy did very well at this, though she was not Ij quite the marvel her father had claimed.

A complication which no one had foreseen, though they certainly should have, manifested itself later in the evening. The bathyscaphe began to move again, as the river

formed around it and increased in depth. The children were quite unable even to guess at the rate of motion, though they could see plants and other bits of landscape moving by the glare of their lights; the speed was far too irregular. Even if they could have reported anything more precise than "sometimes a fast walk, sometimes a creep, and sometimes not at all," they were not even sure when the motion had started. They had had their attention drawn to it by an unusually hard bump, and when they had looked outside the few features visible were already unfamiliar. They might have been drifting a minute or half an hour.

Raeker took some comfort from the event, though Easy had been slightly disposed to tears at first.

"This gives us one more chance of getting our own people to you ahead of Swift's," he pointed out. "The cave men will have the job of hunting for you all over again, while we are getting you more closely located all the time."

"How is that?" asked Easy in a rather unsteady voice. "You didn't know where we were before we started moving, we don't know which way we're moving, how fast, or when we started. I'd say we know less than we did last night, except you can't know less than nothing."

"We don't *know*," granted Raeker, "but we can make a pretty intelligent guess. We judged that you were within a few hours' walk—say twenty-five or thirty miles—of the line between Swift's caves and our people's camp. We are about as sure as we can be without having actually mapped the entire area that this region is in the watershed of the ocean Nick's people found. Therefore, you are being carried toward that sea, and I'll be greatly surprised if you don't wind up floating on it, if not tonight at least in the next night or two. That means that Nick will only have to search along the coast on land if you don't reach the ocean tonight, or look offshore for lights if you do. I shouldn't think you'd go far out to sea; the river will lose

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its push very quickly after getting there, and there's no wind to speak of on Tenebra."

Easy had brightened visibly as he spoke. Amina-dorneldo, also visible on the screen, had not made any change of expression detectable to the human watchers, but the girl had cast a glance or two his way and seemed to be satisfied with the effect of Raeker's words on him. Then a thought seemed to strike her, and she asked a rather pointed question.

"If we do get carried out on the sea, what do Nick's people or anyone else do about it?" she asked. "We'll be out of his reach, and out of Swift's reach, and you say there aren't any winds on this planet, though I don't see why."

"The pressure's so high that the atmosphere doesn't even come close to obeying the classical gas laws," replied Raeker—he was no physicist, but had had to answer the question quite a few times in the last decade and a half— "and the small percentage changes in temperature that do occur result in even smaller changes in volume, and therefore in density, and therefore in pressure. Little pressure difference means little wind. Even changing phase, from gas to liquid, makes so little change in density that the big raindrops just drift down like bubbles, in spite of the gravity."

"Thanks, I'll remember to make sense of that when I get back to school," said Easy. "You're probably right, but you haven't answered my question about how Nick was going to reach us if we went out to sea. Forgive me if I'm spoiling an attempt to change the subject."

Raeker laughed aloud, for the first time in some weeks.

"Good kid. No, I wasn't trying to change the subject; you just asked a question that every visitor for sixteen years has put to me, and I answer it without even thinking. You pushed a button. As far as your question goes, leave it to me. I'm going to talk to Nick first thing in the morning—he couldn't do anything right now."

"All right," said Easy. "If you're that sure, I won't worry. Now how will we be able to tell when we reach the sea?"

"You'll float, the way you did in the lake, at least when some of the water boils off in the morning. I shouldn't be surprised if you were carried off the bottom even at night when the river reaches the sea, but I'm not certain of it. I don't know how completely or how far down the water dilutes the acid. Keep an eye on the landscape, and if you start to drift up from it let us know,"

"All right. That'll be easy."

But they were still on the bottom when the 'scape stopped moving. The human beings at both ends of the communication line had slept in the meantime, but there were still some hours before local daylight was

due. Something had slowed the current so that it was no longer able to push the big shell along, and Raeker suspected that the children had reached the ocean, but he admitted there was no way to be certain until day. The intervening time was used up with language work again; there was nothing else to do. Then the ship began to rise gently off the bottom. The motion was so gradual that it was a minute or two before either of the youngsters was positive it was taking place, and more than three hours passed before the bottom could no longer be seen. Even then they had not reached the surface, or the surface had not reached them, depending on one's viewpoint. It was definitely day by this time, however, and Raeker had lost practically all his doubt about the ship's location. The river had dried up much more quickly, the day before. He told Easy what he was going to do, suggested that she listen in, and then called Nick. There was no immediate answer, and a glance around the screens showed that both Nick and Betsey were with the herd, half a mile away. He sent the robot rolling toward them, meanwhile repeating his call in more pene-

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trating tones. Both herders waved spears in token of understanding, and Nick began to trot toward the approaching machine. Raeker kept it coming, since he saw part of what he wanted at the foot of the hill. Nick met him just before he reached it, and asked what had happened.

"I'll tell you in a few moments, Nick," he replied. "Could you go to the wagon and get a bucket, and then meet me at the pool down here?"

"Sure." Nick loped back up the hill. Raeker had not had the robot bring the bucket because of a long-established habit of not using the machine's moving parts, such as the handling equipment, more than could conveniently be helped.

The pool he had mentioned lay in the bottom of a circular hollow, as was usually the case. Also as usual, it filled only a small part of the hollow, representing all that was left when the nightly lake which did cover the spot boiled almost dry by day. He had assumed for years, on rather inadequate data but without any contradicting evidence so far, that the stuff was oleum—principally sulphuric acid with a heavy lacing of metal ions from the surrounding rocks which had been dissolved in the nightly rain, and an equilibrium amount of the atmospheric gases. He ran the robot through it to make sure of its depth—the slope of the rock sometimes changed rather abruptly at the "acid line," so judging by eye was insufficient—and then waited until Nick returned with the bucket.

"Is that thing tight, Nick? Will it hold liquid without leaking?" In reply, Nick pushed the leather container beneath the surface of the pool, drew it up brimming, and waited for the fluid on the outer surface to drain away. This happened quickly, since the "leather" was not wet by the oleum, and in a few seconds only a dozen or so hazily defined drops were clinging to the outer surface. Nick held the container up at the end of one arm for another minute or so, but nothing more fell.

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"I guess it's tight, all right," he said at length. "Why is it important? We'll never have to carry this stuff very far; there are pools of it everywhere."

"I'm not interested in keeping it *in* the bucket, Nick. Empty it again." The student obeyed. "Now set the bucket right side up in the pool, and let go of it—no, don't fill it." The transmission delay made this warning a trifle late; Nick emptied what had gotten into the container and started over. "That's right—*on top* of the pool. Now let go of it." Nick obeyed. The weight of the strap that served as a handle promptly tipped it over, and three or four gallons of oleum poured in. This weighted the bottom sufficiently to bring the edge to the pool's surface, and there the bucket remained. Nick was startled; he had taken for granted that the thing would plummet to the bottom.

"I'm afraid I've been a trifle negligent with your education," remarked Raeker, "though I suppose the rather ambiguous nature of most of this planet's liquid gives me some sort of excuse for leaving out Archimedes' Principle. Try it again, Nick, and this time put a couple of stones in the bucket first."

As might have been expected anywhere on Tenebra except the actively orogenic regions, there were no loose stones in the neighborhood; but by packing the bottom third of the container with broken-off shrubbery, Nick contrived to achieve the spirit of the Teacher's order. This time the bucket floated almost upright, and with a good deal of freeboard.



"See how much more you can put in it before it sinks," said Raeker. Nick obeyed, without asking for the meaning of the new verb; it was clear enough from context. To his unconcealed astonishment, it proved possible to fill the bucket with the brittle growths without actually forcing it under, though a ripple half an inch high would have accomplished this end—a fact Raeker at once proceeded to demonstrate. At his order, Nick splashed vigorously in the

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pool with his feet; waves curled over the edge of the bucket, and it sank almost at once.

"Do you think it would be possible to make something on that general line, capable of keeping several people from sinking?" asked Raeker.

Nick wasn't sure. "Just on the face of things, I'd say yes," he replied, "but I don't really see why that works at all. If I knew, I could answer more sensibly. What use would it be if we had such a thing?"

Raeker took this opportunity to give a rapid explanation of Archimedes' Principle, plus an account of Easy's reports, mentioning the brief appearance of the cave scout and concluding with the probability that the bathyscaphe had reached the sea. Nick could see the rest of the situation for himself, and, characteristically, went a trifle overboard in his enthusiasm.

"I see!" he exclaimed. "The ship is in the ocean where no one can get at it, so you've showed us how to travel on the ocean itself. We could get out to the ship with this big bucket you want us to make, and pull the ship along with us to the other side, where Swift wouldn't bother us. It's a good idea. We'll start making the bucket as soon as the others come back—in fact, we can start collecting leather for it right now—"

"Hold up a minute, Nick. Crossing oceans, even oceans as small as Tenebra probably has, isn't something you do quite that casually. Also, there's another point to be considered. What if you were out in this—this bucket at night?"

Nick thought briefly. "Why couldn't we carry firewood and torches?"

"You could; but that's not the point. What happens to the ocean at night?"

"It conies up; but wouldn't the bucket go up with it?"

"I'm afraid not. In going up, the ocean decreases enormously in density, and I'm afraid that rather early in the evening you'd find it oozing over the side of your bucket

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•—and you saw what happened just now when the same thing occurred here in front of us."

"Yes," admitted Nick thoughtfully. He was silent for a time. Then he became enthusiastic again. "Wait a minute. The bucket sinks because liquid gets into it, and it is no longer lighter than the liquid it displaces—right?"

"That's right."

"Suppose, then, that instead of a bucket we have a closed bag of air? If it's tied shut the sea can't get in, no matter how much it rises."

"But if the sea becomes no more dense than the air?"

"At least when the water boils out of the sea in the morning the bag will float once more."

"All that is true only if your bag doesn't leak at all. I'd rather you didn't risk your lives by staying at sea during the night, though your idea of bags rather than buckets is a good one. It would be smart to make a ship of many bags tied together, so that if some of them do leak you will still float."

"That's plain enough. But why shouldn't we stay out at night? What if night falls before we get the ship across the ocean."

"You won't cross the ocean. You'll work on it during the daytime, and come ashore again at night."

"But how about Swift?"

"I'll take care of him. Don't you plan to keep the agreement we offered to make with him?"

Nick thought for a moment. "I suppose so, if he really agrees. If that was one of his scouts who found the ship last night, maybe he just decided to find it for himself."

"I still think that find was sheer chance. If it should turn out that you're right, we'll solve that one when we face it. Easy is willing to face Swift, she says. Right, young lady?"

"Certainly."

"Do you *like* Swift?" Nick asked her in some surprise. "I can't forget that he killed two of my friends."

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"I've never met him," Easy pointed out. "I admit it was bad for him to attack your village that way, but probably he couldn't think of any other way to get what he wanted. If you're smart, Nick, I'll bet you could have him doing just what *you* want—and make him think it's his own idea all the time."

"I never heard of such a thing!" exclaimed Nick.

"Well, listen in if Swift finds us again," replied the girl, with a confident tone that surprised even her father. "You'll learn something."

Rich signed to Raeker to cut off his transmitter for a moment, and made a comment. "I hope that young squirt isn't getting too cocky. I admit she's giving Nick just what I've given her on and off all her life; I just hope she's up to it if the occasion arises. That Swift isn't human, or Drommian either!"

Raeker shrugged. "I'm hoping she won't have to try. In the meantime, I'd much rather have her confident than scared senseless."

"I suppose you're right." Rich looked at the screen, where his daughter's confident expression glowed as she enlarged on her theme to the surprised and still doubtful Nick. Raeker listened with amusement for a while, but finally suggested tactfully that she tell him something about boat-building; Nick knew even less about that than he did about diplomacy, and was more likely to need the information. Easy was perfectly willing to change the subject as long as she could keep talking.

Presently 'Mina, who had kept faithfully to his watchman's duties at one of the windows, called to her with the information that he thought he could see the surface. Easy broke off and left the control room hastily, calling back after a moment that her young friend seemed to be right. It was not until the upper observation windows of the bathyscaphe had actually emerged into the "air" that Raeker remembered something; he had missed an opportunity to check on the mysterious sea life originally

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reported by Nick. Aminadorneldo had made no mention of any such creatures during his last period of watch, but Raeker didn't know the young Drommian well enough to feel sure he'd have reported them without special instructions. This was obviously not the time to ask; Easy's eager tongue was busy with more up-to-date reports.

"We're farther out to sea than you thought we would be, Dr. Raeker," she called. "I can just barely see the shore, at the very limit of our hottest lights. I can't make out any details, really; but I think maybe there are some points, or maybe islands, sticking out our way."

"Can 'Mina see anything more?"

"He says not," came Easy's answer after a brief pause. "He doesn't seem to see quite as well as I do, anyway, I've noticed."

"I see. I suppose you can't tell whether you're moving or not."

"The ocean is perfectly smooth, and there aren't any waves around us. There's nothing to tell by. The only things to see are those big jellyfish things floating in the air. They're moving slowly in different directions, more of them toward shore than away from it, I think. Let me watch them for a minute." It was considerably more than a minute before she could make up her mind that the first impression had been right. Even then she admitted willingly enough that this was not evidence of the bathyscaphe's motion.

"All right," said Raeker when this had been settled. "Just keep an occasional eye on the ocean to make sure nothing happens, and give advice to Nick as long as he'll listen to you. He'll do what he and Betsey can about it, but that won't be much before the others get back. They'll probably be gone until tomorrow night, Tenebra time— between five and six days on your clock."

"All right, Doctor. We'll be fine. It's rather fun watching those flying jellyfish." Raeker opened his mike switch and settled back thoughtfully, and with some satisfaction.

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Everything seemed to be progressing properly; perhaps somewhat more slowly than he would have liked, but as rapidly as could reasonably be hoped. This feeling must have showed on his face, for his thoughts were read quite accurately.

"Pleased with yourself, I take it, Man!" The speaker did not need to introduce himself. Raeker endeavored to

control both his features and his feelings, with questionable success.

"Not exactly, Councillor—"

"Why *not exactly*?" shrilled Aminadabarlee. "Why should you feel any remote sense of satisfaction? Have you accomplished anything at all?"

"I think so," Raeker answered in some surprise. "We know very nearly where your boy is, and we should have a rescue team out there in a week or ten days—"

"A week or ten days! And then you'll have to give the team members degrees in electrical engineering, and then hope the wiring of that ridiculous craft hasn't corroded beyond repair in the interval. How long do you think the actual *rescue* will take?"

"I'm afraid I couldn't hazard a guess," Raeker answered as mildly as he could. "As you point out so clearly, we don't know how much damage may have been done to wiring exposed by the inspection ports. I realize that it is hard to wait, but they've been getting on all right for a month now—"

"How stupid can even a human being get?" asked the Drommian of the world at large. "You were talking to the ground just now, and heard as clearly as I did the human child's remark that my son didn't see as well as she did."

"I heard it, but I'm afraid the significance escaped me," admitted the man.

"Drommian eyesight is as good and acute as that of human beings, if not better, and my son's has always been normal for his age. If he can't see as well as the human with him, something's wrong; and my guess is that the low

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oxygen concentration is affecting him. I gather your engineers made no particular provision for altering that factor of the vessel's environment."

"They probably didn't, since the crew was to be human," admitted Raeker. "I did not recognize the emergency, I must admit, Councillor; I'll try to find means of speeding up the operation—for example, I can probably get pictures of the wiring exposed by the ports from the engineers, and have Nick briefed on what to look for while he's waiting for the others. My relief is due in half an hour; as a matter of fact, he'd probably be willing to come now if I called him. Have you been able to get medical advice from Dromm yet? I understand a human doctor arrived a few hours ago, and has been finding out what he can about the diet available on the bathyscaphe."

"Eta Cassiopeia is half a parsec farther from here, and I did not get a message off quite so quickly," admitted the Drommian. "One should be here shortly, however."

Raeker felt that he had made a smart move in forcing the nonhuman to make such an admission; unfortunately, admitting mistakes under pressure does not improve the temper of the average human being, and Aminadabarlee's race was quite human in this respect. He could not be insultingly superior for the moment; even his standards prevented that; but the required repression of choler was a good deal more dangerous to peace than his usual superciliousness. He retired to his own room—which the "incompetent" human engineers had at least set up with a decent atmosphere—and brooded darkly. There were many more message torpedoes. . \_

With the Drommian gone, Raeker decided not to bring his relief on too early; but as soon as the fellow did show up, he made his way to the engineering section and outlined the proposal he had made on the spur of the moment to Aminadabarlee. Sakiiro and his colleagues agreed that it was worth trying, and they all settled down with their blueprints to decide what would be the best things to tell

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Nick and the easiest way to get the information across.

They spent some hours at this. Then Raeker went to eat, and back to his own room to sleep for a few hours. When he reappeared in the observation room, his relief rose gladly.

"Easy has something to report," he said, "but she wants to tell you personally." Raeker raised his eyebrows, dived into his station, and energized the microphone.

"I'm here, Easy," he said. "What's happened?"

"I thought I'd better tell you, since you're the one who said we'd stay put," the girl responded at once.

"We've been drifting closer to shore for five or six hours now."

Raeker smiled. "Are you sure the shore isn't just getting closer to you?" he asked. "Remember, the sea

level had a long way to go down even after you got to the surface."

"I'm quite sure. We've been able to keep our eyes on one piece of shore, and the sea has stayed right by it while we got closer. It has a feature which makes it easy to recognize, though we weren't able to make out very clearly just what the feature was until now."

"What is it?" asked Raeker, seeing that he was expected to.

Easy looked at him with the expression children reserve for adults who have made a bad mistake.

"It's a crowd of about fifty natives," she said.

## **X. COMPREHENSION; CONSTRUCTION; INUNDATION**

NICK, for the hundredth time, looked toward the ocean and fumed. He couldn't see it, of course; to be out of its reach by night the camp had had to be placed well out of its sight by day, but he knew it was there.

He wanted to see it, though; not only to see it but to ride on it. To explore it. To map it. That last idea presented a problem which occupied his mind for some time before he dropped it. Fagin would know the answer; in the meantime there was a boat to be built. That was the real annoyance. Nothing, really, could be done about that until the search teams got back. While it didn't actually take all of his and Betsey's time to watch the herd and gather firewood, neither could do any very effective hunting with those jobs in the background; and the boat was very obviously going to take a lot of skins.

Nick wasn't sure just how many, and to his surprise

Fagin had refused to offer even a guess. This was actually reasonable, since Raeker, who was not a physicist, was ignorant of the precise densities of Tenebra's oceans and atmosphere, the volume of the average leather sack which might be used in the proposed boat, and even the weight

- of his pupils. He had told Nick to find out for himself, a

.A. remark which he had made quite frequently during the process of educating his agents.

Even this, however, called for a little hunting, since it 146

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seemed a poor idea to sacrifice one of the herd to the experiment. Betsey was now scouring the surrounding valleys in the hope of finding something big enough to serve—the floaters of the vicinity had already learned to leave herd and herders alone, and those killed or grounded in the process had long since been disposed of by scavengers. Besides, their skins were much too frail to make good leather.

There was no serious doubt that Betsey would find a skin, of course, but Nick wished she'd be quicker about it. Patience was not one of his strong points, as even Easy had already noticed.

He was a little mollified when she came; she had brought not only the kill, but the skin already removed and scaled—a job which Nick didn't mind doing himself, but it was at least that much less tune spent before the actual experiment. Betsey had kept in mind the purpose to which the skin was to be put, and had removed it with a minimum of cutting; but some work was still needed to make a reasonably liquid-tight sack. It took a while to prepare the glue, though not so long for it to dry—strictly speaking, the stuff didn't dry at all, but formed at once a reasonably tenacious bond between layers of materials such as leaves or skin. Eventually the thing was completed to their satisfaction and carried down to the pool where the bucket had floated a few hours before.

Nick tossed it in and was not in the least surprised to see that it, too, floated; that was not the point of the experiment. For that, he waded hi himself and tried to climb onto the half-submerged sack.

The results didn't strike either Nick or Betsey as exactly funny, but when Raeker heard the story later he regretted deeply not having watched the experiment. Nick had a naturally good sense of balance, having spent his life on a high-gravity world where the ground underfoot was frequently quite unstable; but in matching reflexes with the bobbing sack of air he was badly outclassed. The

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thing refused to stay under him, no matter what ingenious patterns he devised for his eight limbs to enable them to control it. Time and again he splashed helplessly into the pool, which fortunately came only up to his middle. A ten-year-old trying to sit on a floating beach ball would have gone through similar antics.

It was some time before anything constructive came of the experiment, since each time Nick fell into the pool he became that much more annoyed and determined to succeed in the balancing act. Only after many tries did he pause and devote some really constructive thought to the problem. Then, since he was not particularly stupid and did have some understanding of the forces involved— Raeker felt he had not been a complete failure as a teacher—he finally developed a solution. At his instruction, Betsey waded into the pool to the other side of the sack and reached across it to hold hands with him. Then, carefully acting simultaneously, they eased the weight from their feet. They managed to keep close enough together to get all the members concerned off the bottom of the pool for a moment, but this unfortunately demonstrated rather clearly that the sack was not able to support both of them.

Getting their crests back into the air, they waded ashore, Nick bringing the bag with him. "I still don't know how many of these we're going to need, but it's obviously a lot," he remarked. "I suppose six of us will go, and two stay with the herd, the way the Teacher arranged it this time. I guess the best we can do until the others get back is hunt and make more of these things."

"There's another problem," Betsey pointed out. "We're going to have quite a time doing whatever job it is Fagin wants done while trying to stand on one or more of these sacks. We'd better pay some attention to stability as well as support."

"That's true enough," Nick said. "Maybe now that we've done some experimenting, the Teacher will be will-

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ing to give us a little more information. If he doesn't, there's that other person whose voice he sends us—the one he says is in this ship we're to look for— By the way, Bets, I've had an idea. You know, he's been explaining lately about the way voices can be sent from one place to another by machines. Maybe Fagin isn't really with us at all; maybe that's just a machine that brings his voice to us. What do you think of that?"

"Interesting, and I suppose possible; but what difference does it make?"

"It's information; and Fagin himself always says that the more you know the better off you are. I suppose we don't really know this, but it's something worth keeping in mind until evidence comes in."

"Now that you've thought of it, maybe he'll tell us if we ask him," Betsey pointed out. "He usually answers questions, except when he thinks it's for the good of our education to work out the answers ourselves; and how could we check on this one experimentally—except by taking the Teacher apart?"

"That's a point. Right now, though, the really important thing is to get this boat designed and built. Let's stick to that question for a while; we can sneak the other one up when there's less chance of getting a lecture about letting our minds wander."

"All right." This conversation had brought them to the top of the hill where the robot was standing, among the belongings of the village. Here they reported in detail the results of their experiment. Fagin heard them through in silence.

"Good work," he said at the end. "You've learned something, if not everything. Your question about stability is a good one. I would suggest that you build a wooden frame—oh, about the size and structure of one wall of a hut, but lying on the ground. Then the sacks can be fastened to the corners; any time one corner gets lower

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than the others, the buoyant force on it will increase, so the whole thing ought to be fairly stable."

"But wood sinks. How can you make a boat out of it?"

"Just count it as part of the weight the sacks—let's call those floats, by the way—have to carry. You'll need even more floats, but don't let it worry you. I'd suggest that the two of you start the frame now; you might be able to finish it by yourselves, since there's plenty of wood. Then you can start fastening floats to it whenever you can get hold of any; you make a few kills defending the herd every day, so you should make some progress.

"While you're doing that, you might lend your minds to another problem. The bathyscaphe is not staying at sea, but is drifting toward the shore."

"But that's no problem; it *solves* our problems. We'll just have to travel south along the shore until we find it."

You had already decided it must be south of us, you said."

"Quite true. The problem is the fact that Swift, with most of his tribe, seems to be standing on the shore waiting for it. Strictly speaking, Easy hasn't recognized Swift, partly because she can't tell one of you from another yet and partly because they aren't close enough, but it's hard to imagine who else it could be. This raises the question of whether Swift is accepting our offer, or proposes to keep the bathyscaphe and those in it for his own purposes. I suppose it's a little early to expect an answer from him; but if we don't get one some time today, I think we'll have to assume we're on our own and act accordingly."

"How?"

"That is the problem I suggest you attack right now. I suspect that whatever solution you reach, you'll find the boat will figure in it; so go ahead with it, as far as you can."

The Teacher fell silent, and his students fell to work. As Fagin had said, there was plenty of wood around, since the camp had not been there very long. Much of it, of course, was unsuitable for any sort of construction,

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having the brittleness of so many Tenebran plants; but a few varieties had branches or stems both long and reasonably springy, and the two were able to locate in an hour what they hoped would be enough of these. The actual cutting of them with their stone blades took rather longer, and binding them into a framework whose strength satisfied all concerned took longest of all. When completed, it was a rectangle of some fifteen by twenty feet, made of about three dozen rods of wood which an Earth-man would probably have described as saplings, lashed at right angles to each other to form a reasonably solid grillwork. Thinking of it as a floor, neither Nick nor Betsey was particularly happy; the spaces were quite large enough to let their feet through, and the said feet were even less prehensile than those of a human being. They decided, however, that this was an inconvenience rather than a serious weakness, and shifted their attention to the problem of getting floats.

All this was reported to the Teacher, who approved. The approval was more casual than the two realized, for at the moment Raeker's attention was otherwise occupied. The bathyscaphe had now drifted within fifty yards of the shore and had there run aground, according to Easy. She had offered neither observation nor opinion as to the cause of the drift, and none of the scientists who had taken so many reels of data about the planet had been able to do any better. Easy herself did not seem bothered; she was now engaged in language practice across the narrow span of liquid that kept the bathyscaphe out of Swift's reach.

Raeker lacked even the minor comfort of being able to hear the conversation. The microphones of the outside speakers were, somewhat sensibly, located by the observation ports, so that the girl had taken up her station where she would have to shout to be heard in the *Vindematrix*. She did not bother to shout; most of the time she didn't even think of Raeker or, to be embarrassingly frank, of her father. She had not been inter-

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ested in the biology, geology, or the virtually nonexistent climatology of Tenebra; her interest in the rescue operation, while profound and personal, had reached the point where she could only wait for information which was always the same; but here were people, and people she could talk to—at least, after a fashion. Therefore, she talked, and only occasionally could anyone above get her attention long enough to learn anything.

She did find out that Swift was one of those present on the nearby shore, and Raeker duly relayed this information to Nick; but when questions were asked such as whether Swift planned to follow the suggestion he must by now have received via Nick's ex-prisoner, or how he had been able to find the bathyscaphe so quickly, no satisfactory answer was forthcoming. Raeker couldn't decide whether the trouble was Easy's incomplete mastery of the language, her lack of interest in the questions themselves, or a deliberate vagueness on Swift's part. The whole situation was irritating to a man who had exercised fairly adequate control over affairs on Tenebra for some years past; at the moment a majority of his agents were out of contact, what might be called the forces of rebellion were operating freely, and the only human being on the planet was neglecting work for gossip. Of course, his viewpoint may have been slightly narrow.

Things looked up toward the middle of the Tenebran afternoon. Jim and Jane returned, long before they had been expected, to increase the strength of the shipbuilding crew. They reported unusually easy travel

and high speed, so they had reached their first search area on the initial day's travel, examined it, and been able to cover the other and return in something like half the expected time. They had found nothing in their own areas. They had seen a light to the south, but judged that John and Nancy would cover it, and had decided to stick to their own itinerary and get the desired report in. It was quite impossible, of course, for them to read any expression

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from the robot, and Raeker managed to keep his feelings out of his voice, so they never suspected that their report was in any way unsatisfactory. For a short time, Raeker toyed with the thought of sending them out again to check the light; but then he reflected that in the first place John and Nancy would, as Jim said, have done so, and in the second place the 'scaphe had effectively been located, and he decided the pair were of more use getting leather. The lack of initiative they had displayed tended to support this conclusion. He spoke accordingly, and the two promptly took their spears up again and went hunting.

"One point may have struck you, Nick," Raeker said after they had gone.

"What is that, Teacher?"

"They saw the light to the south of their search area. That suggests strongly that the shore of this sea bends westward as it is followed south; and since the caves of Swift lie in the same direction, it is fairly likely that they are closer to the shore than we realized. This may account for Swift's finding the ship so quickly."

"It may," admitted Nick.

"You sound dubious. Where is the hole in the reasoning?"

"It's just that I hunted with Swift's people for a good many days, and covered a lot of territory around his caves in the process, without either encountering the sea myself or hearing it mentioned by any of his people. It seems hard to believe that the lights of your missing ship could be seen a hundred miles, and something like that would be necessary to reconcile both sets of facts."

"Hmph. That's a point I should have considered. That light may call for more investigation, after all. Well, we'll know more when John and Nancy come in."

"We should," agreed Nick. "Whether we actually will remains to be seen. I'm going to get back to fastening this float we've just glued onto the frame. I'm a lot surer that something constructive will come from that." He went

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off to do as he had said, and Raeker devoted himself to listening. Thinking seemed unprofitable at the moment. With two more hunters, the raft progressed more rapidly than anyone had expected. The region of the new camp was not, of course, as badly hunted out as had been the neighborhood of the old village, and skins came in about as fast as they could be processed. Float after float was fastened in place, each corner being supplied in turn to keep the balance—Nick and Betsey were very careful about that. By the late afternoon so many had been attached that it was less a matter of keeping track of which corner came next than of finding a spot not already occupied—the frame was virtually paved with the things. No one attempted to calculate the result of its stability. If anyone thought of such a problem, he undoubtedly postponed it as something more easily determined empirically.

The work was not, of course, completely uninterrupted. People had to eat, there was the need to gather firewood for the night, and the herd to be guarded. This last, of course, frequently helped in the "shipyard" by providing leather without the need of hunting, but sometimes the fighting involved was less profitable. Several times the creatures attacking the herd were floaters, to everyone's surprise.

These creatures were reasonably intelligent, or at least learned rapidly as a rule to avoid dangerous situations. They were also rather slow-flying things—resembling, as Easy had said, the medusae of her home world in their manner of motion—so that after a fairly short time in any one spot, when a reasonable number of them had been killed, the survivors learned to leave the herd alone. Nick and his friends had believed this end accomplished for the present camp; but in the late afternoon no less than four of the creatures had to be faced by the herders in not much over an hour. The situation was both unusual and quite painful: while a competent spearsman could count surely enough on grounding such a creature, it was

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nearly impossible to do so without suffering from its tentacles, whose length and poisonous nature went

far to offset their owner's slow flight.

The attention of all four members of the group was naturally drawn to this peculiar state of affairs, and even the work on the raft was suspended while the problem was discussed. It was natural enough that an occasional floater should drift into the area from elsewhere, but four in an hour was stretching coincidence. The group's crests scanned the heavens in an effort to find an explanation, but the gentle air current toward the southwest was still too feeble at this distance from the volcano even to be felt, much less seen. The sky of Tenebra during the daytime is much too featureless to permit easy detection of something like a slow, general movement of the floaters; and the individual movement of the creatures didn't help. Consequently, the existence of the wind was not discovered until rainfall.

By this time, the raft seemed to be done, in that it was hard to see where any more floats could be attached. No one knew, of course, how many people it would support; it was planned to carry it to the ocean when the others returned, and determined this by experiment.

When the evening fires were lighted, however, it was quickly seen that the rain was not coming straight down. It was the same phenomenon that John and Nancy had observed the night before, complicated by the lack of an obvious cause. After some discussion, Nick decided to light three extra fires on the northeast side of the usual defenses, compensating for the extra fuel consumption by letting an equal number on the opposite side of the outer ring burn out. A little later he let go even more on the southwest, since no drops at all came from that direction even after the convection currents of the camp were well established. He reported the matter to Fagin.

"I know," replied the Teacher. "The same thing is happening where the ship is down, according to Easy. The

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drops are slanting very noticeably inland. I wish she had some means of telling direction; we could find out whether the coast is actually sloping east where she is, or the rain actually moving in a slightly different direction. Either fact, if we know it, could be useful."

"I suppose she can't feel any wind?" asked Nick.

"Not inside the ship. Can you?"

"A little, now that the motion of the drops proves there must be some. I felt more around those fires I lighted when we getting away from the caves, but that's the only time. I think it's getting stronger, too."

"Let me know if you become more certain of that," replied Raeker. "We'll keep you informed of anything from the other end which may have a bearing on the phenomenon." Raeker's use of "we" was apt; the observation and communication rooms were filling with geologists, engineers, and other scientists. The news that Tenebra was putting on its first really mysterious act in a decade and a half had spread rapidly through the big ship, and hypotheses were flying thick and fast.

Easy was giving a fascinating, and fascinated, description of events around the bathyscaphe; for while she and her companion had by now seen plenty of the nightly rainfall, they were for the first time at a place where they could actually observe its effect on sea level. The shore was in sight, and the way the sea bulged up away from it as water joined the oleum was like nothing either child had ever seen. Looking downhill at the nearby shore was rather disconcerting; and it continued, for as the bathyscaphe rose with the rising sea level it was borne easily inland with the bulging surface. This continued until the density of the sea fell too low to float the ship; and even then an occasional bump intimated that its motion had not stopped entirely.

"I can't see anything more, Dad," Easy called at last. "We might as well stop reporting. I'm getting sleepy, anyway. You can wake us up if you need to."

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"All right, Easy." Rich made the answer for Raeker and the other listeners. "There's nothing much going on at Nick's camp right now except the wind, and that seems more surprising than critical." The girl appeared briefly on the screen, smiled good night at them, and vanished; Aminadorneldo's narrow face followed, and that station had signed off for the night.

Attention naturally shifted to the observation room, where the surface of Tenebra could actually be seen. Nothing much was happening, however. The robot was standing as usual in the middle of the rather



unbalanced fire circle, with the four natives spaced around it—not evenly, tonight; three of them were rather close together on the northeast side and the fourth paced a beat that covered the remaining three-quarters of the circle. It was easy to see the reason with a few minutes' observation; for every fire snuffed out on the single man's beat, a full dozen went on the northeast. Someone was continually having to lope forward with a torch to relight one or two of the outer guard flames on that side. Occasionally even an inner fire would be caught, as a second drop blew too soon through the space left unguarded by the effect of a first. There seemed no actual danger, however; none of the natives themselves had been overcome, and their manner betrayed no particular excitement.

While Raeker had been eating, his assistant had had one of the pupils pace off a course which he compared with the robot's length, and then by timing the passage of a raindrop along it clocked the wind at nearly two miles an hour, which as far as anyone knew was a record; the information was spread among the scientists, but none of them could either explain the phenomenon or venture a prediction of its likely effects. It was an off-duty crewman, relaxing for a few minutes at the door of the observation chamber, who asked a question on the latter subject.

"How far from the sea is that camp?" he queried.

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"About two miles from the daytime coast line."

"How about the night one?"

"The sea reaches the valley just below that hill."

"Is that margin enough?"

"Certainly. The amount of rainfall doesn't vary from one year to the next. The ground moves, of course, but not without letting you know."

"Granting all that, what will this wind do to the shore line? With the sea not much denser than the air, the way it is late at night, I should think even this measly two-mile hurricane might make quite a difference."

Raeker looked startled for a moment; then he glanced around at the others in the room. Their faces showed that this thought had not occurred to any of them, but that most—the ones, he noted, most entitled to opinions—felt there was something to it. So did Raeker himself, and the more he thought of it the more worried he became. His expression was perfectly plain to Rich, who had lost none of his acuteness in the last month of worry.

"Think you'd better move them back while there's time, Doctor?" he asked.

"I'm not sure. It isn't possible to move the whole camp with just the four of them, and I hate to leave any of their stuff to be washed away. After all, they're fifty feet higher on that hill than the sea came before."

"Is fifty feet much, to that sea?"

"I don't know. I can't decide." The expression on Rich's face was hard to interpret; after all, he had spent his life in a profession where decisions were made whenever they had to be, with the consequences accepted as might be necessary.

"You'll have to do something, I should think," he said. "You'll lose everything if the sea gets them while they're there."

"Yes, but—"

"But nothing! Look there!" It was the same crewman who had raised the wind question who cut into the ex-

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change. His eyes were fixed on the screen which looked seaward, and both Raeker and Rich knew what he had seen in the split second before they were looking for themselves. They were quite right.

Hours before they were normally due, the oily tongues of the sea were creeping into sight around the bases of the eastern hills. For perhaps a second no words were uttered; then Raeker proceeded to destroy the image the diplomat had been forming of him—that of a slow-thinking, rather impractical, indecisive "typical scientist." With the safety of project and pupils in obvious and immediate danger, he planned and spoke rapidly enough.

"Nick! All of you! Take one second to look east, then get to work. Make sure that all the written material, maps especially, is wrapped securely and fastened to the raft. Make them firm, but leave enough rope to

fasten yourselves to it as well. You and the maps are top priority, and *don't forget it.* With those as safe as possible, do the best you can at securing your weapons to yourselves or the raft. Hop to it!"

A question floated back from Nick; the transmission lag made it uncertain whether or not he had availed himself of the proffered observation time.

"How about the cattle? Without them—" Raeker cut in without waiting for the end.

"Never mind the cattle! There's a big difference between what's nice to do and what's possible to do! Don't even think about anything else until you've taken care of yourselves, the maps, and your weapons!"

Nick's three companions had started to work without argument; the urgency in the Teacher's voice drove Nick himself to follow suit in silence, and a tense period of waiting ensued in the observation room. The distant watchers sat breathless as the work and the ocean raced each other—a race more deadly than any of them had even seen run on an Earthly track.

Raeker noticed that the streams of oleum were much

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higher in the center than at the edges, rather like greatly magnified trickles of water on waxed paper, even though they still showed a fairly distinct surface; evidently the sea had already been heavily diluted by the rain. That meant there was no point in expecting the raft to float. Its air-filled sacks were nearly half as dense as the straight acid; with this diluted stuff their buoyancy would be negligible.

He was almost wrong, as it turned out. The sea oozed up around the hill, snuffing the fires almost at a single blow, and for an instant blurred the picture transmitted from the robot's eyes as it covered the camp. Then the screens cleared, and showed the limp figures of the four natives on a structure that just barely scraped what had now become the bottom of the ocean. It moved, but only a few inches at a time; and Raeker gloomily sent the robot following along.

## **XI. ORGANIZATION; REVELATION; DECLARATION**

NIGHTS—Tenebran nights, that is—were hard on the Drommian, Aminadabarlee. They were even harder on any men who had dealings with him while they lasted. Seeing people engaged in work that had no direct bearing on the rescue of his son, and watching them for two Earthly days at a stretch, was hard for him to bear, even though he knew perfectly well that nothing could be done while the agents on the ground were immobilized or

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actually unconscious. This made no difference to his emotions; somebody, or everybody, should be doing *something*, his glands told him. He was rapidly, and quite unavoidably, coming to regard human beings as the most cold-blooded and uncooperative race in the galaxy. This was in spite of the skilled efforts of Rich, who had plenty to keep him professionally busy.

So far the great nonhuman had not descended to physical violence, but more than one man was carefully keeping out of his way. These were the ones least familiar with Drommians—so far. Raeker had noted that the number was increasing.

Raeker himself wasn't worrying; he wasn't the sort. Besides, he was occupied enough to keep his mind off Dromm and its impulsive natives. The robot, fortunately, had had no fighting to do, since nothing in the form of animal life had approached the raft and its helpless pas\* sengers, or had even been sighted by the carefully watching robot. This was a relief in one way, though Raeker was professionally disappointed. He had wanted to learn something of the creatures who were responsible for the loss of his students' herd a few nights before, and who could apparently live in a remarkably small oxygen concentration. Still, the four tied to the raft were fairly safe, though no one dared let them drift far from the robot; a constant watch was necessary.

As the night wore on, the vagrant currents which had been shifting raft and occupants became fewer, and so much weaker that they were no longer able to move the assembly, whose effective weight must have been only a few pounds. The man in control of the robot found it possible to leave the machine motionless for longer and longer periods; in fact, at one point Raeker almost went to sleep in the control chair. He was aroused from a doze by the shrill voice of the Drommian, however—"And Earth-men expect people to work with them!" in what even a man could recognize as a contemptuous tone—and did

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not repeat the slip. It didn't matter; the raft's passengers were drifting unharmed when day arrived. This period was the hardest, as far as standing guard was concerned; as the water began to boil back out of the sea, the latter's density increased, and the raft began to float. It was extremely fortunate that there were by then no currents at all; raft and passengers went straight up. Unfortunately, but somewhat naturally, it turned upside down as it went, so that for a couple of hours the robot operator had the annoyance of seeing the natives hanging from the underside of the floating platform while they very gradually led the surface of the ocean back toward the ground. They had drifted away from the hilltop during the night, and eventually wound up floating in a relatively small pool in one of the nearby hollows. When it finally became evident that the pool would shrink no farther, the robot had to take action.

Fortunately, the oleum was shallow—so shallow that the raft was supported more by the bodies under it than by its own buoyancy. Raeker guided the machine through the liquid, pushing the four unconscious natives ahead of it to the other side. The raft naturally came along, but eventually the rather untidy heap was dripping at the edge of the oleum pool, with the foundation members struggling gradually back to consciousness.

By this time the bathyscaphe was also out of the sea. Like the raft, it had wound up in a pool at the bottom of a valley; unlike it, there was no question of its floating. The pool was too shallow. As a result, Easy and her friend found themselves in their pressure-tight castle fully equipped with a moat, which effectively prevented Swift and his crew from reaching them.

For Swift was there. He turned up within an hour of the time the pool had finished shrinking, in spite of the considerable distance the bathyscaphe must have drifted during the night. It was out of sight of the sea, Easy reported; the wind that had been moving everything else

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inland had brought the ship along. It didn't bother her; she said that they were getting along splendidly with Swift, and didn't seem too worried when told about Nick's reverses of the night. Rich lost his temper for the first time when he learned that Raeker had carelessly told the child about the destruction of the camp, and didn't regain it until the girl's voice made it perfectly clear that the story hadn't affected her morale.

Raeker himself was thinking less about her than about his rescue operation, at the moment; that was why he had been so careless with his words. Nick and Betsey, Jim and Jane were all safe; the maps had remained attached to the raft, and so had most of the weapons. However, it was going to take a little while to find just where they were, short as the distance they had drifted probably was; and when they did find the camp site, it seemed rather unlikely that they would find much else. The herd would be gone, or nearly so; the wagon—who could tell? A similar period under an Earthly ocean would write it off completely, even in the off chance that it could be found. Here, there was no saying, but Raeker was not optimistic. Finding the site of last night's fire proved easier than expected. The wind proved to be a clue, when it finally occurred to someone—Jim, rather to Raeker's surprise. He and Jane, of course, had bucked it all the way back from their search areas, though they had not attached any meaning to it at the time; now it served to restore the "sense of direction" which for Tenebrans as for humans was a compound of memory and the understanding of elementary natural phenomena. Once they knew the direction of the sea, there was no more trouble; there was no question that they had drifted pretty straight inland. The wagon and the remains of the watch fires were found in an hour. Raeker was really startled to find it and its contents intact; the mere fact that the two-mile hurricane had changed from gas to scarcely denser liquid had made no difference to most of the solid objects in its path.

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"I think we can save a little time," he said at length, when the status of the group's belongings had been determined. "We can go back to the sea now, carrying the boat with us. We'll leave the cart, with a written message for the others; they can either follow us or start moving camp, depending on what seems best at the tune they get back. We'll test out the boat, and search as far south along the coast as tune permits today."

"What do you mean by that?" asked Nick. "Do we search until dark, or until there's only enough time to get back here before dark?"

"Until nearly dark," Raeker replied promptly. "We'll go south until we decide it's far enough, and then go straight inland from wherever we are so as to get away from the ocean hi time."

"Then the others had better move camp no matter what time they get back, and head south with the cart. We're going to have a food problem, and so are they, with the herd gone."

"Gone? I thought I saw quite a few, with Jim and Jane rounding them up."

"That's true, they're not all gone; but they're down to where we can't afford to eat any until a few more hatch. We couldn't even find scales of the others, this time."

"You couldn't? And I didn't see any creatures traveling around while you were hi the sea, either. It seems to me that your missing cattle are more likely to have strayed than been stolen."

"That may be, but they're gone hi any case, as far as we're concerned. If all four of us are heading for the sea right away to test this boat, we won't be able to look for them."

Raeker thought rapidly. Loss of the herd would be a serious blow to his community; remote-control education cannot, by itself, transform a group of people from nomadic hunters into a settled and organized culture with leisure time for intellectual activity. Without the herd

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Raeker's pupils would have to spend virtually all their time finding food. Still, they would live; and unless Easy and her companion were collected pretty soon *they* probably wouldn't. The question really, then, was not whether any could be spared from the cattle-hunt but whether one or two or all would be more useful in testing the boat and, if the test were successful, subsequently searching for the bathyscaphe from it.

Certainly two people were less likely to sink the thing than four. On the other hand, four could presumably drive it faster—Raeker suddenly recalled that neither he nor Nick had given any thought to the method of propulsion the raft was to have. He supposed paddles or something of that nature would be about the only possible means; the thought of trying to teach Nick the art of sailing on a world where the winds were usually nonexistent and the nearest qualified teacher sixteen light years away seemed impractical. With muscle power as the drive agent, though, the more muscles the better.

"All of you will come to the sea. We'll consider the herd problem later. If the boat won't carry all of you, the extra ones can come back and hunt for cattle. This search is important."

"All right." Nick sounded more casual than he actually felt; all his life, as a result of Raeker's own teaching, he had felt that the safety of the herd was one of the most important considerations of all. If this search were still more so, it must really mean something to the Teacher; he wished he could feel that it meant as much to him. He didn't argue, but he wondered and worried.

The four of them were able to carry the boat easily enough, though bucking the wind made matters a little awkward—the wind was even stronger today, Nick decided. In a way, that was good; a last backward glance at the deserted remnants of the herd showed that a huge floater was being swept past them by the savage current and, in spite of all its efforts, could not beat its way back

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to the relatively helpless creatures. Nick pointed this out to his companions, and they all felt a little better. The two miles to the sea were covered fairly rapidly, and no formalities were wasted in testing the boat. It was carried out into waist-deep oleum and set down, and the four promptly climbed aboard.

It supported them—just. The floats were completely submerged, and the framework virtually so. The difficulty was not one of keeping on the surface, but of keeping more or less level. The four were all of almost the same age, but they did differ slightly in weight. One side of the raft persisted in settling deeper whenever they stopped moving; each time this happened they all, naturally, made a scramble for the rising portion, and each time they inevitably overcontrolled so that the raft rocked and tipped precariously first one way and then the other. It took several minutes and much misdirected action and speech before they learned the trick; then they took longer still to learn the use of the paddles Fagin had told them how to make. The robot itself was not too much use; if it stayed ashore its operators couldn't see things on the raft very clearly, and if it crawled into the sea to any point near the vessel it couldn't make itself heard—the boundary between oleum and air was sharp enough to reflect sound waves pretty completely.

"Why do you have them looking at all?" Aminadabar-lee asked acidly at this point. "The robot can travel along the shore as fast as they can paddle that ridiculous craft, and the bathyscaphe isn't at sea anyway. If

you think those pupils are going to be of any use, why not have them *walk* with the machine?"

"Because, while all you say is true, the kids *are* inaccessible to the natives unless a boat is present. It doesn't seem likely that we'd save time by having Nick and his friends search on foot, and then have to go all the way back for the boat when they found the 'scaphe."

"I see," said the Drommian. Raeker cast a quick glance

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at him. The fellow was being unusually agreeable, all things considered; but the man had no time to ponder possible reasons. Nick and his companions were still too much in need of watching. He spoke over his shoulder, however, remembering Rich's injunction about being as courteous as possible to the big weasel. "There's one thing that might help a great deal, though. You've been talking to your son all along, just as Councillor Rich and I have been talking to Easy; do you suppose he'd be the better for something constructive to do down there?"

"What?"

"Well, if he's as good at picking up languages as Easy was supposed to be, maybe he'd do a better job than she at rinding something out from the cave dwellers. Swift quite obviously knows where both our camp and the bathyscaphe are; it would be most helpful if someone could worm a set of directions out of him for getting from the one to the other."

The Drommian's face was unreadable to Raeker, but his voice suggested what from him was high approval.

"That's the first sensible remark I've heard from a human being in the last five weeks," he said. "I'll explain to Aminadorneldo what to do. There's no point in expecting the human girl to do it herself, or to help him." The diplomat must be credited with what for him was the ultimate in tact, courtesy, and self-control—he had restrained himself from remarking that no human being could be expected to be helpful in a situation calling for intelligence.

He decided to go to the communication room in person, instead of working from Raeker's station—the relay system was efficient, but located in a corner which was rather inconvenient to him for anatomical reasons. Unfortunately, when he reached the other compartment it was even worse; the place was crowded with human beings. Rearing the front half of his long body upward he was able to see over them without any trouble, and discovered

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that the screen of the set tied in with the bathyscaphe was imaging the face of the human child. His own son was also visible, very much in the background, but only the human voice was audible—as usual, he reflected. The men were listening intently to her, and Aminadabarlee quite unthinkingly stopped to do the same before ordering the interfering creatures out of the way.

"No matter how we ask the question, we always get the same answer," she was saying. "At first, he seemed surprised that we didn't know; he's gotten over that now, but still says that Nick and Fagin told him where we were."

"No matter how often you say that, it sounds silly to me," retorted one of the scientists. "Are you sure it's not language trouble?"

"Perfectly sure." Easy showed no indignation, if she felt any at the question. "You wanted to know how he found us so easily, and that's what I asked him. He claims he was given the information he needed by Nick, who had it from the robot, and that's what I told you. I don't remember exactly what was said to that prisoner when Nick's people had him; but you'd better play back the transcript and see what you can get out of it. Either the prisoner himself was able to figure it out from what Nick said to him, or Swift was able to do it from the prisoner's repetition. The first seems to make more sense, to me." There were few flies on Easy Rich. Aminadabarlee wouldn't have agreed with that, of course; her admission that she couldn't remember exactly what had been said in a conversation she had overheard lowered her considerably in his estimation. However, even he couldn't understand, any better than the listening scientists, what the cave dwellers had been able to learn from a brief description of country they had admittedly never seen.

Then an idea occurred to him, and he dropped back to the horizontal position for a few moments to think.

This might really do some good; he almost felt guilty at the  
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thought that he'd left all the serious planning in this matter to the human beings. If they'd only keep quiet for a minute or two and let him get his idea straight— But they didn't. They kept on calling excited remarks and questions to the child so far away.

"Wait a minute!" It was a geophysicist who suddenly came up with a point. Aminadabarlee thought, but he didn't pay enough attention to be really sure. "This may be a little far-fetched; but a lot of fairly primitive peoples on Earth and other places get pretty darned good climate predictors—our ancestors knew when spring was coming, you know, and built places like Stonehenge."

"What's the connection?" Several voices asked this question, though not all in the same words.

"This planet has no weather, in our sense of the word; but its geomorphology goes on at a time-rate which almost puts it in the climate class. I just remembered that Nick's prisoner was told that the bathyscaphe stayed on one lake, motionless, for several days, and only then started to drift down a river to the sea. If we're right about Tene-bran weather, *that must have been a brand-new river!* That information was enough for any native—at least for any one who hadn't been cut off from the history or folklore or whatever the Tenebran equivalent may be of his race. They may never have been right on the scene of that river, but it was close enough to their regular stamping grounds so they could tell where it must lie."

"I'm going to check the lab alcohol," commented one listener. The remark put the proponent of the new idea on his mettle.

"Easy!" he called. "You heard what I just suggested. Ask Swift if it's not true that he knows when things like new rivers and rising hills are going to happen. Ask him how he dares to live in caves in a cliff—which as far as \ any of us can see is apt to be knocked down by a quake 1 any day!"

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"All right," the girl said calmly. Her face vanished from I

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the screen. Aminadabarlee was too furious to notice that she had gone. How dare these little monsters take his very own ideas right out of his mind, and claim them for their own? He hadn't quite worked out the details of his notion, but it was going to be the same as the one the human scientist had broached; he was sure of that. Of course, maybe it was a bit far-fetched—of course it was, now that he thought of it a little more carefully. The whole idea was the sheerest speculation, and it was a pity that the girl had been sent to waste time on it. He'd go in and show its weaknesses to his son, and suggest a more fruitful modification, as soon as he worked out its details—only then did he notice that Aminadorneldo had also disappeared from the view screen; he must have gone with the human girl. Well, that was all right; there was a little more thinking to be done, anyway. He kept at it for fifteen or twenty minutes, scarcely noticing the human conversation around him, until the children reappeared. They reported without preamble and without apparent excitement.

"You seem to be right," Easy said. "They seem surprised that anyone wouldn't know when a place was going to become active in quakes, or when a lake was going to spill, and in what direction. They know it so well themselves that they have a good deal of trouble telling me what they use for signs." The geophysicist and his colleagues looked at each other almost prayerfully.

"Don't let them stop trying!" the first one said earnestly. "Get down everything they say and relay it to us, whether you understand it or not. And we were going to use Raeker's students to learn the crustal dynamics of this planet!"

This irrelevance was the last straw, as far as Aminadabarlee was concerned. Without regard to rules of courtesy, either human or Drommian, he plowed into the communications room, his streamlined form dividing the human occupants as a ship divides water. He brought up in front of the screen and, looking past Easy's imaged face

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as though the girl were not there, he burst into an ear-hurting babble of his own language, directed at his son. None of the men interrupted; the creature's size and the ten-clawed limbs would have given most of them ideas of caution even if they had known nothing of Drommians. As it was, Councillor Rich had

spread some very impressive bits of information through the complement of the *Vindematrix*, so ideas weren't necessary.

The shrill sounds were punctuated by others from the speaker; apparently the son was trying to get an occasional word into the conversation. He failed, however; the older being's speech only stopped when he appeared to have run out of words to say. Then it was not Aminadorneldo who answered.

It was Easy, and she answered in her own language, since even her vocal cords couldn't handle Drommian speech.

"We've already told him, sir. Dr. Raeker asked me to let you know when you showed up; you had just left his room when we got the information to him, and I didn't see you until just now. He's told Nick, and the boat should be as close as they can bring it on the sea well before night. They'll start to bring it inland then; Swift says they should be able to see our lights from the sea, so the robot has started back to the camp to meet the others and start them on the way here."

The Drommian seemed stunned, but remembered enough of his manners to shift languages.

"You had already asked Swift to tell the way from the camp to where you are?" he asked rather lamely.

"Oh, yes. 'Mina thought of it some time ago. I should have told Dr. Raeker or one of you sooner." The news that it had been his son's idea calmed Aminadabarlee considerably; privately, most of the men in the room wondered how much truth the girl was speaking. They knew the effective age of the young Drommian, and they were coming to know Easy.

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"How long will it take to get to you—for Nick, that is?" asked Aminadabarlee.

"Swift thinks by mid-afternoon, on foot; he doesn't know how fast the boat goes, though."

"Did you tell him about the boat?"

"Of course. He was wondering how he could get over closer to the ship here; this pool we're in the middle of is too deep for his people to wade, and they don't seem to swim. I suggested floating over on a raft made of wood, but the wood on this crazy planet sinks, we found out."

"You seem to be getting in a lot of talk with those people. Are you really good at their language?"

"Pretty good, but we're still very slow. If there's anything you want to ask Swift, though, let's have it."

"No—nothing right now," said the Drommian hastily. "You didn't suggest that your friend Swift make a raft of the sort Nick has?"

"I did, but he can't do it. His people can get all the skins they'd need, of course, but they can't make tight enough—I was going to say air-tight—bags out of them. They don't know how to make the glue Nick used, and neither do I. He's waiting until Nick gets here with the boat."

"And then will take it away from him, of course."

"Oh, no. He has nothing against Nick. I've told him who Nick is—how the robot stole the eggs from the place where Swift's people leave them to hatch. I think he may be a little mad at the robot, but that's all right. I've said I'd teach him anything he wanted to know, and that Nick had learned a lot and would help. We're getting along very well." The Drommian was startled, and showed it.

"Did Dr. Raeker suggest all this to you?"

"Oh, no; I thought of it myself—or rather, 'Mina and I did. It seemed smartest to be friends with these cave people; they *might* not be able to hurt the ship if they got mad at us, but we couldn't be sure."

"I see." Aminadabarlee was a trifle dazed. He ended

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the conversation casually and courteously—he had never used toward Easy the mannerisms which were so natural with him when he talked to other human beings—and started to make his way back to Raeker's observation room. The scientists were questioning the girl once more before he was out of the room.

He seemed to be fated to choose bad times to move, that day. He had been in the corridors when Easy had given the bathyscaphe's location to Raeker and Nick; he was in them when the four explorers who had discovered the volcano returned and made their report to their teacher. He had stopped to eat, as a matter of fact, and didn't get back to the observation room until the report was finished. By that time the four natives and the robot were heading south with the cart in tow, answering a ceaseless flood of questions from the scientists, some of whom had been content to use the relay system while others had come down

to the observation room, The bewildered Drommian found the latter compartment almost as crowded as the communication room had been a while earlier, and it took him some time to get up to date from the questions and comments flying around.

"Maybe we could get the distance by triangulation—the wind at camp and 'scaphe must be blowing right toward it."

"But we don't know absolute directions at either place. Besides, the wind might 'be deflected by Coriolis action."

"Not much, on a world like Tenebra. You have it backward, though; the mountain is already on the maps. With a little more data we could use the wind direction to pin down the 'scaphe—That was what the Drommian heard as he came in; it confused him badly. A little later, when he had deduced the existence of the volcano, it made a little more sense; he could see how such a source of heat could set up currents even in Tenebra's brutally compressed envelope. By then it was another question that was perturbing him.

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"How strong do you suppose the wind will get? If it brings the sea farther inland each night, and the sea carries the bathyscaphe with it, how close will those kids be carried to the volcano?"

"I don't think we need worry for quite a while. Wind or no wind, the sea that far inland will be mostly water, and won't float them very far. I'll bet if that thing keeps on, too, there won't even be liquid water within miles of it, by night or day."

"Liquid or gas, it might still move the ship. The difference in density isn't worth mentioning."

"The difference in viscosity is." Aminadabarlee heard no more of that one, either; it had given him something to worry about, and he was good at worrying. He started back to the communicating room at top speed, which for him was high; he didn't want anything else to happen while he was out of touch. He managed to reach his goal without hurting anyone, though there was a narrow escape or two as his long form flashed along the corridors.

The scientists had left Easy for the new attraction, and the bathyscaphe screen was blank for the moment. Aminadabarlee didn't pause to wonder whether the children were asleep or just talking to the cave-dwellers; also, he didn't stop to wonder whether the question he had in mind should be mentioned in their hearing or not. He would have berated Raeker soundly for such a thing; but this, of course, was different.

"Miss Rich! 'Mina!" he shrilled unceremoniously into the microphone. For a minute or so there was no answer, and he repeated the call with what another member of his race would have recognized as overtones of impatience. Few human beings would have caught any difference from his normal tones. This time Easy appeared on the screen rubbing sleep out of her eyes, a gesture which either meant nothing to him or which he chose to ignore.

"Where's my son?" he asked.

"Asleep." Easy would not normally have been so short.

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"Well, you'll probably do. Did you hear that they've found out what caused the wind?"

"Yes; I gather it's a volcano. I went to sleep just after that. Has anyone come up with more news?"

"Not exactly news. It's occurred to some of those human fortune tellers that your ship may be blown a little closer to the volcano each night, until you're in serious trouble. What does your friend Swift think about that? He's supposed to be able to predict what his planet is going to do, and he seems to have been able to find you each morning so far."

"We'll, we certainly can't get there for several days; we can't see the light from the volcano from here."

"You mean *you* can't; it's what the natives can see, and what they think, that counts. Have you asked Swift?"

"No. I didn't know about this until just now. Anyway, I'm not worried; if they'd seen the light they'd have mentioned it—they'd have thought it was the robot. We can't possibly reach the volcano for several of Tenebra's days—certainly not by tomorrow."

"Who cares about just tomorrow? How you human beings ever achieved even the civilization you have is a mystery to me. Intelligent people plan ahead."



"Intelligent people don't usually jump to conclusions, either," snapped the girl, in the first display of temper she had shown since the accident. "I'm not worried beyond tomorrow, because by the end of that day we'll be away from here. Please tell Mr. Sakiro to have the shuttle ready to meet us." She turned her back and walked—stalked, rather—out of the field of view; and Aminadabarlee was too startled even to resent the discourtesy.

## **XII. CAPITULATION; OPERATION; ELEVATION**

EASY was awake again by the time Nick reached the bathyscaphe. He had had no trouble finding it; the glow from its lights was quite visible from the coast. The wind was blowing straight toward the light, but Nick and his friends knew nothing of the volcano at the tune and didn't have to worry about whether they were heading for the right light. They came ashore, shouldered the raft, and headed for their beacon. Fagin and the other four pupils had arrived before them; travel on foot was a good deal faster, even for the robot, than by the decidedly clumsy raft. Swift seemed to be in a very tolerant mood. He didn't actually greet the newcomers effusively, but he was talkative enough. He took for granted that they were *his* people—people who had gone a trifle astray, and didn't always know just how to behave, but who might be expected to grow up properly if given time. As long as they treated him as chief, it seemed likely that there would be no trouble.

Within a few minutes of the arrival of John, Nancy, Oliver, Dorothy, and the robot, he had demanded to be shown how to make a fire. Easy, with her two-second advantage in reaction time, told John to go ahead before Raeker even knew the order had been given. John, knowing that the person in the bathyscaphe was one of his teacher's race, obeyed without question. He took out

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his friction gear and had a blaze going in two or three minutes.

Swift then demanded to be shown how to work the device himself; and by the time Nick, Betsy, Jim and Jane arrived with the raft the chief had succeeded in lighting his own fire and was in the highest of spirits. This was more than could be said for anyone on the *Vindematrix*. Aminadabarlee was more than ever convinced that human beings were an ugly-tempered, uncooperative lot; and just now he had more than the usual reason for his opinion. Every human being in the ship was furious with the Drommian, taking their lead from Easy Rich. A night's sleep had not restored her usual sunny temper; she was indignant at the alien's insults of the evening before, and not only refused to explain to Aminadabarlee her justification for saying she would escape within a Tenebran day, but would say nothing more about it to anyone for fear he would hear. It was a childish reaction, of course; but then, Easy was a child, for all her adult speech and mannerisms. Her father had been asked to persuade her to talk; he had stared at her imaged face in the screen for a moment, but no word was spoken. Something must have passed between them, though, for after a moment he turned away and said, "Please have Mr. Sakiro get the shuttle ready to meet the bathyscaphe. I understand it takes some time to install and adjust outside boosters." He promptly left the room, ignoring the questions hurled at him, and disappeared into his own quarters.

"What do we do?" The question was not in the least rhetorical; the geophysicist who put it was a close friend of the Rich family.

"What he says, I should think," answered another scientist. "Rich seems to be sure the kid knows what she's talking about."

"I know he's sure; but does *she*? He's her father; she's all the family he's had for ten years, and he's done a

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marvelous job of bringing her up, but he sometimes overestimates her. She convinced him, just then, that everything is all right; but I don't—we don't know. What do we do?"

"We do just what he asked," pointed out another. "Even if the kid's wrong, there's no harm in having the shuttle ready. Why is everything so shaken up?"

"Because we know what will happen to Easy and her father if she's wrong," replied the geophysicist. "If she's been speaking from her own knowledge, fine; but if that ten-legged weasel made her lose her temper and shoot her mouth off so as to justify her actions—" He shook his head grimly. "She believes her own words *now*, all right, and so does her father. If they're disappointed—well, the kids have stayed alive down there so far because

of the self-control of the Rich family." He ended the discussion by cutting in another phone circuit and transmitting Rich's request to the engineers.

Raeker had been eating and, occasionally, sleeping in the observation room; he'd forgotten by now how long he had been there. The robot was rather out of things, but he could still watch. His pupils seemed to have been re-absorbed into Swift's tribe, and were being told what to do alternately by the chief himself and by Easy in the bathyscaphe. Nobody was asking Fagin what to do or how to do it, but in spite of this things were happening almost too fast for Raeker to keep track of them. He knew that Easy had had an argument with Aminadabar-lee, though he wasn't clear as to the details; he had been told about her promise to be off the ground the next day, but had no more idea than anyone else how she expected to do it. He had had his share of Aminadabarlee's temper, for the Drommian had not by any means been silenced by Easy's flare-up, and had spent some time pointing out to Raeker the foolishness of separating his pupils from their own culture, and how much more would have been learned about Tenebra if contact had been made with

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Swift's people in the first place. Raeker had not actually been rude, but his answers had been rendered vague by his preoccupation with events on the ground, and he had thereby managed to offend the lutroid more than ever. He knew it, but couldn't bring himself to worry seriously about the prospect of severed relations between Sol and Dromm.

He knew in a general way what people were doing on the ground, but he couldn't understand all of it, and no one bothered to tell him. It never occurred to Raeker that this might have been at Easy's request; that she might be going to extremes to make sure that nothing like useful information got back to the *Vindematrix* and the being who had angered her so. He could only watch, photograph, record what conversation he could hear, and try to interpret what went on.

The raft was launched, and Nick and Betsey took Swift out on the surface of the pool to a point just outside one of the bathyscaphe's observation ports. Raeker could see the meeting between Tenebrans and the ship's two occupants^ but could not hear their conversation— Easy was, of course, using the outside speakers, and the robot was too far away to hear these directly. The talk was long, and quite animated, for the gestures of all parties concerned could be seen—the port was large enough to let Raeker see fairly well into the 'scaphe even from the robot's vantage point. He tried to interpret the motions, but had no luck. Conversation did not end until nearly night; then the raft returned to the shore, and everyone began to pack up. A dozen cave dwellers helped carry the raft, others helped pull the cart. For the first time, Swift paid attention to the robot; he ordered it to come along, using Nick as an interpreter. Raeker agreed briefly; the journey was obviously to escape the sea, which would presumably come at least as far inland tonight as it had before.

"Where will the big ship go tonight?" he asked, more

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to secure a demonstration of the cave people's abilities than because the answer made any difference to him. He rather expected Swift would not bother to answer, but title chief was in a very good humor— everything had been going just as he wanted it all day. Once the group was under way, he walked beside the robot and talked quite cheerfully. Nick relayed his words, and he described in great detail the country which they were approaching and the point to which he expected the bathyscaphe to be washed. He also explained his reasons for this opinion, and the geophysicists listened, took notes, and watched with motherly care the recorders which were storing the conversation. For the first hour or two of that night there was more general happiness than the region of Altair had experienced for decades. About the only people not sharing in it were Aminadabarlee and Raeker.

Swift stopped his cavalcade after a scant two hours of rather slow travel. Night had fallen, and the rain was starting to do likewise; he set everyone to work gathering firewood, and ordered Nick to place the guard fires for a camp. Nick and his fellows obeyed without argument; Raeker suspected that they were human enough to enjoy the chance to show off their knowledge. Cave dwellers were at each of the fire sites practicing with friction drills, and one by one the piles of fuel began to glow.

For sixteen years, the lighting of the evening fires had been a signal for a forty-eight-hour period of relaxation on the *Vindematrix*, since nothing but rain ever happened at night on Tenebra. Now that was

changed; discussion, sometimes verging on argument, went on full tilt. The engineers were busy festooning the outside of the shuttle with hydroferron boosters and their control lines. The diplomats wouldn't have been speaking to each other if they had followed their personal inclinations, but professional pride kept them outwardly courteous. People who knew them, however, listened to their talk very uneasily, and thought of jammed reactor control rods.

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A few enthusiasts kept watch through the robot's eyes, partly in the hope that something would happen and partly to keep Raeker company. The biologist refused to leave the observation room; he felt sure that matters were building to some sort of climax, but couldn't guess just what sort. Even during the night this feeling grew worse—particularly at such times as he happened to see or hear one of the diplomats.

Actually, Raeker was suffering badly from a sudden lack of self-confidence; he was wondering how he could possibly teach his students to make the necessary repairs on the bathyscaphe, even if they chose to listen to him. If they wouldn't, or couldn't, he didn't want to see or hear of Rich or Aminadabarlee again; he had convinced himself, quite unjustly, that his own arguments had caused them to pin their faith in him and not undertake any other steps toward a rescue.

In spite of the anxiety which let him sleep only for moments at a time, he managed to get through the night. The departure of the shuttle distracted him for a few minutes—at one point he almost convinced himself that he should go along with it, but common sense prevailed. Several times incidents occurred at the camp, and were pictured on the robot's screen, which would have made him laugh under different circumstances. The cave dwellers were not at all used to fires yet, and had some odd ideas of their properties, uses, and limitations. Several times Nick or one of the other human-educated natives had to make a rescue as someone ran blithely into the dead-air zone of a boiled-away raindrop to relight a fire. When they finally realized that a newly destroyed raindrop was like a newly boiled lake in the early morning, some of them took to waiting a long time before venturing near the extinguished fires, so that the fuel cooled too far to let the blaze spring back to Me at the mere touch of a torch. Several of them grew worried about the fuel supply, which the experienced group had pronounced sufficient, and kept trying to persuade Swift to organize

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wood-collecting parties. Raeker could not, of course, understand these requests, but he heard a couple of his own people commenting on them with something like contempt in their voices. This made him feel somewhat better; if his pupils felt that way about the cave dwellers, perhaps they still had some attachment for their teacher.

Morning finally came without any serious incident in camp or at the bathyscaphe; and once the hill on which the camp was located ceased to be an island—it had been surrounded by the usual rainfall, but not by ocean, as far as anyone could tell—the group headed for the spot where the bathyscaphe was expected to be. This meant a walk nearly as long as that of the previous night, since Swift and his people had expected little motion on the part of the stranded machine. Raeker didn't know whether Easy had reported any drifting; he hadn't heard her voice very often during the last forty-eight hours.

Raeker himself wasn't sure how far to believe the predictions of the natives, and wasn't sure how far he wanted to believe them. If they proved right, of course, it would mean a lot to the geophysicists; but it might also mean that Easy had some grounding for her optimism about the day's events. That was good only *if* it was *solid* grounding; and Raeker could not for the life of him imagine how the girl expected the machine to be either flown, blown, or carried up to a point where the shuttle could meet it. On the few occasions that he had dozed, his sleep had been troubled by wild nightmares involving volcanoes, floaters, and forms of sea life whose shapes never became quite clear.

There was no question of how the geophysicists felt when the predicted spot was reached and the bathyscaphe found to be absent. They buzzed like a swarm of bees, hurling hypotheses at each other with scarcely time to listen to their neighbors. Aminadabarlee fainted, and constituted an absorbing first aid problem for several minutes until he revived by himself, none of the men having the

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slightest idea of what to do for him. Fortunately, the ship turned up after a quarter of an hour's search

exactly where it had been left the night before, which made things easier on the fathers but left many human beings and quite a few Tenebrites rather at a loss for an explanation. The sea had certainly been there; Easy had reported as much. Apparently its transporting power had been lower than expected. Some of the scientists pointed out that this was obvious; this much farther from its natural bed, the sea would be correspondingly more diluted with water. It satisfied him and some of his friends, but Rae-ker wondered how a slightly greater dilution of something which must already have been pretty pure H<sub>2</sub>O, as pure water went on Tenebra, could make that much difference. He wondered what excuse Swift was using, but couldn't find out.

Nor could he find, except by guesswork, the nature of the plan that was being executed before the robot's eyes.

Hunting parties—judging from their armament—were sent out in great numbers, each one accompanied by one of Fagin's pupils with his axe. The raft made trips to the bathyscaphe, and Swift and several others examined its surface with great care; Easy seemed to be talking to them while this went on, but Raeker and his companions couldn't hear what she said. The natives were greatly interested in the hot area at the top of the vessel, where its refrigerators pumped back overboard the calories they had drawn from the living quarters; they started to climb up the hull, by means of the numerous handholds, to examine this more closely. This act, since the craft was circular in cross section and just barely not floating, started the whole vessel rolling toward the raft; the climbers dropped back hastily. One of them fell into the lake, lost consciousness before he could grasp the paddles thrust down to him, and had to be shoved clumsily into shallow oleum by his fellows lying on the raft above him. This brought the raft itself closer to the robot, and Raeker

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was able to hear Nick remark to Betsey, "This will save a lot of time. If the teachers inside don't mind, we can *roll* that thing over here where we can work on it."

"We may do it whether they mind or not, if Swift gets the idea," was the reply. "We'd better ask in English first."

"Right. Let's get back out there." The two slid the raft back into the pool and paddled back toward *the* stranded vessel. This time Raeker knew what the conversation was about even though he couldn't hear it, and he knew how it came out—he could see Easy nod her head in assent. It was several seconds before a frightening thought struck him, and made him call the engineering department.

"Will turning that bathyscaphe over do any harm?" he asked without preamble. "The natives are planning to roll it out of that pool."

The men at the other end exchanged glances, and then shrugged at each other.

"Not as far as I can think at the moment," one of them said. "The ship was designed to fly, and it was assumed that inverted flight might be necessary. The kids may be bumped around a bit, and anything they've left loose will tumble, but nothing vital should suffer."

"Thank goodness for that," Raeker said feelingly, and turned back to his screens. The raft was on its way back to shore, and Nick was calling something to Swift. Raeker could catch only a word or two, since the native language was being used, but he could tell easily enough what was being discussed. Swift got aboard as soon as the raft reached wading depth, loading it to capacity. Back at the bathyscaphe, he and Betsey seized the handholds on the hull and began carefully to climb, Nick staying on the raft to keep it out of the way. Raeker expected some more accidents, but the climbers showed surprising skill and coordination, keeping just above the liquid surface as the ship slowly rocked toward them. It was lucky that the handholds extended all over the hull; Raeker was sure

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they hadn't checked this point before starting their stunt.

A quarter turn brought the hot "exhaust area" into contact with the pool, and set the oleum bubbling furiously— or as close to bubbling as anything could come under Tenebra's atmospheric pressure. There was enough disturbance to attract the attention of the natives on the ship, but not to be visible from shore. Two full rolls brought her to wading depth, and robbed her of enough buoyancy to make another climber necessary. Three turns brought her right side up at the shore line. A slight complication arose when the

climbers dropped off and she started to roll back, and for the first time Raeker was able to make himself heard and listened to; he gave some rapid advice about placing chocks, which Nick heeded. With the hull stable and the children staring out at the robot a few yards away, Raeker thought he might learn what was going on, and he used the machine's speaker.

"Hello, Easy. We're finally together."

"Hello, Doctor. Yes, your people are here. I thought we'd be able to do without them, but they've been a big help. Are you staying to watch the rest?"

The question startled the biologist, to put it mildly.

"Staying? We're just starting to work. I'll call the engineers and have them listen in while I explain the electrolysis circuits to Nick and the others; they'd be here now, only I didn't expect the ship to be available quite so quickly. We'll find whatever wires are corroded or disconnected, and—" Easy must have started talking before he got that far, but the transmission lag delayed his hearing her interruption.

"I'm sorry, Doctor, but I'd rather not have Nick fooling with the ship's wiring. I don't understand it myself, and I don't see how he possibly can keep from making mistakes. We're going up shortly, anyway, so please don't let him get into any of those inspection ports, if they're really open." The girl spoke as pleasantly as ever, but

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there was a note of firmness which no human being who heard her could mistake. Raeker was surprised, and then indignant.

"What do you mean, you'd 'rather not' have Nick work? Who else can? If you think he's ignorant of electricity, what good will it do for you to take over—or Swift? This plan has been under way for weeks, and you can't—"

"I don't care how long it's been organized, and I *can*" replied the girl, still politely. "Swift will do what I ask, and Nick will do what Swift orders. We're going to try Swift's idea first; I'm sure it will work, but if it doesn't perhaps we'll think about yours again."

Raeker looked around helplessly; the kid was right. There was no way in the universe for him to enforce his will. Maybe her father—no; Rich was listening in the communication room, and the relay screen showed something like an expression of satisfaction on his face. The biologist surrendered.

"All right, Easy. Will you tell me what this plan of Swift's is? And how, if you don't trust me and Nick, you can possibly consider an ignorant savage like one of these cave dwellers worth listening to?"

"Your scientific friends do," Easy replied pointedly. "If I tell you, 'Mina's father will hear, and he<sup>1</sup>!! start thinking of things wrong with it, and that'll get Dad worried. You just watch; it won't be long now."

"How does your young friend feel about not telling his father?"

"He doesn't mind, do you, 'Mina?"

"No," piped the young Drommian. "Dad told me to do what Easy said, and besides, he was rude to her. We'll show him!"

Raeker raised his eyebrows at this, and somehow felt a little happier about the whole matter. If someone was going to make a fool of Aminadabarlee . . .

And then Swift's plan became perfectly obvious. A

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group of hunters reappeared, towing among them the helpless form of a floater. The dangerous tentacles of the creature had been removed—it was obvious now why an axeman had accompanied each group—and enough of its gas cells punctured so that it could be held down; but some were still intact, and their intended use could easily be seen.

The hydrogen cells of the bathyscaphe possessed, naturally, pressure-equalizing vents on the lower side of the hull. While these vents opened into the cells on the wrong side of the plastic membrane designed to prevent hydrogen and air from mixing, the other side also had a plastic tube extending down to the same vent, for relief if too much electrolytic hydrogen was run into the cell. This tube was normally held shut, or rather flat, by outside pressure; but it was perfectly possible to push another tube into it from outside, and run gas or liquid into the compartment. This the natives proceeded to do; Raeker wasn't sure of the nature of the tube, but there was nothing surprising in their being able to improvise one. There must have

been a good deal of gas wasted in the transfer process, but this didn't seem to bother anyone. There were, after all, plenty of floaters,

"I see," he said through the robot after a few minutes. "But I think I see a catch."\*

"What?" Easy snapped the question with a speed which suggested she had some doubts of her own.

"That ship was computed around the lift of hydrogen. How do you know that stuff you're using will lift you high enough for your boosters to work, even if an engineer gets aboard to—"

"What makes you think this gas isn't hydrogen?\*"

"What makes you think it is?"

"What else is lighter than water, in the gas state, that's likely to be found on this planet?"

"Why, lots of things, I guess—I—I don't know; I

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hadn't thought of that." Realization struck him. "You've been talking to the engineers!"

"Of course. I don't mean to be rude, but where else could I learn *anything* useful about this ship? I'll admit you know the planet, but that wasn't enough."

"I see," said Raeker slowly. "I hadn't thought as much as I should about the machine; but I did ask the engineers about its wiring—and say! won't you need that anyway? What are you going to do when they get enough gas into your cells to lift the ship out of their reach, but not enough to get you any higher? Hadn't you better have them tie the ship down, at least? You'd better wait until we—"

He was interrupted by laughter. It didn't come from Easy, who had looked impressed for a moment, but from the scientists in the observation chamber. Raeker realized that they were laughing at him, and for a moment was furious; then he realized he had asked for it. He put the best face he could on the matter while one of them carefully explained a little elementary physics.

And that, really, was all. Nick put to use the knowledge he had picked up in balancing on the experimental float, and made sure there were always more forward cells full than after ones. When the ship lifted, it naturally rode the wind toward the volcano; and it rose so slowly at first that the children had a good look at the terrifying sight. They dipped frighteningly toward the glowing mountain as it entered warmer air, but recovered in ample time as the hydrogen in its cells also warmed up. Gradually the glow faded out below them, and Easy and her friend waited happily to meet the shuttle.

#### EPILOGUE: COOPERATION

"I told you human beings were helpless and useless." Happy as he was, Aminadabarlee gave up his ideas with difficulty. "You spend weeks trying to rig a rescue, and then are outsmarted by a savage with less education than either of these children. You spend a decade or two training agents of your own on the planet, and learn more useful facts in a week from natives you never bothered to contact directly."

"Natives who would have tried to eat the robot if any such attempt had been made," Easy pointed out.

"Remember, 'Mina and I know Swift. He respected the, robot because it could talk and tell him things. He'd have ignored it or destroyed it otherwise."

Aminadabarlee's eyes sought his son, who made a gesture of agreement. "Well, anyway, the natives with their own culture are a lot more use, and I'll prove it soon enough."

"How?" asked Raeker.

"I'll have a Drommian project here in three months. We can talk to Swift as well as you, and we'll see who learns more about geophysics in general and Tenebra in particular after that."

"Wouldn't it be more profitable to run the projects jointly, and exchange information?"

"You'd certainly have to say that," sneered the non-human. "I've had enough of cooperation with human beings, and so has the rest of Dromm, if my opinion's good for anything. You learned Swift's language, didn't you, son?"

"Yes, Dad, but—"

"Never mind the but. I know you like Easy, and I suppose she's a little less poisonous than most human beings after the time she spent with you, but I know what I'm talking about. Here—use the robot voice and

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call Swift over to it; you can say something to him for me."

"But I can't, Dad." Even the human beings could see that the youngster was uncomfortable.

"Can't? What do you mean? You just said you'd learned enough of their language—"

"Oh, I understand it well enough. I just can't speak it."

"You mean you just listened, and let that human girl do all the talking? I'm ashamed of you. You know perfectly well that no chance to learn the use of a new language should ever be missed."

"I didn't miss it, Dad." Aminadabarlee seemed to swell slightly.

"Then, in the name of both suns, tell me what you did do!" His voice came closer to a roar than anyone in the room had ever heard from him. Aminadorneldo looked a little helplessly at Easy.

"All right, 'Mina," the girl said. "We'll show him."

The two took their places before the microphone, which Easy snapped on. Then, keeping their eyes fixed on each other, they began to speak in unison. The sounds they produced were weird; sometimes both were together, sometimes the Drommian carried a high note alone, sometimes Easy took the deeper registers. A similar sound, which Raeker recognized perfectly well and understood slightly, came from the speaker; Easy started an answer, using her hands to guide her "little" companion on what words were coming next. They had apparently worked out a fairly satisfactory deaf-mute code between them; and while they spoke much more slowly than Swift, they were obviously perfectly clear to the native.

"He's here, Councillor," Easy remarked after a moment. "What did you want to say to him? This particular translating team is ready to go to work. I do hope you'll forgive 'Mina for cooperating with a human being. There really wasn't any other way, you know."

Nobody laughed.