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THE HIGH CRUSADE, By Poul Anderson
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COVER BY VAN DONGEN
Illustrations by Bernklau, Schoenherr and van Dongen

VOL. LXV
NO. 5
JULY 1960

Astounding Science Fact & Fiction published monthly by Street & Smith Publications, Incorporated, at 575 Madison Avenue, New York 22, New York. Arthur Z. Gray, President; Robert E. Park, Vice-President and Advertising Director; Thomas H. Kaiser, Secretary-Treasurer.

Second-class postage paid at New York, New York and at additional mailing offices. Subscription $5.00 for one year, $9.00 for two years, and $12.00 for three years in the United States, possessions and Canada; $6.25 for one year, $11.00 for two years, $14.50 for three years in Pan American Union, Philippine Islands and Spain. Elsewhere $6.50 for one year, $11.50 for two years, and $15.00 for three years. When possible allow four weeks for change of address. Give old address and new address when notifying us. We cannot accept responsibility for unsolicited manuscripts or art work. Any material submitted must include return postage. All subscriptions should be addressed to Subscription Department, Street & Smith Publications, Incorporated, Boston Post Rd., Greenwich, Connecticut.

Send notice of undelivered copies on Form 3579 to: Astounding Science Fact & Fiction, McCall Street, Dayton 1, Ohio.

Printed in the U. S. A.

NEXT ISSUE ON SALE
JULY 19, 1960

$5.00 per Year in U. S. A.
50 Cents per Copy

UNIMAGINABLE REASONS

IT'S FAIRLY natural to feel that, if a thing is reasonable, an intelligent, reasonable person can understand the reasons behind it. The resultant syllogismic type thinking taking off from that postulate is, I suspect, one of the major sources of human conflict. "If what you want to do is reasonable, and, you claim, I can't understand it, then you are maintaining that I am unintelligent, unreasonable, and incapable of learning. You are insulting my intelligence!"

And that sounds so logical, so reasonable, really . . .

The process of growing up is full of frustrating, embarrassing, and distinctly painful discoveries about the nature of unimaginable—and hence incomprehensible—reasons. The discomfort of those frustrations, embarrassments and painful discoveries is sufficient to make us prefer not to recall that, within our own, inner, personal experience, we have instance after instance of perfectly valid and perfectly unimaginable reason situations.

The small boy, in angry frustration at his arbitrary, dictatorial, unreasonable parents, promises himself "When I grow up and they can't oppress me this way, I'm going to have all the ice cream I want! I'll have ice cream for breakfast and lunch and dinner. And I'll *never* eat those doggone vegetables!"

So he grows up and breaks his promise to himself. He eats vegetables two meals out of three, and has ice cream perhaps twice a month. And his reasons remain utterly unimaginable to the small boys around him.

And, at forty, he's appalled at the insane appetite his fifteen-year-old son displays. The boy must be sick; there is no imaginable reason for the boy to consume two large slabs of roast beef, four potatoes, three slices of bread, two glasses of milk, and then ask hungrily about dessert.

Of course it's unimaginable to a forty-year-old man. Medical researchers did some experiments, however,

and found that fourteen to seventeen year old boys could consume, *and utilize,* literally any given quantity of food, up to and including six thousand calories a day. To eat six thousand calories of food in twelve hours of waking time requires nearly continuous operation of the jaws, which explains the teen-age tendency to eat on the run. A lumberjack felling trees in the north woods in midwinter consumes about four thousand calories a day, just by way of comparison.

However, there are two broad classes of promises to self; the "Some day I will . . ." class, and the "I'll *never* do that sort of thing!" The latter type is apt to be the source of more direct self-induced mental anguish; after all, the "some day I will . . ." type has the characteristic that even fifty years later, there still could come that some day, so you haven't certainly failed your self-promise. But the "I *never* will . . ." is smashed the first time you do.

Typical of the "I'll never do . . ." is the twelve to fourteen year old boy's repugnance reaction to "that mush about girls"—something he knows he'll *never* lower *himself* to.

When in the course of time he does act in that repugnant manner—he does so for completely unimaginable reasons. At least—they are, and forever will remain, unimaginable and uncommunicable for a twelve to fourteen year old boy. He has to stop being a pubescent boy before it becomes possible to imagine those reasons.

It is just as impossible to explain to a true barbarian that he is not a gentleman; the validity of the gentleman's motivations are unimaginable reasons to the barbarian.

Time and again, the achievement of a longed for ability, power, freedom, whatever it may be, carries with it such side effects of broadened comprehension that the original motivation for seeking the power is frustrated by its achievement. The boy who longs for the time when he'll be big, strong, and smart enough to defeat his dictatorial, arbitrary old man . . . finds that, in the process of achieving that state, he has, somehow, also acquired the realization that the old man was fundamentally right. Now he has the power to defeat him —and has lost the motivation.

The peasant sees the king ride by, and dreams "If I were king, things would be different! I'd have all the women I wanted—a new one every night! And people would do what I said, and no arguments with me, or I'd kill 'em! I'd have all the money I wanted, and . . ."

And the king, riding by, is being told by his finance minister that he can *not* go on supporting that astrologer with his plan to map all the stars in the sky, because the wheat crop in the South province failed, and the people there face ruin. It's a one-crop economy, and His Majesty was told again and again that that province *must* be made to give up that stupid system.

And the king sighs; Baron Garmil, whose province it is, is an utterly, unswervingly honest man—and as utter-

ly and fanatically bull-headed as most utterly honest men tend to be. He is, also, far and away the most brilliant military strategist in the realm—and, in all honesty, probably the most brilliant in the current era. The finance minister sees the necessity of changing the South Province; the king sees the impossibility, because it can be done only over Garmil's dead body. And (1) it's doubtful that anyone can achieve that, and (2) Garmil's too necessary to the realm anyway.

Complicating the king's effort to think that one out is a pretty little bit of fluff who persists in chattering at all the wrong moments, and has been trying to crawl into the royal bed for the last week, to the king's weary annoyance.

The small-boy-grown-up *does* eat all the ice cream he wants, just as he promised himself . . . only he wants very little. And just as the peasant visualizes it, the king does have all the women he wants—save that the king wants only one, for reasons quite beyond the peasant's imagining.

There's an extension of this consideration that fits in with an old problem of science fiction. From what we now know of the Universe, there must be, in this galaxy alone, millions of life-bearing planets. Our Solar System appears to be approximately five billion years old; from what we now understand of stellar evolution, Sol must be a "second generation sun." That is, the gas-and-dust cloud from which Sol condensed, must have been debris blasted out from an exploding older star—or stars—which had already run through most of its multi-billion-year life cycle. Recent astrophysical research has found some stars within this galaxy that appear to be between twenty-five and fifty billion years old.

Other life-bearing planets must have existed in this galaxy not just a few million years earlier, but entire stellar lifetimes earlier.

Why haven't they found us, long since?

If the stars are accessible, if interstellar flight is possible, somewhere, somewhen, in the multi-billion-year research efforts of intelligent life, someone must have achieved it. Why haven't they found us, and communicated with us?

For unimaginable reasons, of course.

But we may be able, now, to see some of the not-reasons that exist where we thought there were, "of course," reasons why they should.

The question has almost always been phrased, "Why don't they contact us?" It may resolve better if we ask, instead, "Why should they?"

Intelligent entities are curious.

Well, that's a good, sound reason of course . . . but that doesn't require *open,* or two-way communication, does it? If one of every hundred million missing persons was missing for unearthly reasons, the high-level aliens would be fully informed. In 1850, a chemist might have needed at least half a pound of a substance to make a definitive analysis of it; today, rubbing a piece of ground glass across

the surface of the main mass of metal alloy provides an adequate analytical sample. The smear on the glass is readily analyzed.

It's our curiosity, not theirs, that goes unsatisfied.

But how about the planet itself; wouldn't an intelligent, dynamic race want the planet?

Why? For minerals? Given full, free access to, and use of, space—which must be assumed if we assume interstellar aliens—the requirements for minerals are far more readily fulfilled by asteroids and similar cosmic debris than by laboriously carving through a planetary crust.

"If you're so smart, why aren't you rich, huh?"

Maybe because I've got better sense than to waste my time keeping track of wealth for which I have no need? Maybe because my concept of "wealth" is quite unimaginable to you? Maybe I don't strive to achieve possession of real estate because I have no need for it, nor want it. Maybe the aliens simply don't want planets —this, or any other, save perhaps that unique-in-all-the-Universe individual world on which their species originally evolved.

It needn't be so different from Earth as to have a methane-ammonia atmosphere, either. The air we breathe, the good smell of sweet, fresh air—this is the metabolic product of countless plants and animals that have spent some billions of years evolving together. Perhaps, to an alien from another oxygen-water planet it smells approximately like a burning garbage dump. Out in the middle of a major ocean, you don't get that odor we identify as "the smell of the sea"; the odor apparently comes from the mud and its inhabitants along the continental coasts.

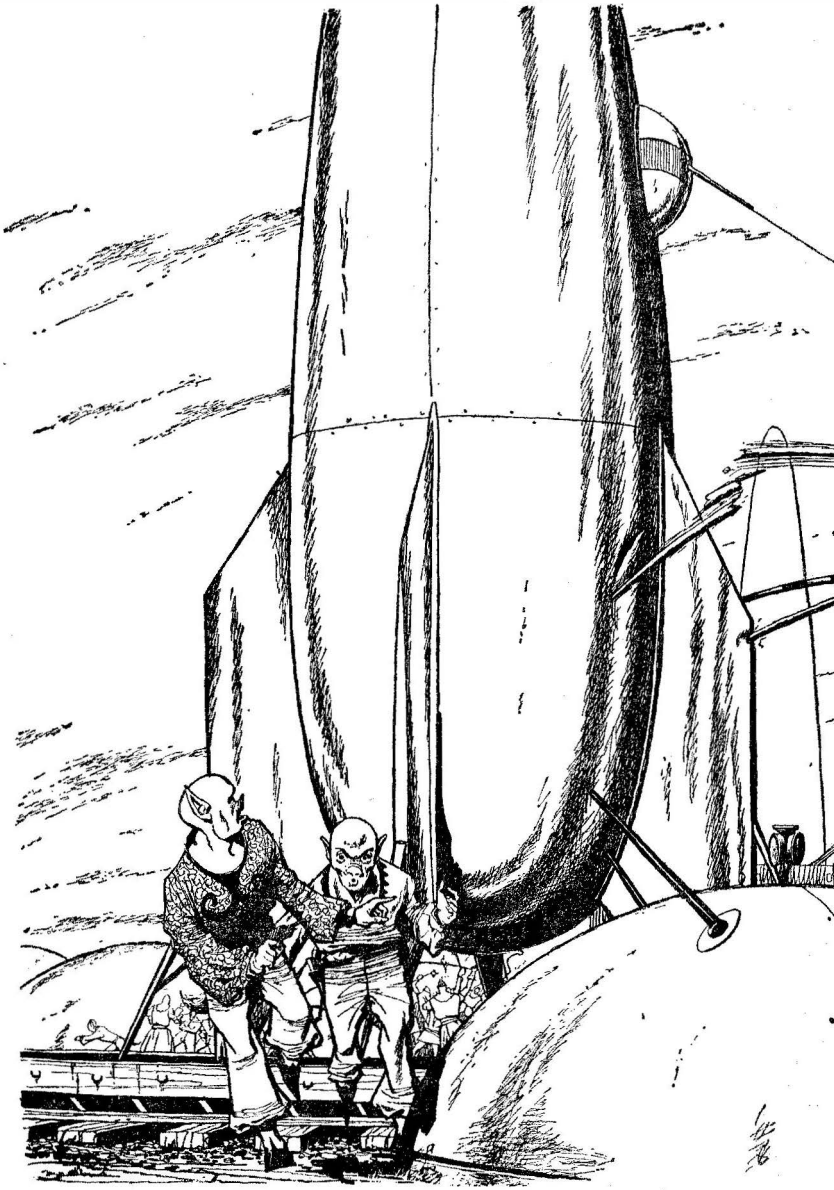
Two motives standard in BEM-style science fiction can be dismissed quickly. Aliens aren't going to invade Earth, and breed human beings for meat animals. It makes a nice background for horror-fantasy, but it's lousy economics. It takes approximately ten years to raise one hundred pounds of human meat, and at that it takes high-cost feed to do it. Beef cattle make better sense—even though that louses up the horror motif.

And that is, of course, assuming the improbable proposition that the aliens' metabolism can tolerate terrestrial proteins at all.

If they can, of course, it's much easier to get local natives, ideally adapted to the planet's conditions, to raise the cattle. Inherently much cheaper than trying to do it yourself. Besides, the local yokels can be paid off in useless trinkets like industrial diamonds, or tawdry little force-field gadgets, children's toys that won't cut anything with any accuracy better than a microinch.

Then there's the old one about raiding Earth and carrying "Earth's fairest daughters" away as love-toys on some alien planet. Possible motive . . . if you'd define "fairest" adequately. If the aliens happen to come from a bit heavier planet, the proposed raids on "Earth's fairest daugh-

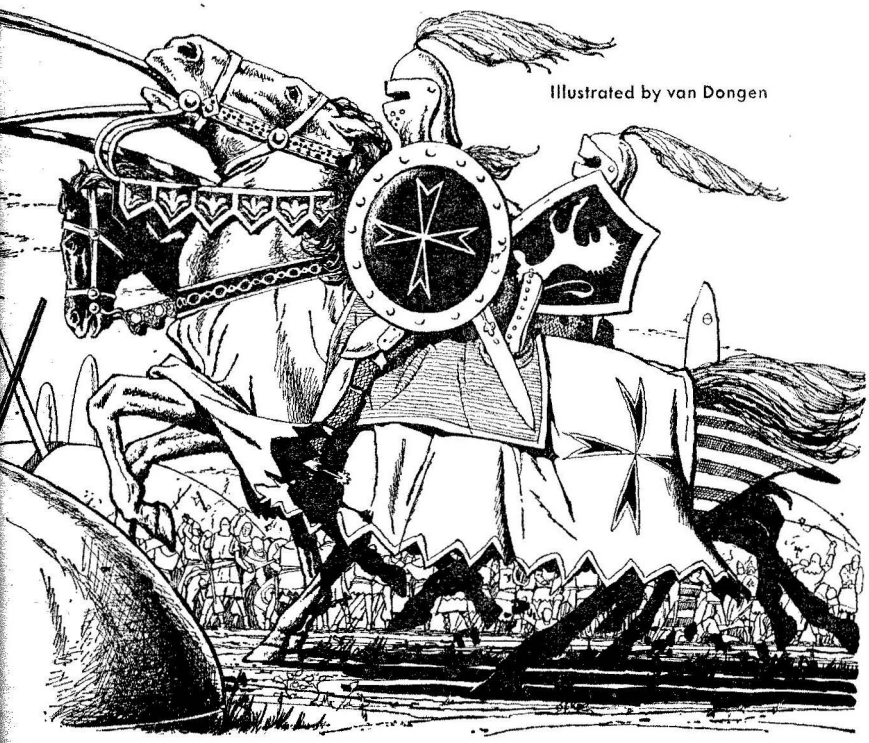
(*Continued on page* 175)



THE HIGH CRUSADE

By POUL ANDERSON

It is easy—but markedly dangerous—to consider that ignorance, stupidity, and folly are the same thing. The invading aliens naturally knew ignorance when they saw it. . . .



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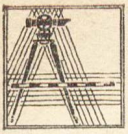


S THE captain looked up, the hooded desk lamp threw his face into ridges of darkness and craggy highlights. A port stood open to alien summer night.

"Well?" he said.

"I've got it translated, sir," answered the sociotechnician. "Had to extrapolate backward from modern languages, which is what took me so long. In the course of the work, though, I've learned enough so I can talk to these . . . creatures."

"Good," grunted the captain. "Now maybe we can discover what this is all about. Thunder and blow-up! I expected to come across almost anything out here, but this—!"

"I know how you feel, sir. Even with all the physical evidence right before my eyes, I found it hard to believe the original account."

"Very well, I'll read it at once. No rest for the wicked." The captain nodded dismissal and the sociotech departed the cabin.

For a moment the captain sat motionless, looking at the document but not really seeing it. The book itself had been impressively ancient, uncials on vellum between massive covers. This translation was a prosaic typescript. Yet he was nearly afraid to turn the pages: afraid of what he might find out. There had been some stupendous catastrophe, more than a thousand years ago; its consequences were still echoing. The captain felt very small and alone. Home was a long ways off.

However—

He began to read.

I.

Archbishop William, a most learned and holy prelate, having commanded me to put into English writing those great events to which I was a humble witness, I take up my quill in the name of the Lord and my patron saint: trusting that they will aid my feeble powers of narrative for the sake of future generations who may with profit study the account of Sir Roger de Tourneville's campaign and learn thereby fervently to reverence the great God by Whom all things are brought to pass.

I shall write of these happenings exactly as I remember them, without fear or favor, the more so since most who were concerned are now dead. I myself was quite insignificant, but since it is well to make known the chronicler that men may judge his trustworthiness, let me first say a few words about him.

I was born some forty years before my story begins, a younger son of Wat Brown. He was blacksmith in the little town of Ansby, which lay in northeastern Lincolnshire. The lands were enfeoffed to the Baron de Tourneville, whose ancient castle stood on a hill just above the town. There was also a small abbey of the Franciscan order, which I entered as a boy. Having gained some skill—my only skill, I fear—in reading and writing, I was often made

instructor in these arts to novices and the children of lay people. My boyhood nickname I put into Latin and made my religious one, as a lesson in humility, so I am Brother Parvus. For I am of low size, and ill-favored, though fortunate to have the trust of children.

In the year of grace 1345, Sir Roger, then baron, was gathering an army of free companions to join our puissant King Edward III and his son in the French war. Ansby was the meeting place. By May Day, the army was all there. It camped on the common, but turned our quiet town into one huge brawl. Archers, crossbowmen, pikemen, and cavalry swarmed through the muddy streets, drinking, gaming, wenching, jesting, and quarreling, to the peril of their souls and our thatch-roofed cottages. Indeed, we lost two houses to fire. Yet they brought an unwonted ardor, a sense of glory, such that the very serfs thought wistfully about going along, were it but possible. Even I entertained such notions. For me it might well have come true, for I had been tutoring Sir Roger's son and had also brought his accounts in order. The baron talked of making me his amanuensis; but my abbot was doubtful.

Thus it stood when the Wersgor ship arrived.

Well I remember the day. I was out on an errand. The weather had turned sunny after rain, the town street was ankle-deep in mud. I picked my way through the aimless crowds of soldiery, nodding to such as I knew. All at once a great cry arose. I lifted my head like the others.

Lo! It was as a miracle! Down through the sky, seeming to swell monstrously with the speed of its descent, came a ship all of metal. So dazzling was the sunlight off its polished sides that I could not see its form clearly. A huge cylinder, I thought, easily two thousand feet long. Save for the whistle of wind, it moved noiseless.

Someone screamed. A woman knelt in a puddle and began to rattle off prayers. A man cried that his sins had found him out, and joined her. Worthy though these actions were, I realized that in such a mass of people, folk would be trampled to death if panic smote. That was surely not what God, if He had sent this visitant, intended.

Hardly knowing what I did, I sprang up on a great iron bombard whose wagon was sunk to the axles in our street. "Hold fast!" I cried, "Be not afraid! Have faith and hold fast!"

My feeble pipings went unheard. Then Red John Hameward, the captain of the longbowmen, leaped up beside me. A merry giant, with hair like spun copper and fierce blue eyes, he had been my friend since he arrived here.

"I know not what yon thing is," he bellowed. His voice rolled over the general babble, which died away. "Mayhap some French trick. Or it may be friendly, which would make our fear look all the sillier.

Follow me, every soldier, to meet it when it lands!"

"Magic!" cried an old man. " 'Tis sorcery, and we are undone!"

"Not so," I told him. "Sorcery cannot harm good Christians."

"But I am a miserable sinner," he wailed.

"Saint George and King Edward!" Red John sprang off the tube and dashed down the street. I tucked up my robe and panted after him, trying to remember the formulas of exorcism.

Looking back over my shoulder, I was surprised to see most of the company follow us. They had not so much taken heart from the bowman's example, as they were afraid to be left leaderless. But they followed—into their own camp to snatch weapons, then out onto the common. I saw that cavalrymen had flung themselves to horse and were thundering downhill from the castle.

Sir Roger de Tourneville, unarmored but wearing sword at hip, led the riders. He shouted and flailed about with his lance. Between them, he and Red John got the rabble whipped into some kind of fighting order. They had scarcely finished when the great ship landed.

It sank deep into pasture earth, its weight was tremendous and I knew not what had borne it so lightly through the air. I saw that it was all enclosed, a smooth shell without poopdeck or forecastle. I did not really expect oars, but part of me wondered—through the hammering of my heart—why there were no sails. However, I did spy turrets, from which poked muzzles like those of bombards.

There fell a shuddering silence. Sir Roger edged his horse up to me where I stood with teeth clapping in my head. "You're a learned cleric, Brother Parvus," he said quietly, though his nostrils were white and his hair dank with sweat. "What d'you make of this?"

"In truth I know not, sire," I stammered. "Ancient stories tell of wizards like Merlin who could fly through the air."

"Could it be . . . divine?" He crossed himself.

" 'Tis not for me to say." I looked timidly skyward. "Yet I see no choir of angels."

A muted clank came from the vessel, drowned in one groan of fear as a circular door began to open. But all stood their ground, being Englishmen if not simply too terrified to run.

I glimpsed that the door was double, with a chamber between. A metallic ramp slid forth like a tongue, three yards downward until it touched the earth. I raised my crucifix while Aves pattered from my lips like hail.

One of the crew came forth. Great God, how shall I describe the horror of that first sight? Surely, my mind shrieked, this was a demon from the lowest pits of Hell.

He stood about five feet tall, very broad and powerful, clad in a tunic of silvery sheen. His skin was hair-

less and deep blue. He had a short thick tail. The ears were long and pointed on either side of his round head; narrow amber eyes glared from a blunt-snouted face; but his brow was high.

Someone began to scream. Red John brandished his bow. "Quiet, there!" he roared. "'Steeth, I'll kill the first man who moves!"

I hardly thought this a time for profanity. Raising the cross still higher, I forced limp legs to carry me a few steps forward, while I quavered some chant of exorcism. I was certain it would do no good; the end of the world was upon us.

Had the demon only remained standing there, we would soon have broken and bolted. But he raised a tube held in one hand. From it shot flame, blinding white. I heard it crackle in the air and saw a man near me smitten. Fire burst over him. He fell dead, his breast charred open.

Three other demons emerged.

Soldiers were trained to react when such things happened, not to think. The bow of Red John sang. The foremost demon lurched off the ramp with a clothyard arrow through him. I saw him cough blood and die. As if the one shot had touched off a hundred, the air was suddenly gray with whistling shafts. The three other demons toppled, so thickly studded with arrows they might have been popinjays at a contest.

"They can be slain!" bawled Sir Roger. "Haro! Saint George for Merry England!" And he spurred his horse straight up the gangway.

They say fear breeds unnatural courage. With one crazed whoop the whole army charged after him. Be it confessed, I, too, howled and ran into the ship.

Of that combat which ramped and raged through all the rooms and corridors, I have little memory. Somewhere, from someone, I got a battle-ax. There is in me a confused impression of smiting away at vile blue faces which rose up to snarl at me, of slipping in blood and rising to smite again. Sir Roger had no way to direct the battle. His men simply ran wild. Knowing the demons could be killed, their one thought was to kill and have done.

The crew of the ship numbered about a hundred, but few carried weapons. We later found all manner of devices stored in the holds, but the invaders had relied on creating a panic. Not knowing Englishmen, they had not expected trouble. The ship's artillery was ready to use, but of no value once we were inside.

In less than an hour, we had hunted them all down.

Wading out through the carnage, I wept with joy to feel the blessed sunlight again. Sir Roger was checking with his captains to find our losses, which were only fifteen all told. As I stood there, atremble with exhaustion, Red John Hameward emerged. He had a demon slung over his shoulder.

He threw the creature at Sir Roger's feet. "This one I knocked out

with my fist, sire," he panted. "I thought might be you'd want one kept alive a while, to put him to the question. Or should I not take chances, and slice off his ugly head now?"

Sir Roger considered. Calm had descended upon him; none of us had yet grasped the enormity of this event. A grim smile crossed his lips. He replied in English as fluent as the nobleman's French he more commonly used.

"If these be demons," he said, "they're a poor breed, for they were slain as easily as men. Easier, in sooth. They didn't know more about infighting than my little daughter. Less, for she's given my nose many hefty tweaks. I think chains will hold this fellow safe, eh, Brother Parvus?"

"Yes, my lord," I opined, "though it were best to put some saints' relics and the Host nearby."

"Well, then, take him to the abbey and see what you can get out of him. I'll send a guard along. Come up to dinner this evening."

"Sire," I reproved, "we should hold a great Mass of thanksgiving ere we do anything else."

"Yes, yes," he said impatiently. "Talk to your abbot about it. Do what seems best. But come to dinner and tell me what you've learned."

His eyes grew thoughtful as he stared at the ship.

II.

I came as ordered, with the approval of my abbot, who saw that here the ghostly and secular arms must be one. The town was strangely quiet as I picked my way through sunset streets. Folk were in church, or huddled within doors. From the soldiers' camp I could hear yet another Mass. The ship brooded mountainous over all our tiny works.

But we felt heartened, I believe, a little drunk with our success over powers not of this Earth. The smug conclusion seemed inescapable, that God approved of us.

I passed the bailey through a trebled watch and went directly to the great hall. Ansby Castle was old Norman work: gaunt to look on, cold to inhabit. The hall was already dark, lit by candles and a great leaping fire which picked weapons and tapestries out of unrestful shadow. Gentlefolk and the more important commoners of town and army were at table, a buzz of talk, servants scurrying about, dogs lolling on the rushes. It was a comfortingly familiar scene, however much tension underlay it. Sir Roger beckoned me to come sit with him and his lady, a signal honor.

Let me here describe Roger de Tourneville, knight and baron. He was a big, strongly thewed man of thirty years, with gray eyes and bony curve-nosed features. He wore his yellow hair in the usual style of a warrior peer, thick on the crown and shaven below—which somewhat marred an otherwise not unhandsome appearance, for he had ears like jug handles. This, his home dis-

trict, was poor and backward, and most of his time elsewhere had been spent in war. So he lacked courtly graces, though shrewd and kindly in his fashion. His wife, Lady Catherine, was a daughter of the Viscount de Mornay; most people felt she had married beneath her style of living as well as her station, for she had been brought up at Winchester amidst every elegance and modern refinement. She was very beautiful, with great blue eyes and auburn hair, but somewhat of a virago. They had only two children: Robert, a fine boy of six, who was my pupil, and a three-year-old girl named Matilda.

"Well, Brother Parvus," boomed my lord. "Sit down. Have a stoup of wine—'sblood, this occasion calls for more than ale!" Lady Catherine's delicate nose wrinkled a bit; in her old home, ale was only for commoners. When I was seated, Sir Roger leaned forward and said intently, "What have you found out? Is it a demon we've captured?"

A hush fell over the table. Even the dogs were quiet. I could hear the hearthfire crackle, and ancient banners stir dustily where they hung from the beams overhead. "I think so, my lord," I answered with care, "for he grew very angry when we sprinkled holy water on him."

"Yet he did not vanish in a puff of smoke? Hah! If demons, these are not kin to any I ever heard of. They're mortal as men."

"More so, sire," declared one of his captains, "for they cannot have souls."

"I'm not interested in their blithering souls," snorted Sir Roger. "I want to know about their ship. I've walked through it since the fight. What a by-our-lady whale of a ship! We could put all Ansby aboard, with room to spare. Did you ask the demon why a mere hundred of 'em needed that much space?"

"He does not speak any known language, my lord," I said.

"Nonsense! All demons know Latin, at least. He's just being stubborn."

"Mayhap a little session with your executioner?" asked the knight Sir Owain Montbelle slyly.

"No," I said. "If it please you, best not. He seems very quick at learning. Already he repeats many words after me, so I do not believe he is merely pretending ignorance. Give me a few days and I may be able to talk with him."

"A few days may be too much," grumbled Sir Roger. He threw the beefbone he had been gnawing to the dogs, and licked his fingers noisily. Lady Catherine frowned and pointed to the water bowl and napkin before him. "I'm sorry, my sweet," he muttered. "I never can remember about these newfangled things."

Sir Owain delivered him from his embarrassment by inquiring: "Why say you a few days may be too long? Surely you are not expecting another ship?"

"No. But the men will be more restless than ever. We were almost

ready to depart, and now *this* happens!"

"So? Can we not leave anyhow on the date planned?"

"No, you blockhead!" Sir Roger's fist landed on the table. A goblet jumped. "Cannot you see what a chance this is? It must have been given us by the saints themselves!"

As we sat awestruck, he went on rapidly: "We can take the whole company aboard that thing. Horses, cows, pigs, fowls—we'll not be deviled by supply problems. Women, too, all the comforts of home! Aye, why not even the children? Never mind the crops hereabouts, they can stand neglect for a while and 'tis safer to keep everyone together lest there should be another visitation.

"I know not what powers the ship owns besides flying, but her very appearance will strike such terror we'll scarce need to fight. So we'll take her across the Channel and end the French war inside a month, d'you see? Then we go on and liberate the Holy Land, and get back here in time for hay harvest!"

A long silence ended abruptly in such a storm of cheers that my own weak protests were drowned out. I thought the scheme altogether mad. So, I could see, did Lady Catherine and a few others. But the rest were laughing and shouting till the hall roared.

Sir Roger turned a flushed face to me. "It depends on you, Brother Parvus," he said. "You're the best of us all in matters of language. You must make the demon talk, or teach him how, whichever it is. He's got to show us how to sail that ship!"

"My noble lord—" I quavered.

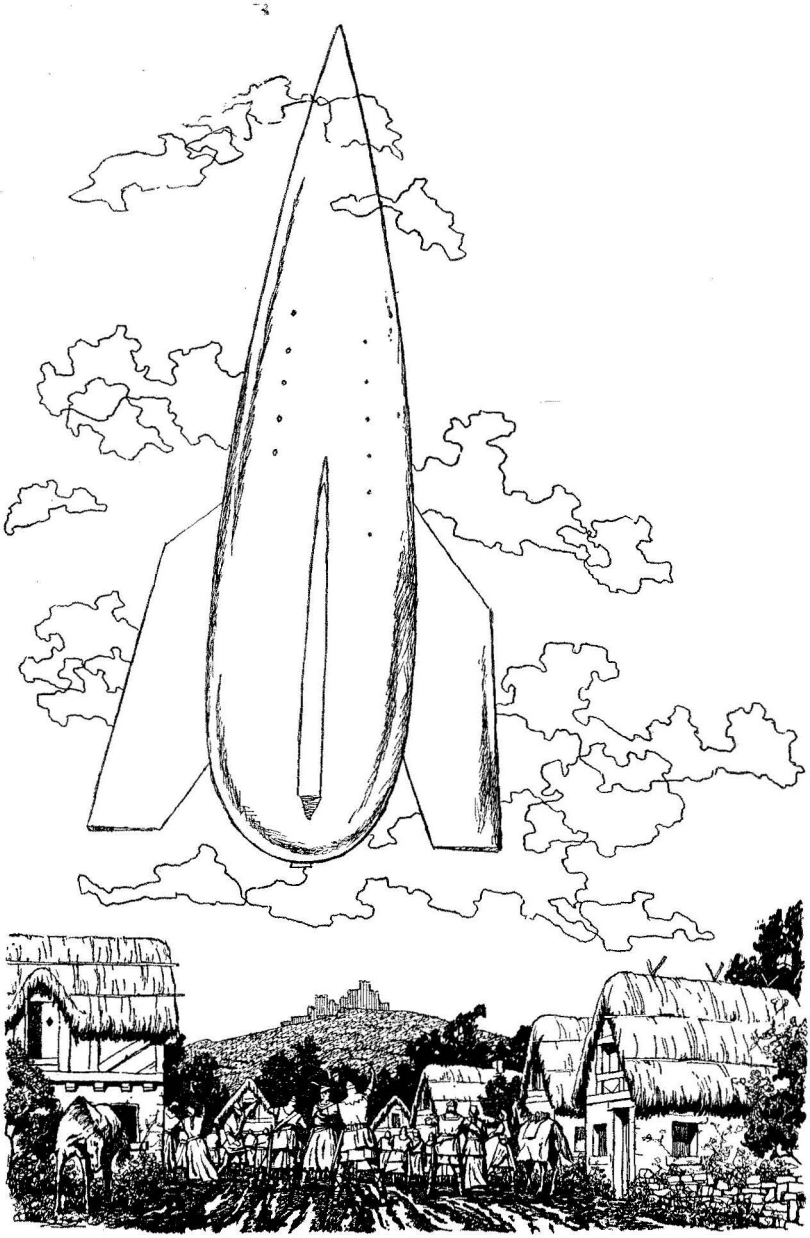
"Good!" Sir Roger slapped my back so I choked and nearly fell off my seat. "I knew you could do it. Your reward will be the privilege of coming with us!"

Indeed it was as if the town and the army were alike possessed. Surely the one wise course was to send messages posthaste to the bishop, perhaps to Rome itself, begging counsel. But no, they must all go, at once. Wives would not leave their husbands, or parents their children, or girls their lovers. The lowliest serf looked up from his acre and dreamed of freeing the Holy Land and picking up a coffer of gold on the way.

What else can be expected of a folk bred from Saxon, Dane, and Norman?

I returned to the abbey and spent the night on my knees, praying for a sign. But the saints remained noncommittal. After matins I went with a heavy heart to my abbot and told him what the baron had commanded. He was wroth at not being allowed immediate communication with the Church authorities, but decided it was best we obey for the nonce. I was released from other duties that I might study how to converse with the demon.

I girded myself and went down to the cell where he was confined. It was a narrow room, half underground, used for penances. Brother



Thomas, our smith, had stapled fetters to the walls and chained the creature up. He lay on a straw pellet, a frightful sight in the gloom. His links clashed as he rose at my entry. Our relics in their chests were placed nearby, just out of his impious reach, so that the thighbone of Saint Osbert and the sixth-year molar of Saint Willibald might keep him from bursting his bonds and escaping back to Hell.

Though I would not have been at all sorry had he done so.

I crossed myself and squatted down. His yellow eyes glared at me. I had brought paper, ink, and quills, to exercise what small talent I have for drawing. I sketched a man and said, *"Homo,"* for it seemed wiser to teach him Latin than any language confined to a single nation. Then I drew another man and showed him that the two were called *homines.* Thus it went, and he was quick to learn.

Presently he signed for the paper, and I gave it to him. He himself drew skillfully. He told me that his name was *Branithar* and that his race was called *Wersgorix.* I was unable to find these terms in any demonology. But thereafter I let him guide our studies, for his race had made the learning of new languages into a science and our task went apace.

I worked long hours with him, and saw little of the outside world in the next few days. Sir Roger kept his domain incommunicado. I think his greatest fear was that some earl or duke might seize the ship for himself. With his bolder men, the baron spent much time aboard it, trying to fathom all the wonders he encountered.

Erelong Branithar was able to complain about the bread and water diet, and threaten revenge. I was still afraid of him, but kept up a bold front. Of course our conversation was much slower than I here render it, with many pauses while we searched for words.

"You brought this on yourself," I told him. "You should have known better than to make an unprovoked attack on Christians."

"What are Christians?" he asked.

Dumfounded, I thought he must be feigning ignorance. As a test, I led him through the Pater Noster. He did not go up in smoke, which puzzled me.

"I think I understand," he said. "You refer to some primitive tribal pantheon."

"It is no such heathen thing!" I said indignantly. I started to explain the Trinity to him, but had scarcely gotten to transubstantiation when he waved an impatient blue hand. It was much like a human hand otherwise, save for the thick sharp nails.

"No matter," he said. "Are all Christians as ferocious as your people?"

"You would have had better luck with the French," I admitted. "Your misfortune was landing among Englishmen."

"A stubborn breed," he nodded. "It will cost you dearly. But if you

release me at once, I will try to mitigate the vengeance which is going to fall on you."

My tongue clove to the roof of my mouth, but I unstuck it and asked him coolly enough to elucidate. Whence came he, and what were his intentions?

That took a long time for him to make clear, because the very concepts were strange. I thought surely he was lying, but at least he acquired more Latin in the process.

It was about two weeks after the landing when Sir Owain Montbelle appeared at the abbey and demanded audience with me. I met him in the cloister garden, we found a bench and sat down.

This Owain was the younger son, by a second marriage with a Welsh woman, of a petty baron on the Marches. I daresay the ancient conflict of two nations smoldered strangely in his breast; but the Cymric charm was also there. Made page and later esquire to a great knight in the royal court, young Owain had captured his master's heart and been brought up with all the privilege of far higher ranks. He had traveled widely abroad, become a troubadour of some note, received the accolade —and then suddenly, there he was, penniless. In hopes of winning his fortune, he had wandered to Ansby to join the free companions. Though valiant enough, he was too darkly handsome for most men's taste, and they said no husband felt safe when he was about. This was not quite true, for Sir Roger had taken a fancy to the youth, admired his judgment as well as his education, and was happy that at last Lady Catherine had someone to talk to about the things that most interested her.

"I come from my lord, Brother Parvus," Sir Owain began. "He wishes to know how much longer you will need to tame this beast of ours."

"Oh . . . he speaks glibly enough now," I answered. "But he holds so firmly to out-and-out falsehoods that I have not yet thought it worthwhile to report."

"Sir Roger grows most impatient, and the men can scarcely be held any longer. They devour his substance, and not a night passes without a brawl or a murder. We must start soon or not at all."

"Then I beg you not to go," I said. "Not in yon ship out of Hell." I could see that dizzyingly tall spire, its nose wreathed with low clouds, rearing beyond the abbey walls. It terrified me.

"Well," snapped Sir Owain, "what has the monster told you?"

"He has the impudence to claim he comes not from below, but from above. From Heaven itself!"

"He . . . an angel?"

"No. He says he is neither angel nor demon, but a member of another mortal race than mankind."

Sir Owain caressed his smooth-shaven chin with one hand. "It could be," he mused. "After all, if Unipeds and Centaurs and other mon-

strous beings exist, why not those squatty blueskins?"

"I know. 'Twould be reasonable enough, save that he claims to live in the sky."

"Tell me just what he did say."

"As you will, Sir Owain, but remember that these impieties are not mine. This Branithar insists that the Earth is not flat, but is a sphere hanging in space. Nay, he goes further and says the Earth moves about the Sun! Some of the learned ancients held similar notions, but I cannot understand what would keep the oceans from pouring off into space or—"

"Pray continue the story, Brother Parvus."

"Well, Branithar says that the stars are other suns than ours, only very far off, and have worlds going about them even as our own does. Not even the Greeks could have swallowed such an absurdity. What kind of ignorant yokels does the creature take us for? But be this as it may, Branithar says that his people, the Wersgorix, come from one of these other worlds, one which is much like our Earth. He boasts of their powers of sorcery—"

"That much is no lie," said Sir Owain. "We've been trying out some of those handweapons. We burned down three houses, a pig, and a serf ere we learned how to control them."

I gulped, but went on: "These Wersgorix have ships which can fly between the stars. They have conquered many worlds. Their method is to subdue or wipe out any backward natives there may be. Then they settle the entire world, each Wersgor taking hundreds of thousands of acres. Their numbers are growing so fast, and they so dislike being crowded, that they must ever be seeking new worlds.

"This ship we captured was a scout, exploring in search of another place to conquer. Having observed our Earth from above, they decided it was suitable for their use and descended. Their plan was the usual one, which had never failed them hitherto. They would terrorize us, use our home as a base, and range about gathering specimens of plants, animals, and minerals. That is the reason their ship is so big, with so much empty space. 'Twas to be a veritable Noah's ark. When they returned home and reported their findings, a fleet would come to attack all mankind."

"Hm-m-m," said Sir Owain. "We stopped that much, at least."

We were both cushioned against the frightful vision of our poor folk being harried by unhumans, destroyed or enslaved, because neither of us really believed it. I had decided that Branithar came from a distant part of the world, perhaps beyond Cathay, and only told these lies in the hope of frightening us into letting him go. Sir Owain agreed with my theory.

"Nonetheless," added the knight, "we must certainly learn to use the ship, lest more of them arrive. And what better way to learn, than by

taking it to France and Jerusalem? As my lord said, 'twould in that case be prudent as well as comfortable to have women, children, yeomen, and townsfolk along. Have you asked the beast how to cast the spells for working the ship?"

"Yes," I answered reluctantly. "He says the rudder is very simple."

"And have you told him what will happen to him if he does not pilot us faithfully?"

"I have intimated. He says he will obey."

"Good! Then we can start in another day or two!" Sir Owain leaned back, eyes dreamily half closed. "We must eventually see about getting word back to his own people. One could buy much wine and amuse many fair women with his ransom."

III.

And so we departed.

Stranger even than the ship and its advent was that embarkation. There the thing towered, like a steel cliff forged by a wizard for a hideous use. On the other side of the common huddled little Ansby, thatched cots and rutted streets, fields green beneath our wan English sky. The very castle, once so dominant in the scene, looked shrunken and gray.

But up the ramps we had let down from many levels, into the gleaming pillar, thronged our homely, red-faced, sweating, laughing people. Here John Hameward roared along with his bow across one shoulder and a tavern wench giggling on the other. There a yeoman armed with a rusty ax that might have been swung at Hastings, clad in patched wadmal, preceded a scolding wife burdened with their bedding and cooking-pot, and half a dozen children clinging to her skirts. Here a crossbowman tried to make a stubborn mule climb the gangway, his oaths laying many years in Purgatory to his account. There a lad chased a pig which had gotten loose. Here a richly-clad knight jested with a fine lady who bore a hooded falcon on her wrist. There a priest told his beads as he went doubtfully into the iron maw. Here a cow lowed, there a sheep bleated, here a goat shook its horns, there a hen cackled. All told, some two thousand souls went aboard.

The ship held them easily. Each important man could have a cabin for himself and his lady—for several had brought wives, lemans, or both as far as Ansby Castle, to make a more social occasion of the departure for France. The commoners spread pallets in empty holds. Poor Ansby was left almost deserted, and I often wonder if it still exists.

Sir Roger had made Branithar operate the ship on some trial flights. It had risen smoothly and silently as he worked the wheels and levers and knobs in the control turret. Steering was childishly simple, though we could make neither head nor tail of certain discs with heathenish inscriptions, across which quivered needles. Through me, Branithar told Sir

Roger that the ship derived its motive power from the destruction of matter, a horrid idea indeed, and that its engines raised and propelled it by nullifying the pull of the earth along chosen directions. This was senseless—Aristotle has explained very clearly how things fall to the ground because it is their nature to fall, and I have no truck with illogical ideas to which flighty heads so easily succumb.

Despite his own reservations, the abbot joined Father Simon in blessing the ship. We named her *Crusader*. Though we only had two chaplains along, we had also borrowed a lock of Saint Benedict's hair, and all who embarked had confessed and received absolution. So it was thought we were safe enough from ghostly peril, though I had my doubts.

I was given a small cabin adjoining the suite in which Sir Roger lived with his lady and their children. Branithar was kept under guard in a nearby room. My duty was to interpret, to continue the prisoner's instruction in Latin and the education of young Robert, and to act as my lord's amanuensis.

At departure, however, the control turret was occupied by Sir Roger, Sir Owain, Branithar, and myself. It was windowless, like the entire ship, but held glassy screens in which appeared images of the Earth below and all the sky around. I shivered and told my beads, for it is not lawful for Christian men to gaze into the crystal globes of Indic sorcerers.

"Now, then," said Sir Roger, and his hooked face laughed at me, "let's away! We'll be in France within the hour!"

He sat down before the panel of levers and wheels. Branithar said quickly to me: "The trial flights were only a few miles. Tell your master that for a trip this length, certain special preparations must be made."

Sir Roger nodded when I had passed this on. "Very well, let him do so." His sword slithered from the sheath. "But I'll be watching our course in the screens. At the first sign of treachery—"

Sir Owain scowled. "Is this wise, my lord?" he asked. "The beast—"

"Is our prisoner. You're too full of Celtic superstitions, Owain. Let him begin."

Branithar seated himself. The furnishings of the ship, chairs and tables and beds and cabinets, were somewhat small for us humans—and badly designed, without so much as a carven dragon for ornament. But we could make do with them. I watched the captive intently as his blue hands moved over the panel.

A deep humming trembled in the ship. I felt nothing, but the ground in the lower screens suddenly dwindled. That was sorcerous; I would much rather the usual backward thrust of a vehicle when it starts were not annulled. Fighting down my stomach, I stared into the screen-reflected vault of Heaven. Erelong we were among the clouds, which

proved to be high-floating mists. Clearly this shows the wondrous power of God, for it is known that the angels often sit about on the clouds, and do not get wet.

"Now, southward," ordered Sir Roger.

Branithar grunted, set a dial, and snapped down a bar. I heard a clicking as of a lock. The bar stayed down.

Hellish triumph flared in the yellow eyes. Branithar sprang from his seat and snarled at me: *"Consummati estis!"* His Latin was very bad. "You are finished! I have just sent you to death!"

"What?" I cried.

Sir Roger cursed, half understanding, and lunged at the Wersgor. But the sight of what was in the screens checked him. The sword clattered from his hand, and sweat leaped out on his face.

Truly it was terrible. The earth dwindled beneath us as if it were falling down a great well. About us, the blue sky darkened, and stars glittered forth. Yet it was not nightfall, for the sun still shone in one screen, more brightly than ever!

Sir Owain screamed something in Welsh. I fell to my knees.

Branithar darted for the door. Sir Roger whirled and grasped him by the robe he wore. They went over in a raging tangle.

Sir Owain was paralyzed by terror, and I could not pull my eyes from the horrible beauty of the spectacle about us. Earth shrank so small that it only filled one screen. It was blue, banded, with dark splotches, and round. *Round!*

A new and deeper note entered the low drone in the air. New needles on the control panel quivered to life. Suddenly we were moving, gaining speed, with impossible swiftness. An altogether different set of engines, acting on a wholly unknown principle, had unwound their ropes.

I saw the moon swell before us. Even as I stared, we passed so near that I could see mountains and pockmarks upon it, edged with their own shadows. But this was inconceivable! All knew the moon to be a perfect circle. Sobbing, I tried to break that liar of a vision screen, but could not.

Sir Roger overcame Branithar and stretched him half-conscious on the deck. The knight got up, breathing heavily. "Where are we?" he gasped. "What's happened?"

"We're going up," I groaned. "Up and out." I put my fingers in my ears so as not to be deafened when we crashed into the first of the crystal spheres.

After a while, when nothing had occurred, I opened my eyes and looked again. Earth and moon were both receding, little more than a doubled star of blue and gold. The real stars flamed hard, unwinking, against an infinite blackness. It seemed to me that we were still picking up speed.

Sir Roger cut off my prayers with an oath. "We've this traitor to handle first!" He kicked Branithar

in the ribs. The Wersgor sat up and glared defiance.

I collected my wits and said to him in Latin, "What have you done? You will die by torture unless you take us back at once."

He rose, folded his arms, and regarded us with bitter pride. "Did you think that you barbarians were any match for a civilized mind?" he answered. "Do what you will with me. There will be revenge enough when you come to this journey's end."

"But what *have* you done?"

His bruised mouth grinned. "I set the ship under control of its automaton-pilot. It is now steering itself. Everything is automatic—the departure from atmosphere, the switchover into translight quasi-velocity, the compensation for optical effects, the preservation of artificial gravity and other environmental factors."

"Well, turn off the engines!"

"No one can. I could not do so myself, now that the lock-bar is

down. It will remain down until we get to Tharixan. And that is the nearest world settled by my people!"

I tried the controls, gingerly. They could not be moved. When I told the knights, Sir Owain moaned aloud. But Sir Roger said grimly:

"We'll find whether that is the truth or not. The questioning will at least punish his betrayal!"

Through me, Branithar replied with scorn: "Vent your spite if you must. I am not afraid of you. But I say that even if you broke my will, it would be useless. The rudder settings cannot be changed now, nor the ship halted. The lock-bar is meant for situations when a vessel must be sent somewhere with no one aboard." After a moment he added earnestly: "You must understand, though, I bear you no malice. You are foolhardy, but I could almost regret the fact that we need your world for ourselves. If you will spare me, I shall intercede for you when we get to Tharixan. Your own lives may be given you, at least."

Sir Roger rubbed his chin thoughtfully. I heard the bristles scratch under his palm, though he had shaved only last Thursday. "I gather the ship will become manageable again when we reach this destination," he said. I was amazed how coolly he took it after the first shock. "Could we not turn about then and go home?"

"I will never guide you!" said Branithar to that. "And alone, unable to read our navigational books, you would never find the way. We will be farther from your world than light can travel in a thousand of your years."

"You might have the courtesy not to insult our intelligence," I huffed. "I know as well as you do that light has an infinite velocity."

He shrugged.

A gleam lit Sir Roger's eye. "When will we arrive?" he asked.

"In ten days," Branithar informed us. "It is not the distances between stars, great though they are, that has made us so slow to reach your world. We have been expanding for three centuries. It is the sheer number of suns."

"Hm-m-m. When we arrive, we have this fine ship to use, with its bombards and the handweapons. The Wersgorix may regret our visit!"

I translated for Branithar, who answered, "I sincerely advise you to surrender at once. True, these fire beams of ours can slay a man, or reduce a city to slag. But you will find them useless, because we have screens of pure force which will stop any such beam. The ship is not so protected, since the generators of a force shield are too bulky for it. Thus the guns of the fortress can shoot upward and destroy you."

When Sir Roger heard this, he said only: "Well, we've ten days to think it over. Let this remain a secret. No one can see out of the ship, save from this place. I'll think of some tale that won't alarm the folk too much."

He went out, his cloak swirling behind him like great wings.

IV.

I was the least of our troop, and much happened in which I had no part. Yet I shall set it down as fully as may be, using conjecture to fill in the gaps of knowledge. The chaplains heard much in confession, and without violating confidence, they were ever quick to correct false impressions.

I believe, therefore, that Sir Roger took Catherine his lady aside and told her how matters stood. He had hoped for calm and courage from her, but she remained stock-still a moment, regarding him. Then she whispered, almost in unbelief: "But you are *smiling!*"

He threw back his head to laugh aloud. "And why not? True, this turn was unforeseen—it raises great dangers—but what an enterprise! What a chance! We'll make Huon of Bordeaux himself look like a crone huddled in her inglenook!"

"If God Himself commanded us to this . . . perhaps then you were right to joy in it—but, but as 'tis . . ." Her voice died away in horror.

Exalted by his boundless visions, and by her, who was the very crown of his world, Sir Roger cried, "Nay, not God. Myself. I want to go on this venturing; is that not reason enough to do it?"

Her lovely face turned red and then white, and she stamped a small foot on the steel deck. "Ill was the day I wed you!" Rage burst bitterly from her. "Hard enough that your oafishness should disgrace me before king and court, and doom me to yawn my life away in that bear's den you call a castle. Now you set the lives and the very souls of my children at hazard!"

"But, dearest," he stammered, taken aback. "I thought . . . I could not know—"

"Nay, you were too stupid! Your arrogance told you the demon was so afraid of you he would be your obedient slave. And now you cannot even admit how he tricked and doomed you. Mary, Pity women!"

She whirled, sobbing, and hurried from him.

Sir Roger stared after her till she had vanished down the long corridor. Then, heavy-hearted, he betook himself to see his troopers.

He found them in the after hold, cooking their supper. The air remained sweet in spite of all the fires we lit; Branithar told me the ship embodied a system for renewing the vital spirits of the atmosphere. I found it somewhat unnerving always to have the walls luminous and not know day from night. But the common soldiers sat around, hoisting ale crocks, bragging, dicing, cracking fleas, a wild godless crew who nonetheless cheered their lord with real affection.

Sir Roger signaled to Red John Hameward, whose huge form lumbered to join him in a small side chamber. "Well, sire," he remarked, "it seems a longish ways to France after all."

"Plans have been . . . changed,"

Sir Roger told him carefully. "It seems there may be a rare booty in the homeland of this ship. With that, we could equip an army large enough not only to take, but to hold and settle all our conquests."

Red John belched and scratched under his doublet. "If we don't run into more nor we can handle, sire."

"I think not. But you must prepare your men for this change of plan, and soothe whatever fears they have."

"That'll not be easy, sire."

"Why not? I told you the plunder would be good."

"Well, my lord, if you want the truth, 'tis in this wise. You see, though we've most of the Ansby women along, and many of 'em are unwed and, um, friendly disposed . . . even so, my lord, the fact remains, d' you see, we've twice as many men as women. Now the French girls are fair, and belike the Saracen wenches would do in a pinch —indeed, they're said to be very pinchable—but judging from those blueskins we overmastered, well, their females aren't so handsome."

"How do you know they don't hold beautiful princesses in captivity that yearn for an honest English face?"

"That's so, my lord. It could well be."

"Then see you have the bowmen ready to fight when we arrive." Sir Roger clapped the giant on the shoulder and went out to speak similarly with his other captains.

He mentioned this question of women to me somewhat late and I was horrified. "God be praised, that He made the Wersgor so unattractive, if they are of another species!" I exclaimed. "Great is His forethought!"

"Ill-favored though they be," asked the baron, "are you sure they're not human?"

"Would God I knew, sire," I answered after thinking about it. "They look like naught on Earth. Yet they do go on two legs, have hands, speech, the power of reason."

"It matters little," he decided.

"Oh, but it matters greatly, sire!" I told him. "For see you, if they have souls, then it is our plain duty to win them to the Faith. But if they have not, it were blasphemous to give them the sacraments."

"I'll let you find out which," he said indifferently.

I hurried forthwith to Branithar's cabin, which was guarded by a couple of spearmen. "What would you?" he asked when I sat down.

"Have you a soul?" I inquired.

"A what?"

I explained what *spiritus* meant. He was still puzzled. "Do you really think a miniature of yourself lives in your head?" he asked.

"Oh, no. The soul is not material. It is what gives life . . . well, not exactly that, since animals are alive . . . will, the self—"

"I see. The brain."

"No, no, no! The soul is, well, that which lives on after the body is

dead, and faces judgment for its actions during life."

"Ah. You believe, then, that the personality survives after death. An interesting problem. If personality is a pattern rather than a material object, as seems reasonable, then it is theoretically possible that this pattern may be transferred to something else, the same system of relationships but in another physical matrix."

"Stop maundering!" I snapped impatiently. "You are worse than an Albigensian. Tell me in plain words, do you or do you not have a soul?"

"Our scientists have investigated the problems involved in a pattern concept of personality, but so far as I know, data are still lacking on which to base a conclusion."

"There you go again," I sighed. "Can you not give me a simple answer? Just tell me whether or not you have a soul."

"I don't know."

"You're no help at all," I scolded him, and left.

My colleagues and I debated the problem at length, but except for the obvious fact that provisional baptism could be given any nonhumans willing to receive it, no solution was reached. It was a matter for Rome, perhaps for an ecumenical council.

While all this went on, Lady Catherine had mastered her tears and swept haughtily on down a passageway, seeking to ease her inner turmoil by motion. In the long room where the captains dined, she found Sir Owain tuning his harp. He leaped to his feet and bowed. "My lady! This is a pleasant . . . I might say dazzling . . . surprise."

She sat down on a bench. "Where are we now?" she asked in sudden surrender to her weariness.

Perceiving that she knew the truth, he replied, "I don't know. Already the sun itself has shrunk till we have lost view of it among the stars." A slow smile kindled in his dark face. "Yet there is sun enough in this chamber."

Catherine felt a blush go up her cheeks. She looked down at her shoes. Her own lips stirred upward, unwilled by herself.

"We are on the loneliest voyage men ever undertook," said Sir Owain. "If my lady will permit, I'll seek to while away an hour of it with a song cycle dedicated to her charms."

She did not refuse more than once. His voice rose until it filled the room.

V.

There is little to tell of the outward journey. The tedium of it soon bulked larger than the perils. Knights exchanged harsh words, and John Hameward had to crack more than one pair of heads together to keep order among his bowmen. The serfs took it best; when not caring for livestock, or eating, they merely slept.

I noticed that Lady Catherine was often at converse with Sir Owain, and that her husband was no longer overjoyed about it. However, he was

always caught up in some plan or preparation, and the younger knight did give her hours of distraction—even of merriment.

Roger and I spent much time with Branithar, who was willing enough to tell us about his race and its empire. I was reluctantly coming to believe his claims. Strange that so ugly a breed should dwell in what I judged to be the Third Heaven, but the fact could not be denied. Belike, I thought, when Scripture mentioned the four corners of the world, it did not mean our planet Terra at all, but referred to a cubical universe. Beyond this must lie the abode of the blessed; while Branithar's remark about the molten interior of the earth was certainly consonant with prophetic visions of Hell.

Branithar told us that there were about a hundred worlds like our own in the Wersgor empire. They circled as many separate stars, for no sun was likely to have more than one habitable planet. Each of these worlds was the dwelling place of a few million Wersgorix, who liked plenty of room. Except for the capital planet, Wersgorixan, they bore no cities. But those on the frontiers of the empire, like the Tharixan whither we were bound, had fortresses which were also space-navy bases. Branithar stressed the firepower and impregnability of these castles.

If a usable planet had intelligent natives, these were either exterminated or enslaved. The Wersgorix did no menial work, leaving this to such helots, or to automata. Themselves they were soldiers, managers of their vast estates, traders, owners of manufactories, politicians, courtiers. Being unarmed, the enslaved natives had no hope of revolting against the relatively small number of alien masters. Sir Roger muttered something about distributing weapons to these oppressed beings when we arrived and telling them about the Jacquerie. But Branithar guessed his intent, laughed, and said Tharixan had never been inhabited, so there were only a few hundred slaves on the entire planet.

This empire filled a rough sphere in space, about two thousand light-years across. (A light-year being the incredible distance that light covers in one standard Wersgor year, which Branithar said was about ten per cent longer than the Terrestrial period.) It included millions of suns with their worlds. But most of these, because of poisonous air or poisonous life forms or other things, were useless to the Wersgorix and ignored.

Sir Roger asked if they were the only nation which had learned to fly between the stars. Branithar shrugged contemptuously. "We have encountered three others, who developed the art independently," he said. "They live within the sphere of our empire, but so far we have not subdued them. It was not worthwhile, when primitive planets are such easier game. We allow these three races to traffic, and to keep the

small number of colonies they had already established in other planetary systems. But we have not allowed them to continue expanding. A couple of minor wars settled that. They have no love for us, they know we will destroy them some day when it is convenient for us to do so, but they are helpless in the face of overwhelming power."

"I see," nodded the baron.

He instructed me to start learning the Wersgor language. Branithar found it amusing to teach me, and I could smother my own fears by hard work, so it went quite fast. Their tongue was barbarous, lacking the noble inflections of Latin, but on that account not hard to master.

In the control turret I found drawers full of charts and numerical tables. All the writing was beautifully exact; I thought they must have such scribes it was a pity they had not gone on to illuminate the pages. Puzzling over these, and using what I had learned of the Wersgor speech and alphabet, I decided this was a set of navigational directions.

A regular map of the planet Tharixan was included, since this had been the home base of the expedition. I translated the symbols for land, sea, river, fortress, and so on. Sir Roger pored long hours over it. Even the Saracen chart his grandfather had brought back from the Holy Land was crude compared to this; though on the other hand the Wersgorix showed lack of culture by omitting pictures of mermaids, the four winds, hippogriffs, and similar ornamentation.

I also deciphered the legends on some of the control-panel instruments. Such dials as those for altitude and speed could readily be mastered. But what did "fuel flow" mean? What was the difference between "sub-light drive" and "super-light drive"? Truly these were potent, though pagan, charms.

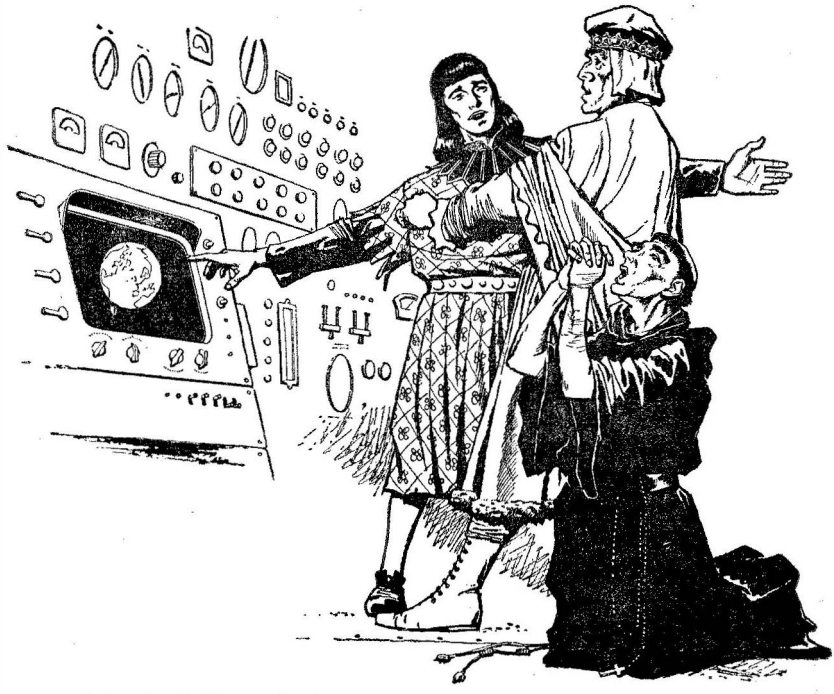
And so the sameness of days passed, and after a time which felt like a century we observed that one star was waxing in the screens. It swelled, until it flamed big and bright as our own sun. And then we saw a planet, similar to ours save that it had two small moons. Downward we plunged, till the scene was not a ball in the sky but a great rugged sweep of landscape under our footsoles. When I saw heaven again turned blue, I threw myself to the deck in thanksgiving.

The lock-bar snapped upward. The ship came to a halt and hung where it was, a mile in the air. We had reached Tharixan.

VI

Sir Roger had summoned me to the control turret, with Sir Owain and Red John, who led Branithar on a leash. The bowman gaped at the screens and muttered horrid oaths.

Word had gone through the ship that all fighting men must arm themselves. The two knights here were in plate, their esquires waiting outside with shields and helmets. Horses



stamped in the holds and along the corridors. Women and children huddled back with bright fearful eyes.

"Here we are!" Sir Roger grinned. It was eldritch to see him so boyishly gay, when everyone else was swallowing hard and sweating till the air reeked. But a fight, even against the powers of Hell, was something he could understand. "Brother Parvus, ask the prisoner where we are on the planet."

I put the question to Branithar, who touched a control button. A hitherto blank screen glowed to life, showing a map. "We are where the cross-hairs center," he told us. "The map will unroll as we fly about."

I compared the screen with the chart in my hand. "The fortress called Ganturath seems to lie about a hundred miles north by northeast, my lord," I said.

Branithar, who had been picking up a little English, nodded. "Ganturath is only a minor base." He must put his boasts into Latin still. "Yet numerous spaceships are stationed there, and swarms of aircraft. The fire-weapons on the ground can blast this vessel out of existence, and force screens will stop any beams from your own guns. Best you surrender."

When I had translated, Sir Owain

said slowly: "It may be the wisest thing, my lord."

"What?" cried Sir Roger. "An Englishman yield without a fight?"

"But the women, sire, and the poor little children!"

"I am not a rich man," said Sir Roger. "I cannot afford to pay ransom." He clumped in his armor to the pilot's chair, sat down, and tapped the manual controls.

Through the downward vision screens, I saw the land slide swiftly away beneath us. Its rivers and mountains were of homelike shape, but the vegetation's green hues were overlaid with a weird bluish tint. The country seemed wild. Now and again we saw a few rounded buildings, amidst enormous grainfields cultivated by machines, but otherwise it was bare of man as the New Forest. I wondered if this, too, were some king's hunting preserve, then remembered Branithar's account of sparse habitation everywhere in the Wersgor Empire.

A voice broke our silence, chattering away in the harsh blueface language. We started, crossed ourselves, and glared about. The sounds came from a small black instrument affixed to the main panel.

"So!" Red John drew his dagger. "All this time there's been a stowaway! Give me a crowbar, sire, and I'll pry him out."

Branithar divined his meaning. Laughter barked in the thick blue throat. "The voice is borne from afar, by waves like those of light but longer," he said.

"Talk sense!" I demanded.

"Well, we are being hailed by an observer at Ganturath fortress."

Sir Roger nodded curtly when I translated. "Voices out of thin air are little compared to what we've already seen," he said. "What does the fellow want?"

I could catch only a few words of the challenge, but got the drift of it. Who were we? This was not the regular landing place for scout craft. Why did we enter a forbidden area? "Calm them," I instructed Branithar, "and remember I will understand if you betray us."

He shrugged, as if amused, though his own brow was also filmed with sweat. "Scoutship 587-*Zin* returning," he said. "Urgent message. Will halt above the base."

The voice gave assent, but warned that if we came lower than a *stanthax* —about half a mile—we would be destroyed. We were to hover until the crews of patrol aircraft could board us.

By now, Ganturath was visible: a compact mass of domes and half-cylinders, masonry over steel skeletons as we later found out. It made a circle about a thousand feet in diameter. Half a mile or so northward lay a smaller set of buildings. Through a magnifying view screen, we saw that out of the latter jutted the muzzles of a number of huge fire-bombards.

Even as we came to a halt, a pale shimmering sprang up around both parts of the fortress. Branithar pointed: "The defensive screens.

Your own shots would spatter harmlessly off. It would be a lucky hit that melted one of those gun muzzles, where they thrust out beyond the shield. But you are an easy target."

Several egg-shaped metallic craft, like midges against the huge bulk of our *Crusader,* approached. We saw others lift from the ground, the main part of the fortress. Sir Roger's fair head nodded. " 'Tis as I thought," he said. "Those screens stop a fire-beam, mayhap, but not a material object, since the boats pass through."

"True," said Branithar by way of me. "You might manage to drop an explosive missile or two, but the outlying section, where the guns are, would destroy you."

"Ah-ha." Sir Roger studied the Wersgor with eyes gone pale. "So you possess explosive shells, eh? Doubtless aboard this very craft. And you never told me. We'll see about that later." He jerked a thumb at Red John and Sir Owain. "Well, you two have seen how the ground lies. Go back to the men, now, and be ready to emerge fighting when we land."

They departed, nervously eying the screens, where the aircraft were very near us. Sir Roger put his own hands on the wheels that controlled the bombards. We had learned, with some experimentation, that those great weapons almost aimed and fired themselves. As the patrol boats closed in Sir Roger cut loose.

Blinding hell-beams stabbed forth. They wrapped the aircraft in flame. I saw the nearest one cut in two by that fiery sword. Another tumbled red-hot, a third exploded. Thunder boomed. Then all I saw was falling metal scrap.

Sir Roger tested Branithar's claims, but they were true: his beams splashed off that pale, translucent screen. He grunted. "I looked for that. Best we get down now before they send up a real warship to deal with us, or open fire from the outlying emplacement." While hs spoke, he sent us hurtling groundward. A flame touched our hull, but then we were too low. I saw Ganturath's buildings rush up to meet me, and braced myself for death.

A ripping and crunching went through our ship. This very turret burst open as it brushed a low lookout tower. But the battlements of that were snapped off. Two thousand feet long, incalculably heavy, the *Crusader* squashed half Ganturath beneath itself.

Sir Roger was on his feet even before the engines went dead. "Haro!" he bellowed. "God send the right!" And off he went, across the canted, buckled deck. He snatched his helmet from the terrified esquire and put it on as he strode. The boy followed, teeth chattering but nonetheless in charge of the de Tourneville shield.

Branithar sat speechless. I gathered up my robe and hurried off to find a sergeant who would lock up the valuable captive for me. This being done, I was able to witness the battle.

We had come down lengthwise rather than on our tail, protected by the artificial weight generators from tumbling around inside. Havoc encompassed us, smashed buildings and sharded walls. A chaos of blue Wersgorix boiled from the rest of the fortress.

By the time I got to the exit myself, Sir Roger was out with all his cavalry. He didn't stop to gather them, but charged into the thick of the nearest enemies. His horse neighed, mane flying, armor flashing, the long lance spitted three bodies at once. When at length the spear was broken, my lord drew his sword and hewed lustily. Most of his followers had no scruples about unknightly weapons; they eked out blade, mace, and morningstar with handguns from the ship.

Now archers and men-at-arms poured forth, yelling. Belike it was their own terror that made them so savage. They closed with the Wersgorix ere our foe could unleash many lightning bolts. The battle became hand-to-hand, a leaderless riot, where ax or dagger or quarterstaff was more useful than fire-beam or pellet-gun.

When the space about him was cleared, Sir Roger reared in his black stallion. He clashed back his visor and set bugle to lips. It shrieked through the din, summoning the mounted force. These, better disciplined than the foot soldiers, disengaged themselves from the immediate fray and joined the baron. A mass of great horses, men like steel towers, blazoned shields and flying plumes and lances aloft, formed behind my lord.

His gauntleted hand pointed to the outlying fort, where the skyward bombards had ceased their futile shooting. "That we must seize, ere they rally!" he cried. "After me, Englishmen, for God and St. George!"

He took a fresh shaft from his esquire, spurred his charger, and began to pick up speed. The earthquake roll of hoofs deepened behind him.

Those Wersgorix stationed in the lesser fort poured out to resist the attack. They had guns of several kinds, plus small explosive missiles to be thrown by hand. They picked off a couple of riders. But in that short distance there was no time for more long-range shooting. And they were unnerved in any event. There is no sight more terrifying than a charge of heavy cavalry.

The trouble of the Wersgorix was that they had gone too far. They had made combat on the ground obsolete, and were ill-trained, ill-equipped, when it happened. True, they possessed fire-beams, as well as force shields to stop those same fire-beams. But they had never thought to lay down caltrops or chevaux-de-frise.

As it was, the frightful blow struck their line, rolled over it, stamped it into mud, and continued without even being slowed.

One of the buildings beyond gaped open. A small spaceship—

though big as any sea-going vessel on Earth—had been trundled forth. It stood on its tail, engine growling, ready to take off and flame us from above. Sir Roger directed his cavalry thither. The lancers hit it in a single line. Shafts splintered; men were hurled from the saddle. But consider: a charging cavalryman may bear his own weight of armor, and have fifteen hundred pounds of horse beneath him. The whole travels at several miles per hour. The impact is awesome.

The ship was bowled over. It fell on its side and lay crippled.

Through and through the lesser fort, Sir Roger's horsemen ramped, sword, mace, spurred boot and shod hoof. The Wersgorix died like swatted flies. Or say rather, the flies were the small patrol boats, buzzing overhead, unable to shoot into that melee without killing their own folk. To be sure, Sir Roger was killing their own folk anyway; but by the time the Wersgorix realized that, they were too late.

Back in the main section where the *Crusader* lay, the fight sputtered down into a question of slaying bluefaces, or taking them prisoner, or chasing them into the nearby forest. It was still one vast confusion, though, and Red John Hameward felt he was wasting the skill of his longbowmen. He formed them into a detachment and quick-stepped across open ground to aid Sir Roger.

The patrol boats swooped low, hungrily. Here was prey they might get. Their thin beams were intended for short ranges. On the first pass, two archers died. Then Red John yelled an order.

Suddenly the sky was full of arrows. A clothyard shaft with a six-foot yew bow behind it will go through an armored man and the horse beneath him. These little boats made matters worse by flying directly into the gray goose flock. Not one of them escaped. Riddled, their pilots quilled as hedgehogs, they crashed. The archers roared and ran to join the fray ahead.

The spaceship which the lancers had knocked over was still manned. Its crew must have recovered their wits. Suddenly its gun turrets spurted flame, no mere handweapon beam but thunderbolts that knocked down walls. A horseman and his steed, caught in that fire, were instantly gone. Vengefully, the lightnings raged around.

Red John picked up one end of a great steel beam, part of the dome shattered by those bombards. Fifty men aided him. They ran toward the entry port of the ship. Once, twice, crash! Down came the door, and the English yeomen stormed within.

The Battle of Ganturath lasted for some hours, but most of that time went merely to ferret out hidden remnants of the garrison. When the alien sun smoldered westward, there were about a score of English dead. None were badly wounded, for the flame guns usually killed if they hit the mark at all. Some three hundred Wersgorix were slain, roughly

an equal number captured: many of these latter were minus a limb or an ear. I would guess that perhaps a hundred more escaped on foot. They would carry word of us to the nearest estates—which, however, were not very close by. Evidently the speed and destructiveness of our initial attack had put Ganturath's farspeakers out of action before the alarm could go abroad.

Our true disaster was not revealed till later. We were not dismayed at having wrecked the ship we came in, for we now had several other vessels whose aggregate volume would hold us all. Their crews had never gotten a chance to man them. However, in her atrocious landing, the *Crusader* had burst open her control turret. And the Wersgor navigational notes therein were now lost.

At the moment, all was triumph. Red-splashed, panting, in scorched and dented armor, Sir Roger de Tourneville rode a weary horse back to the main fortress. After him came the lancers, archers, yeomen—ragged, battered, shoulders slumped with exhaustion. But the Te Deum was on their lips, rising beneath the strange constellations that twinkled forth, and their banners flew bravely against the sky.

It was wonderful to be an Englishman.

VII.

We made camp at the nearly intact lesser fort. Our people chopped wood from the forest, and as the two moons rose, their blazes leaped up. Men sat close, faces picked out of darkness by the homely unrestful light, waiting for the stewpots to be ready. Horses cropped the native grass without enjoying its taste. The captured Wersgorix huddled together under a guard of pikemen. They were stunned; this did not seem possible. I felt almost sorry for them, godless and cruel though their dominion was.

Sir Roger summoned me to join his captains, who were camped near one of the gun turrets. We manned what defenses were available, against expected counterattack, and tried not to wonder what new frightfulness the foe might have in their armory.

Tents had been erected for the more well-born ladies. Most were abed, but Lady Catherine sat on a stool at the edge of the firelight. She listened to our talk, and her mouth was drawn into bleak lines.

The captains sprawled weary on the ground. I saw Sir Owain Montbelle, idly thrumming his harp; scarred, fierce old Sir Brian Fitz-William, the third of the three knighted men on this voyage; big Alfred Edgarson, the purest of Saxon franklins; gloomy Thomas Bullard, fingering the naked sword on his lap; Red John Hameward, shy because he was the lowest born of them all. A couple of pages poured wine.

My lord Sir Roger, the unbendable, was on his feet, hands clasped behind his back. Having removed

his armor like the others, while leaving his clothes of pride in their chest, he might have been the humblest of his own sergeants. But then one saw the sinewy jut-nosed face, and heard him talk. And spurs jingled on his boots.

He nodded as I came into view. "Ah, there, Brother Parvus. Sit down and have a stoup. You've a head on your chine, and we need all good redes tonight."

A while longer he paced, brooding. I dared not interrupt with my own dreadful news. A medley of noises in the dark deepened its twin-mooned otherness. These were not the frogs and crickets and nightjars of England: here was a buzz, a saw-toothed hum, an inhumanly sweet singing like a lute of steel. And the odors were alien too, which disturbed me even more.

"Well," said my lord. "By God's grace, we've won this first encounter. Now we must decide what to do next."

"I think—" Sir Owain cleared his throat, then spoke hurriedly: "No, gentles, I am sure. God aided us against unforeseeable treachery. He will not be with us if we show undue pride. We've won a rare booty of weapons, with which we can accomplish great things at home. Let us therefore start back at once."

Sir Roger tugged his chin. "I'd liefer stay here," he answered, "yet there's much in what you say, my friend. We can always come back after the Holy Land is freed, and do a proper job on this fiend's nest."

"Aye," nodded Sir Brian. "We're too alone now, and encumbered with women and children and aged and livestock. So few fighting men against a whole empire, that were madness."

"Yet I could like to break another spear against these Wersgorix," said Alfred Edgarson. "I haven't won any gold here yet."

"Gold is no use unless we bring it home," Captain Bullard reminded him. "Bad enough campaigning in the heat and thirst of the Holy Land. Here, we know not even what plants may be poisonous, or what the winter season is like. Best we depart tomorrow."

A rumble of assent went up among them.

I cleared my throat miserably. Branithar and I had just spent a most unpleasant hour. "My lords—" I began.

"Yes? What is it?" Sir Roger fairly glared at me.

"My lords, I do not think we can find the way home!"

"What?" They roared it out. Several leaped to their feet. I heard Lady Catherine suck a horrified breath in between her teeth.

Then I explained that the Wersgor notes on the route to our sun were missing from the shattered control turret. I had led a search party, scratching about everywhere in the attempt to find them, but had no success. The interior of the turret

was blackened, melted in places. I could only conclude that a stray firebeam had come through the hole, played across a drawer burst open by the violence of our landing, and cindered the papers.

"But Branithar knows the way!" protested Red John. "He sailed it himself! I'll wring it out of him, my lord."

"Be not so hasty," I counselled. " 'Tis not like sailing along a coastline, where every landmark is known. There are uncounted millions of stars. This scouting expedition zigzagged among them looking for a suitable planet. Without the figures which the captain wrote down as they sailed, one might spend a lifetime in search and not happen on our own sun."

"But doesn't Branithar remember?" yelped Sir Owain.

"Remember a hundred pages of numbers?" I responded. "Nay, none could do that, and this is the more true since Branithar was not the captain of the ship nor the one who kept track of her wanderings and heaved the log and performed other navigational duties, rather our captive was a lesser noble whose task was more among the crewmen and in working with the demonic engines than—"

"Enough." Sir Roger gnawed his lip and stared at the ground. "This changes things. Yes— Was not the *Crusader's* route known in advance? Say by the duke who sent her out?"

"No, my lord," I said. "Wersgor scoutships merely go off in any direction the captain likes and look at any star he deems promising. Not till they come back and report does their duke know where they have been."

A groan went up. Those were hardy men, but this was enough to daunt the Nine Worthies. Sir Roger walked stiffly over to his wife and laid a hand on her arm.

"I'm sorry, my dear," he mumbled.

She turned her face from him.

Sir Owain arose. The knuckles stood forth pale on the hand that clutched his harp. "This have you led us to!" he shrilled. "To death and damnation beyond the sky! Are you satisfied?"

Sir Roger clapped hand on hilt. "Be still!" he roared. "All of you agreed with my plan. Not a one of you demurred. None were forced to come. We must all share the burden now, or God pity us!"

The younger knight muttered rebelliously, but sat down again.

It was awesome how swiftly my lord rebounded from dismay to boldness. What began as a mask put on for the others' benefit became, within seconds, his own true mood. Indeed he was a peerless leader. I attribute it to the blood of King William the Conqueror, a bastard grandson of whom wed an illegitimate daughter of that Earl Godfrey who was later outlawed for piracy, and so founded the noble de Tourneville house.

"Come, now," said the baron with steadily rising cheerfulness. " 'Tis

not so bad. We've but to act with steadfast hearts, and the day shall yet be ours. Remember, we hold a good number of captives, whom we can use as a bargaining point. If we must fight again, we've already proven they cannot withstand us under anything like equal conditions. I admit there are more of them, and that they have more skill with these craven hell-weapons. But what of that? 'Twill not be the first time brave men properly led have driven a seemingly stronger army from the field.

"At the very worst, we can retreat. We have sky ships enough, and can evade pursuit in the trackless deeps of space. But I'm fain to stay here, bargain shrewdly, fight where needful, and put my trust in God. Surely He, Who stopped the sun for Joshua, can swat a million Wersgorix if it pleases Him: for His mercy endureth forever. After we've wrung terms from the foe, we'll make them find our home for us, and stuff our ships with gold. I say to you, hold fast! For the glory of God, the honor of Eng-

land, and the enrichment of us all!"

He caught them up, bore them on the wave of his own spirit, and had them cheering him at the end. They crowded close, hands on his hands above his great shining sword, and swore to remain true till the danger was past. Thereafter an hour went in eager planning—most of it, alas, wasted, for God seldom brings that to pass which man expects. Finally all went to their rest.

I saw my lord take his wife's arm to lead her into his pavilion. She spoke to him, a harsh whisper, she would not hear his protests but stood there denouncing him in the enemy night. The larger moon, already sinking, touched them with cold fire.

Sir Roger's shoulders slumped. He turned and went slowly from her, wrapped himself in a saddle blanket and slept in the dews of the field.

It was strange that a man among men was so helpless against a woman. He had something beaten and pitiful about him as he lay there. I thought it boded ill for us.

VIII.

We had been too excited at first to pay attention, and afterward we slept too long. But when I woke again, finding it still dark, I checked the movement of stars against trees. Ah, how slowly! The night here was many times as long as on Earth.

This unnerved our folk badly enough in itself. The fact that we did not flee—by now, it could no longer be concealed that treason, rather than desire, had brought us hither—puzzled many. But at least they expected weeks to carry out whatever the baron decided.

The shock, when enemy ships appeared even before dawn, was great.

"Be of good heart," I counselled Red John, as he shivered with his bowmen in the gray mists. "'Tis not that they have powers magical. You were warned of this at the captains' council. 'Tis only that they can talk across hundreds of miles and fly such distances in minutes. So as soon as one of the fugitives reached another estate, the word of us went abroad."

"Well," said Red John, not unreasonably, "if that's not magic, I'd like to know what is."

"If magic, you need have no fear," I answered, "for the black arts do not prevail against good Christian men. However, I tell you again, this is mere skill in the mechanic and warlike arts."

"And those do prevail against g-g-good Christian men!" blubbered an archer. John cuffed him to silence, while I cursed my own clumsy tongue.

In that wan tricky light, we could see many ships hovering, some of them as big as our broken *Crusader*. My knees drummed under my cassock. Of course, we were all inside the force screen of the smaller fort, which had never been turned off. Our gunners had already discovered that the fire-bombards placed here had controls as simple as any in the

spaceship, and stood prepared to shoot. However, I knew we had no true defense. One of those very powerful explosive shells whereof I had heard hints, could be fired. Or the Wersgorix might attack on foot, overwhelming us with sheer numbers.

Yet those ships did only hover, in utter silence under the unknown stars. When at length the first pale dawnlight streamed off their flanks, I left the bowmen and fumbled through dew-wet grass to the cavalry. Sir Roger sat peering heavenward from his saddle. He was armed cap-a-pie, helmet in the crook of an arm, and none could tell from his face how little sleep had been granted him.

"Good morning, Brother Parvus," he said. "That was a long darkness."

Sir Owain, mounted close by, wet his lips. He was pale, his large long-lashed eyes sunken in dark rims. "No midwinter night in England ever wore away so slowly," he said, and crossed himself.

"The more daylight, then," said Sir Roger. He seemed almost cheerful, now when he dealth with foemen rather than unruly womenfolk.

Sir Owain's voice cracked across like a dry twig. "Why don't they attack?" he yelled. "Why do they just wait up there?"

"It should be obvious. I never thought 'twould need mentioning," said Sir Roger. "Have they not good reason to be afraid of us?"

"What?" I said. "Well, sire, of course we *are* Englishmen. However—" My glance traveled back, over the pitiful few tents pitched around the fortress walls; over ragged, sooty soldiers; over huddled women and grandsires, wailing children; over cattle, pigs, sheep, fowl, tended by cursing serfs; over pots where breakfast porridge bubbled. "However, my lord," I began again, "at the moment we look more French."

The baron grinned. "What do they know about French and English? For that matter, my father was at Bannockburn, where a handful of tattered Scottish pikemen broke the chivalry of King Edward II. Now all the Wersgorix know about us is that we have suddenly come from nowhere and—if Branithar's boasts be true—done what no other host has ever achieved: taken one of their strongholds! Would you not move warily, were you their constable?"

The guffaw that went up among the horse troopers spread down to the foot, until our whole camp rocked with it. I saw how the enemy prisoners shuddered and shrank close together when that wolfish noise smote them.

As the sun rose, a few Wersgor boats landed very slowly and carefully, a mile or so away. We held our fire, so they took heart and sent out people who began to erect machinery on the field.

"Are you going to let them build a castle under our very noses?" cried Thomas Bullard.

" 'Tis less likely they'll attack us, if they feel a little more secure," the baron answered. "I want it made plain that we'll parley." His smile turned wry. "Remember, friends, our best weapon now is our tongues."

Soon the Wersgorix landed many ships in a circular formation—like those stonehenges which giants raised in England before the Flood—to form a camp walled by the eerie faint shimmer of a force screen, picketed by mobile bombards, and roofed by hovering warcraft. Only when this was done did they send a herald.

The squat shape strode boldly enough across the meadows, though well aware that we could shoot him down. His metallic garments were dazzling in the morning sun, but we discerned his empty hands held open. Sir Roger himself rode forth, accompanied by myself gulping Our Fathers on a palfrey.

The Wersgor shied a trifle, as the huge black stallion and the iron tower astride it loomed above him. Then he gathered a shaky breath and said, "If you behave yourselves, I will not destroy you for the space of this discussion."

Sir Roger laughed when I had fumblingly translated. "Tell him," he ordered me, "that I in turn will hold my private lightnings in check, though they are so powerful I can't swear they may not trickle forth and blast his camp to ruin if he moves too swiftly."

"But you haven't any such lightnings at your command, sire," I protested. "It wouldn't be honest to claim you do."

"You will render my words faithfully and with a straight face, Brother Parvus," he said, "or discover something about thunderbolts."

I obeyed. In what follows I shall as usual make no note of the difficulties of translation. My Wersgor vocabulary was limited and I daresay my grammar was ludicrous. In all events, I was only the parchment on which these puissant ones wrote, erased, and wrote again. Aye, in truth I felt like a palimpsest ere that hour was done.

Oh, the things I was forced to say! Above all men do I reverence that valiant and gentle knight Sir Roger de Tourneville. Yet when he blandly spoke of his English estate —the small one, which only took up three planets—and of his personal defense of Roncesvaux against four million paynim, and his single-handed capture of Constantinople on a wager, and the time guesting in France when he accepted his host's invitation to exercise the *droit de seigneur* for two hundred peasant weddings on the same day—and more and more—his words nigh choked me, though I am accounted well versed both in courtly romances and the lives of the saints. My sole consolation was that little of this shameless mendacity got through the language difficulties, the Wersgor herald understanding merely—after a few attempts to impress us—that here was a person who could outbluster him any day in the week.

Therefore he agreed on behalf of his lord that there would be a truce while matters were discussed in a shelter to be erected midway between the two camps. Each side might send a score of people thither at high noon, unarmed. While the truce lasted, no ships were to be flown within sight of either camp.

"So!" exclaimed Sir Roger gaily, as we cantered back. "I've not done so ill, have I?"

"K-k-k-k," I answered. He slowed to a smoother pace, and I tried again: "Indeed, sire, St. George—or more likely, I fear, St. Dismas, patron of thieves—must have watched over you. And yet—"

"Yes?" he prompted me. "Be not afraid to speak your mind, Brother Parvus." With a kindness wholly unmerited: "Ofttimes I think you've more head on those skinny shoulders than all my captains lumped together."

"Well, my lord," I blurted, "you've wrung concessions from them for a while. As you foretold, they are being cautious whilst they study us. And yet, how long can we hope to fool them? They have been an imperial race for centuries. They must have experience of many strange peoples living under many different conditions. From our small numbers, our antiquated weapons, our lack of home-built spaceships, will they not soon deduce the truth and attack us with overwhelming force?"

His lips thinned. He looked toward the pavilion which housed his lady and children.

"Of course," he said. "I hope but to stay their hand a while."

"And then what?" I pursued him.

"I don't know." Whirling on me, fierce as a stooping hawk, he added: "But 'tis my secret, d' you understand?"

I nodded. Sir Roger straightened in the saddle. Slowly, his eyes kindled afresh. "I shall not remain so," he vowed. "I do not accept the idea that a de Tourneville can be broken." He struck spurs to his horse and galloped into camp.

IX.

During the long wait before Tharixan reached its noontide, my master summoned his captains to a council. A trestle table was erected before the central building, and there we all sat.

"By God's grace," he said, "we're spared thus far. You'll note that I've even made them land all their ships. I'll wrangle to win us as much respite as may be. That time must be put to use. We must strengthen our defenses. Also, we'll ransack this fort, seeking especially maps, books, and other sources of information. Those of our men who're at all gifted in the mechanic arts, must study and test all the machines we find, so that we can learn to fly and erect force screens and otherwise match our foes. But all this has to be done secretly, in places hidden from enemy eyes. For if ever they learn we don't already know all about such imple-

ments—" He smiled and drew a finger across his throat.

Good Father Simon, his chaplain, turned a little green. "Must you?" he said faintly.

Sir Roger nodded at him. "I've work for you, too. I shall need Brother Parvus to interpret Wersgor for me. But we have one prisoner, Branithar, who speaks Latin—"

"I would not say that, sire," I interrupted. "His declensions are atrocious, and what he does to irregular verbs may not be described in gentle company."

"Nevertheless, until he's mastered enough English, a cleric is needed to talk to him. You see, he must explain whatever our students of the captured engines do not understand, and must interpret for any other Wersgor prisoners whom we may question."

"Ah, but will he do so?" said Father Simon. "He is a most recalcitrant heathen, my son, if indeed he has any soul at all. Why, only a few days ago on the ship, in hopes of softening his hard heart, I stood in his cell reading aloud the generations from Adam to Noah, and had scarcely gotten past Nimrod when I saw that he had fallen asleep!"

"Have him brought hither," commanded my lord. "Also, find One-Eyed Hubert and tell him to come in full regalia."

While we waited, talking in hushed voices, Alfred Edgarson noticed how I sat quiet. "Well, now, Brother Parvus," he boomed, "what ails you? Methinks you've little to fear, being a godly fellow. Even the rest of us, if we conduct ourselves well, have naught to fear but a sweating time in Purgatory. And then we'll join St. Michael at sentry-go on Heaven's walls. Not so?"

I was loath to dishearten them by voicing what had occurred to me, but when they insisted, I said, "Alas, good men, worse may already have befallen us."

"Well?" barked Sir Brian Fitz-William. "What is it?"

"We had no sure way to tell time on the voyage hither," I whispered. "Hour glasses are too inaccurate, and since reaching this devil-made place we've neglected even to turn them. How long is the day here? What time is it on our Earth?"

Sir Brian looked a trifle blank. "Indeed, I know not. What of it?"

"I presume you had a haunch of beef to break your fast," I said. "Are you sure it is not Friday?"

They gasped and regarded each other with round eyes.

"When is it Sunday?" I cried. "Will you tell me the date of Advent? How shall we observe Lent and Easter, with two moons morris-dancing about to confuse the issue?"

Thomas Bullard buried his face in his hands. "We're ruined!"

Sir Roger stood up. "No!" he shouted into the strickenness. "I'm no priest, nor even very godly. But did not Our Lord Himself say the Sabbath was made for man and not man for the Sabbath?"

"I like it not," mumbled Bullard. "I take this to be a sign that God has turned His face from us, withdrawing the due times of the fasts and sacraments."

Sir Roger grew red. He stood a moment more, watching the courage drain from his men like wine from a broken cup. Then he calmed himself, laughed aloud, and cried:

"Did not Our Lord command His followers to go forth as far as they were able, bringing His word, and He would be with them always? But let's not bandy texts. Perhaps we are venially sinning in this matter. Well, if that be so, a man should not grovel but should make amends. We'll make costly offerings in atonement. To get the means for such offerings . . . have we not the entire Wersgor Empire at hand, to squeeze for ransom till its yellow eyes pop? This proves that God Himself has commanded us to this war!" He drew his sword, blinding in the daylight, and held it before him hilt uppermost. "By this, my knightly sigil and arm, which is also the sign of the Cross, I vow to do battle for God's glory!"

He tossed the weapon so it swung glittering in the hot air, caught it again and swung it so it shrieked. "With this blade will I fight!"

The men gave him a rather feeble cheer. Only glum Bullard hung back. Sir Roger leaned down to that captain, and I heard him hiss: "The clinching proof of my reasoning is, that I'll cut anyone who argues further into dogmeat."

Actually, I felt that in his crude way my master had grasped truth. In my spare time I would recast his logic into proper syllogistic form, to make sure; but meanwhile I was much encouraged, and the others were at least not demoralized.

Now a man-at-arms fetched Branithar, who stood glaring at us. "Good day," said Sir Roger mildly, through me. "We shall want you to help interrogate prisoners and instruct us in our studies of captured engines."

The Wersgor drew himself up with a warrior's pride. "Save your breath," he spat. "Behead me and be done with it. I misjudged your capabilities once, and it has cost many lives of my people. I shall not betray them further."

Sir Roger nodded. "I looked for such an answer," he said. "What became of One-Eyed Hubert?"

"Here I am, sire, here I am, here's good old Hubert," and the baron's executioner hobbled up, adjusting his hood. The ax was tucked under one scrawny arm and the noosed rope laid around his hump. "I was only wandering about, sire, picking flowers for me youngest grandchild, sire."

"I've work for you," said Sir Roger.

"Ah, yes, sire, yes, yes, indeed." The old man's single rheumy eye blinked about, he rubbed his hands and chuckled. "Ah, thank you, sire! 'Tis not that I mean to criticize, that ain't old Hubert's place, and he

knows his humble place, him who has served man and boy, and his father and grandsire afore him, executioners to the noble de Tourneville. No, sire, I knows me place and I keeps it as Holy Writ commands. But God's truth, you've kept poor old Hubert very idle all these years. Now your father, sire, Sir Raymond, him we called Raymond Red-Hand, there was a man what appreciated art! Though I remember his father, your grandsire, me lord, old Nevil Rip-Talon, and his justice was the talk o' three shires. In his day, sire, the commons knew their place and gentlefolk could get a decent servant at a decent wage, not like now when you let 'em off with a fine or maybe a day in the stocks. Why, 'tis a scandal—"

"Enough," said Sir Roger. "The blueface here is stubborn. Can you persuade him?"

"Well, sire! Well, well, well!" Hubert sucked toothless gums with a pure and simple delight. He walked around our rigid captive, studying him from all angles. "Well, sire, now this is another matter, 'tis like the good old days come back, 'tis, yes, yes, yes, Heaven bless my good kind master! Now o' course I took little equipment with me, only a few thumbscrews and pincers and such-like, but it won't take me no time, sire, to knock together a rack. And maybe we can get a nice kettle of oil. I always says, sire, on a cold gray day there ain't nothing so cozy as a glowing brazier and a nice hot kettle of oil. I think o' my dear old daddy and I gets tears in this old eye, yes, sire, that I do. Let me see, let me see, tum-te-tum-te-tum." He began measuring Branithar with his rope.

The Wersgor flinched away. His smattering of English was enough to give him the drift of conversation. "You won't!" he yelled.

"Now let's just see your hand, if you please." Hubert took a thumbscrew from his pouch and held it against the blue fingers. "Yes, yes, 'twill fit snug and proper." He unpacked an array of little knives. *"Sumer is icumen in,"* he hummed, *"lhude sing cucu."*

Branithar gulped. "But you're not civilized," he said weakly.

Choking and snarling: "Very well. I will do it. Curse you for a pack of beasts! When my people have smashed you, it will be my turn!"

"I can wait," I assured him.

Sir Roger beamed. But suddenly his face fell again. The deaf old executioner was still counting over his apparatus. "Brother Parvus," said my lord, "would you . . . could you . . . break the news to Hubert? I've not the heart to tell him."

I consoled the old fellow with the thought that if Branithar were caught lying, or otherwise failing to give us honest help, there would be punishment. This sent him hobbling happily off to construct a rack. I told Branithar's guard to make sure the Wersgor saw that work.

TO BE CONTINUED

THE TROUBLEMAKER

By CHRISTOPHER ANVIL

Illustrated by Schoenherr

There's no more suitable punishment—or reward—for a man than to give him just exactly what he wants. The old three-wishes fairy stories knew that; our ancestors may have been ignorant, but only a fool would think them stupid! Now usually a troublemaker is looking for trouble. . . .

12/02/96 Probably the closest thing to hell on a commercial spaceship is to have the gravitor control run wild. Next on the list is what happens when there's a troublemaker in the crew.

Three years ago, we had the first experience. It looks as if we are now about to have the second.

The trouble started when Krotec, our cargo-control man, was killed by a freak meteor at the cut-loose point. We had just thrown the cargo section into hyperdrive and were swinging around to get an empty returned section from the recovery crew when the meteor hit. We all felt bad about Krotec's death. But there was nothing we could do except head back to the loading center as usual.

When we got back to the loading center, word came in that a replacement for Krotec was due on board at 2330.

The captain insists that each new man be greeted as he comes on board. Willis and I, respectively third and second in command, offered to do the greeting. Willis got the job.

Around 0130, Willis woke me up.

"Listen," he said, "that replacement hasn't showed up yet. The transport office says he started out in a little one-man taxi-boat two hours and twenty minutes ago. Do you suppose he's drunk?"

"I *hope* not."

A cargo-control man has to inspect and approve each cargo before it can be shipped. Because of this, a drunk cargo-control man can cause a long delay. Each delay cuts down the ship's competitive rating. And each cut in the rating means a cut in the bonus given to the officers and crew of the fastest ships.

"Listen," I said. "We're just loading grain, aren't we?"

"We are. Just a few hours more and we'll be full up. If we can get out of here by 0800, we've got a chance to beat *Nova* and get first place for a change. But we've got to get this cretin to start checking cargo before we can even think of leaving."

"How about the transport office? Do they know where this one-man taxi-boat is now?"

"All they can say is that a rough fix shows it's somewhere in B cargo area, and it's sending out an 'unoccupied' signal. That means our replacement has matched locks with some other boat or ship in our area, and left the one-man boat."

It took a few moments to absorb what this meant. Each ship takes its

share of fast and slow cargoes. While we were loading grain and leaving tomorrow, other ships were taking on fragile goods that would keep them at the loading center for several days. On some of these ships, roaring parties were now going on. If our wandering cargo-control officer got into one of these parties, it would be no easy job to get him out.

"Well," I said, dressing quickly, "we can't very well start asking where he is."

"No," said Willis sourly. "There are those who would load him up with rum and hide him somewhere just to gain a few points on us."

"That means there's nothing else to do but get another taxi-boat and go hunt for him. One-man boats aren't used much, so we've got a chance."

A couple of hours later, this chance seemed to have gotten pretty thin. I had been staring into the glaring lights and shadows all over B cargo area, and Willis had been calling the transport office at intervals. The transport office insisted the one-man boat was still in B area. But if so, I hadn't seen it. An unpleasant possibility was just beginning to dawn on me when Willis appeared on the little screen, his face white and set.

"Don't bother looking for him any more. He's here."

The screen went blank. I went back to the ship, and saw that the boatlike bulk of the pressure loader had stopped pulsating. Willis was waiting in the control room as I went in.

"You know," he said, "that so-and-so was right here all the time? He was hooked onto the cargo-section's lock, out of sight in the shadow of the ship. That means he has been alone in the cargo-section for a long time, without our knowing it."

"I notice we aren't loading."

"No, we aren't loading. He came in here, and used the screen to get the chief inspector's office. He says there's 'danger of possible weevil infestation' in the cargo, and he's slapped a forty-eight-hour delay on the ship."

"That's ridiculous."

"Is it? Don't forget, the inspector here is a stickler for caution. Any cargo-control man who shows caution gets a pat on the head. And since Krotec got hit before we picked up the empty cargo section, that means we were without a regular cargo-control officer to check the cargo section."

"Yes," I said, "but the captain checked it himself." I was thinking that the captain is a fanatic for efficiency, a rigid teetotaler, an early-to-bed-early-to-rise man with iron habits and unvarying devotion to duty. It suddenly occurred to me that this would carry no weight whatever with the chief inspector. "Look," I said, "the captain has qualified as a cargo-control man. He's perfectly able to serve as one in a pinch."

Willis smiled. "Sure. But what I am talking about is how it will look on paper. The captain is not a *regu-*

lar cargo-control man. The inspector, not knowing the captain, will generously assume that the captain was out of practice and missed something. We will therefore be hung up here till the inspector goes through all his motions. *Nova* will beat us by light-years. But what I am thinking about most is what life on board the same ship as this self-seeking troublemaker is going to be like."

12/03/96 After about three hours sleep, I woke up to find that the captain wanted to see me. Willis was on the way out as I went in. The captain listened intently as I told what little I knew of what had happened the night before. Then he leaned back with his eyes narrowed.

"Well," he said, "we want to be fair to this man. But I don't think we ought to lean over backward so far he can kick our feet out from under us. Suppose you go out there and study his record folder while I get him in here and study him."

I agreed, and in due time started back to the captain's compartment carrying the record folder of one L. Sneat in a portfolio. The captain's door opened up and our new cargo-control man backed out with a slightly glazed look, and both hands spread wide. He was talking in the low earnest voice of the smooth wolf suddenly face-to-face with the girl's father and three tough brothers.

"Why should I, captain?" he was saying. "It wouldn't make sense, would it? Honestly, I *mean* it. Who would do a thing like that? And to the people he has to live with, too?"

"Just bear in mind," came the captain's voice, "if you have several hundred dollars in the bank, you can write quite a few twenty-dollar checks, and nothing happens to you. But write just one check too many and all hell breaks loose."

"Captain, I just don't understand—"

"Then go think it over."

Our new replacement moved away protesting his innocence as I went in and shut the door. The captain was frowning slightly.

"Some people," he said, "are all tactics and no strategy. They are so busy elbowing their way to the head of the line that they never look to see where the line is going." He glanced at me and said. "What did you find out?"

"Our friend was born in '68 on an outpost world called 'Broke.' He passed a company competitive exam, got good grades, and has been a cargo-control man a little less than four years. He has several commendations on his record and no black marks. Our ship is the eighth ship he has been cargo-control man on."

"In four years?"

"Yes, sir. Eight ships in four years."

"Let's see that folder."

I handed it to him.

It may have been imagination, but I thought I saw the captain's back hair rise up as he looked at the names of those ships. He growled, "Go get the latest rating and bonus list."

"Right here, sir."

The captain put it beside the record folder and glanced from one to the other.

Glancing over the captain's shoulder, I could see the names of the seven ships our new cargo-control man had been on before being assigned to ours. They were *Calliope, Derna, Hermes, Orion, Quicksure, Light Lady, Bonanza.*

The lowest seven names on the rating and bonus lists were: *Calliope, Derna, Hermes, Orion, Quicksure, Light Lady, Bonanza.*

Bonanza was in such bad shape that it had a bonus of minus 27.92. That is, the officers and men of *Bonanza* were paying back 27.92 cents out of every dollar they earned, as a fine for inefficiency.

The captain looked at this for a while, then sent for the records tape covering previous rating and bonus lists.

A quick glance at these lists showed us that the month before Sneat boarded *Bonanza,* that ship had a rating of 94.98 out of a possible 100.00.

One month later, *Bonanza*'s rating was 76.01.

The captain looked at the record folder again. He had much the same expression as a settler on a new planet, who walks slowly past a tree, ax in hand, while he judges which way the tree will naturally fall, whether it is worth felling, and if so, where to sink the ax in first.

Then he looked up, smiled, and said we'd certainly have to work hard to make up for the delay. That was all he had to say for the moment.

12/04/96 Well, we're moving at last. No weevils were found. But Sneat produced some debris containing what could have been either pieces of bast-weevil wing-covers—or else bits of the brownish semitransparent insulation used on much of the wiring aboard ship. If it was from wiring, of course, it could have been carelessly dropped by anyone. Sneat has tried to get out of a head-on clash with the captain by claiming that this stuff was found, not inside the inner part of the cargo section, but in the outer inspection corridor. This corridor was thoroughly gone over by Gaites, one of our technicians, before the captain ever went into the cargo section itself. But since Gaites has a reputation for taking life easy, Sneat has succeeded in unloading part of the blame. Meanwhile, Sneat has on his record the inspector's commendation for extreme thoroughness.

12/07/96 Sneat seems to be weathering his unpopularity pretty well, all considered. For some reason, Gaites is now getting most of the blame for the delay.

12/08/96 Another facet of Sneat's character has come to light. The one officer on the ship with any social standing is Grunwald, the navigator. Grunwald's uncle is governor of New Venus. Grunwald likes chess.

Sneat has now taken several tapes on chess out of the ship's library.

12/12/96 In the rec. room tonight were Grunwald and Sneat, playing chess. Afterward, Grunwald expansively pointed out certain fine points of the game. Sneat was all ears—an attentive student eager to learn from the master.

A peculiar thing has turned up lately. On most of our trips, there is a feeling on the ship of well-earned contentment. On this trip, however, there is an undercurrent of rankling dissatisfaction. The original delay, and the charges and countercharges between Sneat and Gaites, seem to have started it. But now that it *is* started, it apparently goes along by itself, one man speaking sharply to another, to produce a vicious circle that is gradually changing the emotional atmosphere of the ship.

What the captain plans to do about it isn't clear. I've remarked on it to him, but it may well be that he doesn't appreciate it. Around him personally, everything is as it was before.

12/15/96 Sneat now seems to be close friends with Grunwald. He is also getting to be friends with Meeres, the medic. Meeres is interested in psychology. Lately, Sneat has been busy with the psychology tapes. Soon he should be able to listen and ask questions intelligently, which should seem fine to Meeres.

12/18/96 If Sneat isn't playing chess with Grunwald, he is likely to be talking psychology with Meeres.

12/19/96 So as to keep Sneat from step-by-step turning the whole ship, with the exception of the captain and me, into an "I love Sneat" society, I've pointed out to Willis what is going on. Strange to say, Willis hadn't noticed it. Now that he does notice it, he is once more turning a cold eye on Sneat. The sorry part of this is that the ship is being split into factions.

12/20/96 Willis tells me that Sneat has been needling Ferralli, the drive technician, because Ferralli is overweight. The rest of the crew has also kidded Ferralli, but that was good-natured. Sneat's procedure is different. The other day, he asked Ferralli, "Say, boy, are you expecting?" Ferralli smiled dutifully. After a few wisecracks, any other crewman would have let it go. But Sneat harps on the theme: "Say, is it going to be a boy or a girl?" "What are you going to call it?" Sneat has now given this mythical baby a name—"Oswald"—and the whole business is getting on Ferralli's nerves. This is the kind of joke other crewmen will drift into when they can't think of anything better to say, and it is only a matter of time till Ferralli lashes back. Very quickly we may get into a situation where everyone is jabbing everyone else's weak point, and then this ship will be quite a place to live.

12/21/96 I just had a talk with Fer-

ralli. In the less than three weeks since this trip started he has changed from a happy-go-lucky crewman to a mass of bitterness. He says everywhere he turns, someone asks, "How's Oswald?" Everyone, that is, except Sneat. When the going gets rough, Sneat is likely to stop it, saying, "Ah, come on, fellows, break it up. He needs his strength." Ferralli says he knows Sneat starts it; but when Sneat gets the others to leave him alone, Ferralli actually finds himself feeling grateful. The thought goes through his head, "Sneat isn't such a bad guy, after all." I said I supposed this was exactly what Sneat wanted. Ferralli suddenly burst out, "If he doesn't leave me alone, I'll kill him!"

12/22/96 Now, too late, I see why Sneat singled out Ferralli to pick on. Nearly everyone is now afraid of Sneat's tongue. If this were a military ship, we would no doubt so cramp Sneat that his effect would be barely a tenth what it is now. But as it is, it's a civilian ship, with civilian restrictions, and on top of that the captain seems to be patiently waiting for something. What he is waiting for, I don't know. Meanwhile, there is a steadily increasing amount of bad feeling building up, that gives the impression of an open powder keg just waiting for a match. Sneat has begun calculatedly insulting Willis and me, so it seems obvious which way the force of the explosion is supposed to go. So far, Willis and I have had several clashes with Sneat, but he is clever with words, and always wins. Lately I have caught myself wondering how Sneat would react if he found himself stuffed head first into the garbage disposal unit.

12/23/96 Willis suggested that I change shifts at dinner tonight so I could see for myself how Sneat operates during meals. The captain generally switches from shift to shift to check on the quality of the food, and as a rule takes his tray elsewhere at dinner—so that if we lesser ranks want to indulge in horseplay, he won't cramp our style.

But tonight, to my surprise, the captain stayed to eat with the rest of us.

We had hardly sat down, in a general atmosphere of dull brooding apathy, when Willis nudged me, and I heard Sneat make a needling comment to Meeres, to the effect that Ferralli seemed to be "eating for two," didn't he?

I was just starting to wonder how anyone could possibly control that kind of needling when the captain's voice said coldly, "What was that, Sneat?"

For just an instant, Sneat looked jolted. Then he glanced up and said ironically, "Did you say something, captain?"

In the same cold voice, the captain, said, "As you know, Sneat, you just made a comment about someone 'eating for two.' Explain it."

"Just part of a private conversation, captain."

"You mean it doesn't have anything to do with anyone else here? Just you and Meeres?"

"Did I say that?"

The captain didn't say anything for a moment, and Sneat smiled very faintly. I glanced at the captain, feeling the same frustration I'd felt when arguing with Sneat myself. The captain, however, was looking at Sneat with an expression of intense concentration. Something seemed to rise up in the backs of his eyes as he said, in a very gentle voice, "Do you understand the laws on 'incitement to mutiny,' Sneat?"

A heavy silence settled in the room. Sneat looked jarred for the second time. So was I. It seemed to me that Sneat had skillfully avoided that pitfall.

Before Sneat could say anything, the captain said, looking directly at Sneat, "Why are you so afraid to explain that comment you just made to Meeres?"

"I've already explained to you, captain, that that was part of a private conversation."

"I notice, Sneat, that you avoid the word 'sir' as if you were afraid of it. Just what is it you're afraid of?"

A faint puzzled expression crossed Sneat's face. He opened his mouth and shut it again. Then he stiffened angrily. It occurred to me that somehow the captain had thrown him off-balance.

Again, before Sneat could say anything, the captain spoke.

"You know, Sneat, a private conversation is usually a conversation not many people know about. You don't carry out a private conversation in a loud voice, with other people around, do you?"

Sneat relaxed, and spoke in a drawling voice.

"Well, if you must know, captain, and if you want to make Ferralli feel bad—go ahead and ask."

"Then you admit that what you said was intended to make Ferralli feel bad?"

"No, but your rubbing it in might make him feel bad. Probably has already, in fact. Why don't you drop it, captain?"

By now, everybody was glancing tensely from Sneat to the captain. The captain was looking directly into Sneat's eyes as he spoke again.

"You know, you can start trouble, but you can't expect always to drop it and slip out from under, leaving other people to bear the burden."

Sneat started to speak, and the captain added, "There comes a time when the burden lands on *you.*"

Sneat sat very still, then casually shoved his chair back.

"You're the first captain I've ever met who tried to badger his crew. I don't think I care to finish this meal."

"People who needle others shouldn't be so sensitive. Just as a a cargo-control man who causes a forty-eight hour delay shouldn't try to shift the blame to someone else."

This caused a general stir in the room. The captain made this comment just as Sneat started out, and added, "Naturally, if you have noth-

ing to say in your own defense, you *should* go."

Sneat suddenly swung around and snapped, "That cargo section was filthy!"

Gaites was at the table, and stood up. "The devil it was! It was clean!"

Sneat cast a shrewd calculating glance at Gaites. "Everyone knows you're lazy."

"Yeah? Do you want a punch in the teeth?"

The captain said coldly, "Gaites has been on this ship for a long time, and we never had a delay or a complaint. You no sooner stepped on board then we had a forty-eight hour delay, for weevils that weren't there. Every previous trip we've taken has been pleasant. Since you've been here there's been nothing but trouble." The captain paused, then added, "Unfortunately, I am forbidden by regulations to reveal anything about the ship or ships you were assigned to before this one."

Sneat opened his mouth, then closed it again. A look of angry indignation crossed his face.

The captain waited politely, and then someone started to laugh. In a moment, everyone would have been laughing, because Sneat was neatly caught in his own traps. Everyone *would* have been laughing but the instant the first person laughed, Sneat glanced directly at him and said, "Shut up."

This produced another tense si-

lence, and suddenly something in the air of the ship seemed to change.

A tall crewman stood up, and said slowly, "I was laughing, Sneat. Now, with all respect to the captain, I would like to make just one comment. If I may, sir?"

He glanced courteously at the captain.

"Go ahead," said the captain.

Sneat abruptly turned on his heel and started out of the room.

The tall crewman looked at our cargo-control man's retreating back and said clearly, "I am inviting you, Sneat, to tell me 'shut up' just once more, either now or later."

Sneat walked out without replying.

The tall crewman glanced around before sitting down. A set of hard approving glances answered him. Then he looked directly at the captain, and said, "Thank you, *sir*."

The captain smiled. "You're very welcome." He added, "Now, I would like to make a brief announcement." There was an immediate silence, and the captain said, "The base has granted us a Christmas present. We have been given permission to land and spend December 25th and 26th on the planet of New Cornwall."

There was a startled silence, then a roar of cheers. *Planetfall!* How the captain managed to wring that out of Base, I don't know. But all of a sudden we were the same old ship again. The mood and atmosphere that had been missing were back once more. Suddenly the crew began to sing, "For he's a jolly good fellow."

In the midst of all this renewed good will, with everyone feeling like his own self again, I happened to look at the door.

And there was Sneat, looking in.

He was still with us.

12/24/96 I asked the captain today if there was anything we could do to transfer Sneat, or in some way get him off the ship. I suggested that if he happened to stay behind on New Cornwall, that would be fine.

"You mean," said the captain smiling, "if he should by chance get cracked over the head and dumped up some secluded alley, just before we take off?"

"That's what I had in mind, sir."

"Hm-m-m. Well, we can reserve that as a last resort. But I don't think it will be necessary. Do you know much about New Cornwall?"

"No, sir. Of course, we've all been looking it up in the atlas. It's a planet now well into its first stage of industrialization, with a fast-growing population. I don't understand their government system."

"What don't you understand about their government?"

"According to the atlas it's a 'representative absolute monarchy.' There couldn't be such a thing."

"Well," said the captain, smiling, "wait a while. And don't be too hasty about tossing Sneat up an alley with a big bump on his head. Bear in mind how men have always dealt with troublesome creatures."

"What do you mean, sir?"

"Men bait rattraps with cheese and bacon."

I stared. "But how does this help us with Sneat?"

"Why does Sneat try to terrorize a whole ship? What does he like about this? I'll tell you my opinion: Sneat likes power."

12/26/96 Well, we came down to the planet in the tender, and yesterday was a wonderful Christmas.

To begin with, we no sooner landed than crowds of people welcomed us, and we were all given invitations to spend Christmas with individual families. While we were still overwhelmed from this, we got the additional shock of seeing local officials snap to attention, salute the captain, and call him "your highness." This seemed fairly ridiculous, but the captain took it calmly and pretty soon a white motorcar drove up, there was a blast of trumpets, and everyone fell on his face except the captain and the rest of us from *Starlight.* This incident left us feeling totally out of focus. But that is small price for having forty-eight hours leave on a real planet. We were willing to overlook the strange local customs.

The next thing we knew, a flunky jumped off the back of the white car, grabbed a polished silver handle and hauled open the rear door. He flattened himself in the dust as a fresh crew of flunkies rushed to unroll a long purple rug about two-and-a-half feet wide. This stretched from the rear door of the car to the captain. This bunch of flunkies then fell in the dust.

While we are staring at this, there stepped out of the car a tall man with a grim enduring look, dressed in several yards of white cloth trimmed in gold and silver, with flashing epaulettes, several rows of medals on each side of his chest, a purple sash, a sword, and a silver and gold baton in his hand.

This mass of flashing color strode up toward the captain, and they stared each other in the eye.

The captain seemed to have a faint smile as he said in a loud clear voice, "How stands the kingdom, your royal and imperial majesty?"

"It stands well, as you left it, your royal highness."

Just in front of the car, one of the loyal subjects was getting this all down with some kind of camera on a tall tripod. He was doing this while lying flat on his stomach, and staring into a periscope arrangement with a couple of remote-control handles that aimed the camera.

I was beginning to wonder if this wasn't some kind of joke or carnival performance, when somebody nudged my arm. I realized it was Sneat. In a low voice, he said, "Look there."

I looked, and saw, about eighty feet away, an armored car with its gun aimed at us. There was another one nearby, and near that about thirty men carrying long guns and wearing over their left breast pockets an emblem like a silver gunsight.

I glanced around uneasily. "What is this, a trap?"

"No, no," said Sneat, in a low excited voice. "It's the king's guard. See

that crown on their left shoulders?"

True enough, that did seem to be it. I looked hard at Sneat in curiosity. It was the first time I had seen him with that eager excited look.

Well, in due time the formalities between the captain and the local king were all concluded, they bowed to each other and the king turned around and started back to the car. The set of flunkies that handled the purple rug sprang into action and rolled it up behind the king as he neared the car. A new set staggered around carrying another rolled-up rug, which they set down in front of the captain. As fast as the first set rolled up the purple rug, the second set unrolled a light pink rug with a purple stripe down each side. Along this, the captain walked.

I glanced around as this procession headed for the car. First the king, then a bunch of flunkies rolling the rug up about two steps behind him, then a new bunch unrolling another rug, then the captain walking along about two steps behind them. All around me were men from *Starlight* with their jaws hanging open, eyes staring, and glancing back and forth from the car to the line of armed guards.

About this time, a third set of flunkies heaved the top off the rear of the royal car, and a fussy individual began rearranging the cushions. The king and the captain got in, all the rugs were rolled up, and the car set off to a blast of trumpets.

Sneat said in irritation, "That business with rugs was overdone."

I stared at him, trying to see his viewpoint. But now all the populace, that had been flat on their faces a minute ago, stood up. They seemed to think nothing of having spent all that time flat on the ground, but immediately took up the conversation where they had left off, so that in a few minutes we were each setting out in company with a different family.

Well, we had a morning of sightseeing, many of us went to church, and we all had a big Christmas dinner. The main topic of local conversation was the coming selection. I listened in silence as long as I could, but finally was overcome by curiosity.

"Election?" I asked.

"Oh no," said my host. *"Selection.* You see, his majesty has worked at the job for a decade now. Naturally he's tired. Tomorrow a successor will select himself."

"Select *himself?"*

"Of course. The job is a tremendous burden, you know. It would hardly be fair to *force* it upon anyone."

"You mean, someone *volunteers* to be king?"

"Exactly."

"Well—What if a halfwit—"

"Such people are not qualified."

"All right. But if your kings are *absolute* monarchs, what's to prevent you from ending up under a dictator?"

Everyone laughed. "True," said my host, "in the bad old days back on Earth, such things happened. But

here, modern science prevents it. *Our* kings think only of the good of their subjects."

"How does modern science manage that?"

"I'm sure I couldn't say."

"How do your kings 'select themselves'?"

"Why, we gather in the great arena. The first man to cross the line is king."

I stared. "A sort of race?"

"Oh no. Not a race. There is never a rush to step over the line. You'll see what I mean."

It developed that the tests we had been required to pass to become spacemen were stiff enough to qualify any of us to become king of New Cornwall if we wanted, and therefore we all ended up the next day with our hosts in a gigantic sports arena hung with silver and gold banners, and with a long straight purple line drawn down the length of the arena.

As we watched, a military band played a march, a line of horsemen in blue uniforms with silver breastplates and drawn swords rode in, there was a blast of trumpets, and the king came in followed by a herald with a big scroll, who walked out to a microphone set almost at the purple line, raised the scroll, and read:

"Be it known, that our illustrious king and emperor, desiring to lay down the heavy burden of his duty, hereby throws open to all you qualified and assembled—be you of native birth or whatever, so long as you be human—the right to ascend the throne.

"With this right, be it well and clearly known, pass the command of all the armed forces of the planet New Cornwall, and the absolute right to command of each citizen what you will, and to be obeyed.

"Whosoever desires to achieve this absolute authority, and whosoever is is willing to accept the heavy burden it entails, let him so signify by stepping forward across this line."

There followed a half-hour harangue to point out the nobility of taking up the burden, and the need to give the present king, who had worked hard all this time, a well-earned rest.

At the end of this half-hour, Sneat stepped forward and crossed the line. Sneat is now king of New Cornwall.

12/27/96 This evening, I was busy filling out the necessary forms to account for the disappearance of Sneat, when the captain walked in.

"Well," he said, "that was better than bashing him over the head, wasn't it?"

"Yes, sir," I said. "This really gets him out of the crew for good. A little rough on the planet, though."

"Oh, no. Sneat will make a good king." The captain spoke in the positive manner of one who knows by direct experience. He added, "After all, he hasn't any *choice* in that matter."

I shoved back the forms and turned around to face the captain. He was looking at me with his usual expression, which is a sort of quiet authority. A slight change of the lines

around mouth and eyes can shift this expression to one of friendly warmth or arctic chill. It was now necessary to risk the chill.

"Sir," I said, "you realize that this ship is a mass of boiling curiosity?"

"It's good for them," said the captain, with a faint grin. "It will take their minds off their troubles."

"I can't think," I said, "of anyone I'd want to have over me as an absolute monarch. But if I *had* to choose someone for that position, the last person I'd pick would be Sneat."

"And yet," said the captain, "most people you might pick would kick and scream to get out of the job. Sneat *wants* it."

"Yes," I said. "As you remarked earlier, Sneat seems to love power. But does that mean he should *have* power? Human history is overburdened with men who loved power, got it, misused it, made their subjects miserable, and were finally overthrown by some new power-maniac. Then the new man went through the same process as the one before."

"True, but all that is systematized down on New Cornwall. The average king only lasts about eight to ten years. After that, he can't get rid of the power fast enough."

"Then there must be special conditions," I said.

The captain nodded. "There are special conditions. It would be interesting to know why it is that great genius will suddenly appear in one place, and not in another place where conditions look just as favorable. New Cornwall, as you know, is not fully industrialized. But its citizens trade their products with worlds that are industrialized. Advanced electronics equipment is available on the planet, and of course, it has to be kept in repair. Skilled repairmen make an excellent living. It is like this on other worlds, but it was on New Cornwall that the genius appeared."

I listened intently, and the captain went on. "This man became interested in the relationship between the electrical current used in man-made apparatus, and the impulse that passes along a nerve in the body of an animal. The result of his studies was a tiny device called a 'neurister'. A neurister, surgically inserted in the proper place, can receive from outside a signal especially keyed to it. The result of this signal is that the neurister stimulates a nerve nearby. And the result of this is that the person in whom the neurister has been inserted feels a sensation from that part of his body."

A chill traveled up and down my spine. "What kind of sensation?"

"Depending on the circumstances, a sense of uneasiness, a pressure, an itching, a burning, a feeling of pain, or—in the extreme—downright agony. From the king down through the dukes and earls to the lowest squire, the governing authorities on New Cornwall are all liberally supplied with neuristers."

The captain glanced at his watch, and added, "About this time, I imagine, Sneat is stretched out on the operating table."

"Much as I dislike Sneat," I said, "I wouldn't have wished this on him."

"You didn't have to. He chose it himself."

"Who pulls the switch that sends the pain through him if he gets out of line?"

"Each of the nobles has, while he's in office, not only a set of neuristers, but what corresponds to a relay, located within his body cavity. Each of the loyal subjects, on the other hand, has within him a small device corresponding to a transmitter."

Suddenly it dawned on me. "You mean—If, say, some dark night there's a catastrophe like an earthquake or a flood—?"

A faint grin crossed the captain's face, and he nodded. "Squires, knights, baronets, barons, viscounts, earls, marquises, dukes, princes, and king—everyone having any authority in the region—suddenly wakes up with a pain in the part of his anatomy that corresponds to the source of the trouble. The king, for instance, is likely to come to at 3:00 a.m. with a peculiar grinding pain in the upper part of the calf of his left leg, whereupon he will jump out of bed shouting, 'Quick! I think another typhoon just hit Bijitoa! Get the disaster crews ready!' The Viscount of Bijitoa, whose whole body is now one living ache, will already be doing everything possible."

"But," I said, "if Sneat has absolute authority, tell me why couldn't he order the neuristers removed?"

"Yes, but here is the real work of genius. A special type of neurister-transmitter responds directly to a triggering impulse from the brain of the king or nobleman who has it. The activating impulse is the thought of evading duty."

"Then what happens?"

"Every neurister in the body is activated. It's like a slow dip in boiling oil.

"It has its compensations," said the captain. "He will have as much authority and respect as he could easily ask for. After the conventional term, a new selection will be held, the neuristers will be removed, he'll have a bonus and a small but steady income. The people will respect him, and whenever he's on the planet he'll have full honors and the courtesy title of 'your highness'."

Suddenly I was alert. "They'll call him, 'your highness'?"

The captain nodded, then smiled and rolled back his sleeve. Above the wrist, his muscular arm was marked with a number of small fine scars. He said, "I know whereof I speak."

A moment later we had said goodnight, and he was gone.

I sat still, aware of the change that had taken place in the ship in the past few days. Once more everything seemed smooth, efficient, and good-natured.

There could be little doubt that the captain knew how to run things.

No wonder.

THE END

THE.

By DEAN McLAUGHLIN

Rightness seems to bear no discernible correlation with righteousness — particularly when fear, or that subtle form of greed known as publicity-seeking gets involved....

Illustrated by Bernklau

PROLOGUE

The cold wind screamed and drove dart-chips of crystal stuff deep into Chier-cuala's fur.

Chier-cuala struggled up the hill. It was hard going. His walking flippers couldn't find good footing in the white, soft powder that smothered the land, and the slope was steep. His stubby legs ached with fatigue. He floundered and wallowed in the white powder. It was cold.

He couldn't remember any cold time like this one. Never had it been so cold. Never had the wind blown so hard—so endlessly. It had not stopped for many sleeping times. And never had the strange white powder lain so thick on the ground.

Chier-cuala couldn't understand.

The cold, hard darts of crystal stuff clung to his fur. He brushed them away. The wind plastered more against him. The wind leaked through his thick pelt and chilled him. His walking flippers ached and throbbed with the cold. He whimpered softly.

Stubbornly, he pressed on toward the crest of the hill. He needed food. His hunger was a compelling agony. It was the only thing that could have driven him out into this cold and wind. Always before, when a cold time came, he had huddled in his lair until it stopped—until the sky was blue again, and the powderlike white stuff on the ground turned to wetness, and the air turned warm.

But this time the cold had not stopped, and the wind still blew, and the sky remained gray. He had not eaten since . . .

He remembered the last thing he ate—the small, clumsy creature he had caught in the recesses of his lair. It was so small he would have ignored it, except he was starved.

And after he ate it, he had slept through a dark time, and then there was a bright time during which he did not eat because there was nothing, and then another dark time through which his sleep was troubled by visions of edible creatures.

Now, forced out of his lair by his hunger, he climbed the hill. The odd creatures on the hilltop had given him good things to eat, sometimes, when he did things which they made him understand they wanted him to do. Purposeless things, and some of them were very hard, but the odd creatures gave him good things to eat when he did them.

The slope was covered with the cold, white powder, and the broken-off stems and stalks of what had been

. . BROTHERHOOD OF KEEPERS

a forest stuck up nakedly. Shattered pieces of them, buried under the white powder, slashed his walking flippers and blue stains marked his path.

Chier-cuala tried to pull himself up the steep slope by grasping the upright stalks in his prehensile, paddle-like forepaws. The stalks broke. He fell back—rolled downhill in a whirl of the white powder. It got into his fur. It was wet and cold.

He lay where he stopped rolling. He whimpered, too weary to move. Finally, knowing he must move and making the effort, he struggled up and went on. He did not try to grasp the stalks again.

At last, he found a way to the hilltop. The wind blew more fiercely up there. It slashed through his fur and chilled his body. He cried softly, miserably. His walking flippers were full of pain—turning numb. The blue stains in his footprints grew large. Clumsily, he stumbled across the hilltop toward the place of the odd creatures.

He whacked a forepaw against the flat thing that blocked the entrance. It did not move. He slapped again, and then again and again, harder and harder. He uttered a broken, heart-forsaken cry. He could not understand why the odd creatures did not take away the entrance-block and give him food.

He had to have food. He was hungry.

The cold wind screamed.

Chier-cuala slapped the door and sobbed.

I.

HEY called it coffee, even though it was brewed from the stems of a plant which originated forty light-years from Earth. It had a citric, quinine-like taste. Hot and sweetened, it served the same function as coffee. Some people even preferred it.

It was an odd hour; Sigurd Muller and Loren Estanzio were alone in the commissary. Muller sipped from his cup—it was too hot yet. He set it down.

"What do you think about it?" he asked the younger man.

Estanzio made an awkward, unconvincing shrug. "It sort of scares me," he admitted.

"Yeah?" Muller said. He leaned his weight on the table. "Why?"

The young man was embarrassed. "Well," he explained, "you remember last year, just after I got here, you put me through the test sequence—the same one you use on the floppers?"

Muller smiled. "I put all you young squirts through it. You're supposed to be smart, or you wouldn't get to come here. It's a good calibration standard."

Estanzio nodded. "I didn't do so good," he said.

"You did average," Muller recalled, as if it was an unimportant matter. He tapped a fingernail on the table top. "The trick with an intelligence test, you've got to make it tougher than the smartest guy to take

it. Otherwise, it's a no good test." He slouched back and half-closed his eyes. "In the seven years I've been here, the average intelligence of the scientist-candidates that come here hasn't gone up an inch. I guess you kids have reached an evolutionary plateau."

"That's the thing that scares me," Estanzio confessed. "I mean, I knew all about mazes and problems, but the set you've got had me stopped. And when I saw that flopper catch on to the pattern maze—when it didn't even know the principle of a maze . . ." He hesitated. "I'm scared," he repeated lamely.

"It was a smart one, all right," Muller said.

Estanzio wasn't ready to go quite that far. "It could have been a fluke," he suggested.

Muller shook his head. "No fluke," he said. He leaned closer. "What if I told you the one we had today wasn't the first?"

Estanzio frowned. "I hadn't heard of any others," he said doubtfully. "And I know there haven't been any since I've been here."

"You've just been here a year," Muller reminded him. "I had two the year before you came. They both came from the same place—the same place this one came from."

"Ziggurat Mountain?"

"Yeah," Muller said. "An enclave shut up in the mountains with no way out and a population of about seven and a half thousand. It used to be six thousand—it's been going up the last ten years."

Estanzio thought about that for a while. Idly, he turned the handle of his coffee cup one way, then the other. "Just the sort of place we could expect it to happen," he said finally.

Muller nodded, smiling. "Now tell me why."

"Well, it's a small population in a limited area—isolated—and they're under extreme selection pressure. It's the sort of situation that's almost sure to show an evolutionary trend."

"You got that out of Houterman's book," Muller told him.

Estanzio flushed. "Sure," he admitted. "But he's right, isn't he?"

Muller shrugged. "It's the same basic principle," he agreed. "But he wasn't talking about the setup here. He was talking about evolution by genetic drift—where the genes already exist. That's not what's happening here."

"Are you sure?" Estanzio asked hesitantly.

"Yeah," Muller stated. "We've had this station here ever since the planet switched from Alpha to Beta —that's close to a thousand years. We've been testing floppers all that time. If the genes had been around back then, they'd 've shown up in the first couple of centuries. They didn't. The first flopper that showed up even halfway intelligent—don't scowl like that, I've checked the records—was just forty years ago. And guess where he came from."

"Ziggurat Mountain?" Estanzio guessed.

Muller rapped a fist on the table.

"Right," he said through his teeth. "It's a mutation. It's got to be. And it happened right there in the enclave."

Estanzio was silent a moment. "Why did you kill it?" he asked.

"Same reason I killed the other two," Muller said. "I want a look at it's brain. The first two—I thought they were flukes. Now I don't think so—and a look at this one's brain cells will prove it."

"But wasn't that against the rules?" Estanzio wondered. "I mean, a flopper showing exceptional characteristics . . ."

Muller scratched his satanic beard. "So it was against the rules," he said contemptuously. "I had to find out, and that's the only way."

Abruptly, then, he changed the subject—or seemed to. "You go back with the supply ship, don't you?"

It wasn't really much of a question. Only a very unusual scientist-candidate stayed more than one year. Estanzio nodded.

Muller smiled, satisfied. "O.K.," he said. "When you get back, you can talk about this all you want. But while you're still here . . . it didn't happen. None of it. Understand?"

"I . . . I think so," Estanzio said slowly. "But . . . why?"

"Because they're getting smart," Muller told him. "If we don't do something, they'll all get smart—smarter than we are. And they're vicious—you've seen what the wild ones are like. Well, we can't let it happen. That's why we've had this station here all these years—to watch 'em, because someone way back then figured this might happen. So we can stop 'em, if it does. But there's just enough softheads around here that *want* it to happen. We don't want them finding out—or anybody else."

"Oh," Estanzio said. He frowned helplessly. "But what can we do? How can we stop them?"

"Don't ask," Muller chuckled. "I might tell you."

"Well, I'd like to know," Estanzio said.

Muller leaned his weight on the table. He tapped the hard surface confidentially. "You heard who's coming in the supply ship this time?"

Estanzio paused, trying to remember. "Well, there's Blackett, and Holman, and . . ."

Muller waved a hand. "I don't mean personnel. I mean just for a look around."

"Hitchcock?" Estanzio wondered incredulously. "But he's . . . He'd be on *their* side. He always is."

"He might be," Muller admitted, "if he knew what he was doing. Most of the time, he just meddles. That's what he's going to do here."

"Are you sure?"

"Yeah. I'm sure," Muller said, smiling. "I'm going to help him."

He laughed.

"I was horrified, gentlemen. Horrified."

That, Adam Hitchcock decided, was the thing to say about Xi Scorpii when he got back to Earth. That was

what he would tell his Society for Humane Practices, to signal the beginning of a new crusade.

The Xi Scorpii Foundation would protest, of course. They would say he was misrepresenting the facts. But that didn't worry him. Men always said that when he exposed their iniquities, and it never made the slightest difference. The public always recognized the truth.

Hitchcock made his decision as soon as he arrived at Xi Scorpii—while he was still descending the stairway scaffold that huddled close up against the *Wayfarer*'s flank. His mood was surly—it had been a bad trip out. The *Wayfarer* was a cargo ship, with only minimal provision for passengers; he had been obliged to share his cabin with a young scientist-candidate whose single-minded enthusiasm for the mutational aspects of genetic chemistry left him with a very unflattering picture of the scientific mind.

Carrying a piece of luggage in each hand, Hitchcock trudged down the stairs. It was a long way down, and the scaffold felt rickety. It trembled and creaked in the wind.

Any civilized place would have had an elevator.

The wind was cold. It howled around him. It chilled his throat. It penetrated through the thin overcoat he wore—a coat which was all he'd have needed on any civilized planet. His ash-gray hair was tangled. His ears tingled painfully. His jowls were numb. His head ached and his nostrils watered. It was a dreadful planet.

He paused on the stairway and set down his bags. He tried to draw his collar tight. It was no use—the cold air continued to ooze through. Grimly, he started down again. His camera, on its loop over his shoulder, bumped against his side.

The landing field toward which he descended would not have done justice to a survey camp. It was nothing but a leveled-off rock plain without pavement, no larger than a city block. Various atmosphere craft crowded the edge of the field on the side nearest the outpost's black dome. On the other side, a cold sea spread all the way to the edge of the sky. Sluggish, floe-choked waves smashed on the rocks, building castles of ice with their spray.

Critically, Hitchcock glanced toward the bright sun. It burned in a blue, clear sky, but it gave no warmth. Nor was the system's other star more than a fleck of light down close to the ice-dappled sea.

Definitely, this planet wasn't fit for anything to live on—neither man nor any other creature.

Already, he saw as he continued his descent, the ship was disgorging its cargo. Its hoist settled massive crates and bundles of supplies on sledges which were dragged toward the dome by harnessed teams of shaggy, dirty-white, short-legged creatures about the size of very large dogs. At rest, while waiting for their sleds to be loaded, they squatted on their hind legs, their apparently boneless arms curled up almost double and their mittenlike paws pressed flat

against their bodies. No one was directing them. They seemed to know what to do.

Halfway down the scaffold, Hitchcock stopped again. He turned to the man behind him and pointed at the laboring creatures. "Are those the natives?" he asked. He had to shout to be heard above the howl of the wind.

The man—another of those eager young scientist - candidates — didn't seem to understand the question. "The floppers?" he wondered uncertainly, then nodded.

Hitchcock unlimbered his camera and put the scene on tape.

It was an outrage!

The poor things were slaves!

When he reached the bottom, a man in a thick, hooded garment was waiting beside a sled with removable benches set on it. Its eight-flopper team squatted stoically, cringing from the frigid wind. The man reached out to take Hitchcock's luggage. "Climb aboard," he invited loudly. "We'll be heading for the dome in a minute, as soon as the rest of you get down."

Hitchcock didn't let go of his bags. He glanced at the harnessed floppers. "Thank you," he said stiffly—and his teeth rattled with the cold. "I prefer to walk."

The man shrugged, but he looked concerned. "It's a long way to hike in this wind," he advised, nodding toward the dome a half mile away. "The first thing you know, you've took a deep breath, and then you've got frost in your lungs. Better ride along with the rest of us peasants."

"If they have to pull me, I will not ride," Hitchcock insisted staunchly.

"Who—the floppers?" the man wondered incredulously. "They grew up in this weather. They eat it for breakfast."

"They didn't grow up to be slaves," Hitchcock retorted.

The man looked at him queerly. "You must be this Hitchcock we heard about," he said. "Listen, mister —somewhere you've got the idea these floppers are people. They're not. They're just smart animals."

"No creature in the universe was ever born to be a slave," Hitchcock intoned.

The man made an exasperated noise. "Just take my word for it. If you walk, you'll wish you hadn't. Now climb aboard. We're ready to move."

He jerked an imperative thumb at the sled. Hitchcock eyed him for a long, stubborn moment.

Then the cold and the wind persuaded him. He went to the rear of the sled and put his baggage in the rack, all the time stamping his feet to put warmth in them. His hands were numb and blue. Shivering, he told himself the creatures could endure the climate better than himself, and that they would drag the sled whether he rode it or not. He would not add much to their burden.

But he hadn't forgotten his mission. He raised his camera and taped the scene—first the sled and its load of huddled, windlashed passengers—then swung the lens forward to the

floppers waiting mutely in their harnesses. They had a sad, downtrodden look. Hitchcock let his camera dwell on them.

Unfortunately, they were ugly as sin.

He demanded quarters of his own, and got them. Coldly, he rejected the suggestion that a flopper could carry his luggage. Lordly, austere, he strode along the corridor to his room.

When he got there, a flopper was inside. With single-minded concentration, it went on sweeping while Hitchcock laid his bags on the bed. For all the sign it gave, it might not have noticed his entrance.

It would have been as tall as Hitchcock, but its legs were too short. Its pelt was silvery gray. Its head was revolting—a slab-shaped, almost neckless thing set on top of a shoulderless body. The big, googling eyes were placed far apart, leaving space for the big, lipless mandible-jaws in between them. On top, the single ear stood up like the peak of a much-too-small cowl.

The rest of the creature was equally hideous—the flexible arms as seemingly boneless as a fire hose, and the flat, big, floppy feet. It was marsupial, with a pendulous pouch that pulsed spasmodically, as if something alive was inside. But the creature was also unquestionably—almost indecently—masculine. It had a musky smell. Hitchcock stared at it with sick distaste.

It continued to work the broom with brainless absorption. It swept around Hitchcock's feet as if he was a piece of furniture.

"Stop that!" Hitchcock commanded offendedly.

The flopper stopped. Looking up at him dumbly, it rolled its bulbous brown eyes.

"Get out of here!" Hitchcock told it.

The flopper just looked at him, dumb and trembling. Tentatively, it started sweeping again.

"No! Get out!" Hitchcock yelled.

Frantically, the flopper went on sweeping. It tried to work too fast. The broom flew out of its flipperlike hands and whacked Hitchcock's knee. Hitchcock yowled with pain and rage.

The creature fled, bounding out the door on all fours. Hitchcock grabbed the broom and chased it as far as the hall. He caught only a glimpse of it as it disappeared around a corner.

Slamming the door, Hitchcock went back and sat on the bed. He rolled down his hose to inspect his whacked knee. It was an angry red, but not damaged.

The stupid brute!

Someone knocked on the door. Hitchcock pulled up the hose and refastened the top to his undershorts. Smoothing down his tunic skirt, he said, "You may enter."

A slovenly dressed man came in—ankle socks, ill-fitting kilt, and turtleneck. He had a full, untrimmed, black beard. "What's the ruckus in here?" he asked.

"Ruckus?" Hitchcock repeated incredulously. "Here?"

"Yeah. Here," the man insisted. "One of my cleaning boys skedaddled out of this hallway and dove in his hutch like a carload of hell was looking for him. He'd cleaned up this far, so he must've been here." He glanced down at his feet. "That's his broom." He picked it up.

"I told it to leave," Hitchcock said. "I refuse to be a party to its slavery."

"Exactly how did you say it?" the man asked intently.

"I asked it please to get out of here," Hitchcock stated primly. "I must say the creature was unpardonbly stupid. I had to repeat it twice."

The bearded man looked skeptical, but didn't challenge the assertion. "That's not in his vocabulary," he told Hitchcock. "You're new here, so I guess it isn't your fault. But after this, if you want a flopper to scram, say, 'That's all,' and he'll get right out. They're real obedient if you're proper with 'em. But you got to give 'em the right commands."

"I'll keep my own room clean," Hitchcock announced frigidly. "Keep your slaves out of here."

"If you want 'em to stay out, bolt the door," the bearded man advised. "It'll worry the boy to have his routine monkeyed with, but it's better than scuttle his training."

"Keep them away from me," Hitchcock repeated insistently.

The man looked him up and down. His eyes were steady. "Don't expect 'em to understand everything you say," he said finally. "They don't."

He backed out of the room and shut the door.

Mindful of his banged knee, still seething, Hitchcock rummaged in his bags for the liniment tube he always carried. He most certainly *would* keep his door locked. The mere thought of that mindless creature pawing his possessions made him tremble with rage.

It was terrible, the indignities a man of good will was forced to endure!

II.

"I hope your room is satisfactory," Ben Reese said as they began Hitchcock's tour of the outpost. He was a plump man, Ben Reese—almost forty, with a round face and an almost bald scalp. Hitchcock worried him.

"Adequate," Hitchcock replied. He had a nerve-rattling way of walking—never looking where they went. Constantly, he twisted his head in one direction, then another. "Spartan, but adequate."

"We don't have many luxuries here," Reese admitted. "Everything we have has to come in the supply ship."

"Um-m-m," Hitchcock muttered. "Tell me, Mr. Reese—what is it like to be the undisputed monarch of an entire solar system?"

Shocked speechless, Reese stopped in his tracks and stared at the man. "I don't think you understand," he managed finally.

Hitchcock walked loftily onward. Reese had to run to catch up.

"All I do is . . . is co-ordinate our research work here," he explained, a little breathless. "And . . . and I estimate our supply needs. The ship only comes once a year—someone has to do it."

But Hitchcock's attention was on something else. Maybe he was deaf—he didn't seem to have heard.

They followed the dome's main hall. Their buskinned feet whispered softly on the tiles. Only a few people passed them. In the dim light, the near silence, it was like the cellars under a castle. Floppers intent on their tasks scurried past like industrious gnomes.

At the hall's end, where it split into two out-curving corridors, Reese paused. "Would you rather see the anatomy lab first?" he proposed. "Or the biochemical department?"

Hitchcock didn't reply. Not far up one of the corridors, a flopper was belaboring the floor with a mop. A sloppy bucket sloshed by its feet. With an almost expressionless look of glee, Hitchcock turned his camera on it.

The flopper worked on, oblivious of them. After a long moment, Hitchcock stopped his camera and turned. "You said something?" he inquired.

"I asked what you wanted to see first," Reese said.

Hitchcock glanced down at him as if he were a bug. "It makes absolutely no difference," he assured Reese. "Before I am done here, I will expect to have seen everything."

They went on with the tour. For Reese, it was an endless trial. Hitchcock listened only to the things he

cared to hear, and trained his camera on every laboring flopper they passed.

Reese endured it as long as he could. He had no illusions why Hitchcock had come to Xi Scorpii—the man was convinced the floppers were victims of human oppression, and planned to expose it. He and his Society for Humane Practices had already done something like that on a score of other planets, completely disregarding the actual facts. Reese had hopes he could persuade the man to leave Xi Scorpii alone, but he lacked the faintest idea of how he could do it.

Finally, when Hitchcock unlimbered his camera at the sight of a flopper washing dishes in the commissary, he thought he saw his chance.

"Why are you doing that?" he demanded.

"I am gathering evidence," Hitchcock replied. He held his whirring camera steady, not looking at Reese. "When I return home, I intend to see this outrage stopped."

Reese was nonplussed. Even knowing Hitchcock's intentions, he could not imagine what the man was talking about.

"I will not stand still and see any person enslaved," Hitchcock stated.

So that was it. "But . . . they're *animals,*" Reese explained. "We've trained them to do these jobs because we don't have enough people here to do them. They . . . they're just domesticated animals."

Hitchcock put up his camera and turned. "Do you ask me to deny the evidence of my own eyes?" he demanded. "I see this one washing dishes, and you tell me it's only an animal?"

"Why not," Reese wondered softly. "It's a . . . a rather intelligent animal, of course—somewhat more advanced than, say, the terrestrial chimpanzee. But that still leaves it far below the human level. Are . . . are you against using animals to take the burden of work off a man's shoulders?"

Hitchcock said succinctly: "Let us continue our tour."

He walked off, forcing Reese to tag after him. They were out in the corridor again when Hitchcock said, his voice scathing, "I was advised that the welfare of the natives was being neglected, but—"

"Who told you that?" Reese wondered blankly.

Hitchcock was impatient. "It's common knowledge on every civilized planet," he stated.

"But it . . . it's not true!" Reese protested. "You can't even properly call them natives. They're only animals—in fact, rather primitive animals in most respects. They do have fairly well developed brains—that is, we can teach them some reasonably complicated things, and they have moderately good judgment—but they haven't any abstract reasoning power, or the ability to symbolize, or . . . or social instinct—none of the things that make people human."

"I came here," Hitchcock replied, "to judge that for myself. I have heard excuses like yours on other planets I've visited—planets where

the most outrageous violations of decency were practiced. Why, can you imagine—on Epsilon Eridani they were actually *eating* them! As for conditions here, I will come to my own conclusions."

He paused then, slowed his stride, and turned to Reese. "Well, where do we go now?"

Originally, Reese had planned for them to continue along the corridor. The microfilm reference library would have been next. But now, suddenly, he changed his mind. He nodded across the corridor toward a spiral stairwell.

"Down there," he said.

As they clambered down the narrow, steep stairs—Reese going first—Reese said, "So far, you've only seen floppers who were born here—I mean, here in the dome. You see, when this"—he gestured inclusively around himself—"was being built, they were brought in for study, to set a standard we could guide our work by. They've been here ever since. We've let them breed without any control, and they haven't been under the selection pressure the ones outside have been under, so they still ought to be almost identical to their ancestors. That makes them a good comparison-standard against the floppers outside."

They emerged from the stairway into a corridor that looked very much like the one they'd left. Reese led Hitchcock into a side corridor which ended at a double-doored threshold. Passing through, they walked out onto a gallery overlooking a roomful of partitioned cubicles on the floor below. Most of the cubicles had floppers in them.

"These are wild floppers we've brought in to examine," Reese explained.

Hitchcock crossed to the rail and aimed his camera downward. "They are no different from the others," he declared truculently. "Must you keep them in solitary confinement? It's inhuman!"

"But it's not like that at all," Reese tried to explain. "They come from different geographical areas, and we put them back when we're done with them. We have to keep them apart to prevent them from breeding. Besides, they might kill each other."

The sound of their voices had made the floppers look upward. Their lipless, fleshless jawbones clashed slaveringly. Hitchcock moved his camera back and forth across their upturned, bloodlusting faces.

"I want you to see something," Reese said. He crossed to a cold locker recessed in the wall and took out a large haunch of meat. It was a hideous blue-green color, and a translucent, cartilaginous length of bone protruded from it.

"Watch," he told Hitchcock.

Hitchcock was horrified. "You're going to feed them *that?*" he demanded. "But it's putrescent!"

"Oh, no," Reese assured him, earnestly shaking his head. "That's its natural color." He did not add that it came from a domesticated flopper which had died; Hitchcock would

have claimed he was promoting cannibalism. Crossing to the rail, he dropped the haunch into one of the pens directly below.

The flopper grabbed it before it hit the floor—grabbed it between its flexible paws and crammed it against its maw. It masticated the meat, bone and all, with its toothless, bare-bone jaws. It worked the meat to a messy pulp and sucked it inward, its throat pulsing hideously.

When they saw the meat dropped, the floppers in the surrounding pens tried to get to it—tried to leap and climb out of their prisons, but the pen walls were too smooth and high. Blind-stubborn, they kept on trying, slamming their bodies again and again against the partitions. They yelped crazily. The room was full of thunder, rasping screams, and screechings.

Through it all, with wild looks of apprehension, the favored one suckled and gobbled at the haunch. Its lipless mouth worked greedily. Trickles of blue-stained drool oozed down its front. In a remarkably short time, the haunch was gone without a trace.

The other floppers were still trying to reach the pen where they had seen the haunch fall. And now, gorged and still drooling, the flopper in that pen was trying to get out, too. It leaped and fell back, leaped and fell back, time after time—its goggling brown eyes turned upward, its appetite whetted. Involuntarily, Hitchcock flinched back from its ferocity, then bent eagerly forward so his camera could witness its rage. The crazed creature's hacking cries were swallowed in the general tumult.

Hitchcock stopped his camera, finally, and turned. He shouted something. The noise smothered his words. Reese gestured to the door. He led Hitchcock outside.

When the door closed behind them, shutting off the ear-blasting noise, Hitchcock turned on Reese.

"They seem to hate you," he observed. "Don't you feed them?"

"We fed them not more than an hour ago," Reese said, with a glance at his watch. "They didn't behave with much intelligence, did they?"

"Hm-m-m," Hitchcock growled. "A starving man would act that way."

"But these . . . they weren't starved," Reese argued. "They were probably half-starved when they were captured, of course, but they've been fed since then—most of them several times."

"I cannot believe that," Hitchcock retorted. "Those creatures were *starved*."

Reese shook his head. "Their reaction was pure habit," he said. "Food is scarce for them. It's been scarce all their lives. Their . . . their ravenousness is natural for them."

With a look of scornful pleasure on his face, Hitchcock pounced. "And why, may I ask, do you permit them to starve?"

It came to Reese that he had made a mistake. In trying to win a small argument, he had given Hitchcock support for a much more serious—much more difficult argument.

"Why . . . why," he stammered. "We're scientists. We're here to . . . to *study* the floppers. It's our whole reason for being here. You see . . . you see, we believe the floppers stand a very good chance of developing human-level intelligence. We've been watching for signs of it for nearly a thousand years, now. And if we tried to make their lives any easier, it would interfere with their development."

"Nonsense," Hitchcock sniffed.

"It isn't nonsense," Reese persisted reasonably. "It's a logical conclusion based on the principle of natural selection. If you'd let me explain the situation here—"

"I am fully aware of the situation here," Hitchcock replied. "I consider it disgraceful."

Reese gritted his teeth. "This is an unusual planet," he said earnestly, hoping the man would pause and begin to doubt. "That is, its orbit is unusual."

"Well, certainly," Hitchcock said. "I would expect a planet in a double-star system to have a distorted orbit."

"It's worse than that," Reese persisted mildly. "When this system was explored the first time, this planet had an orbit around Alpha—it's still in the books as Alpha II. But now it's going around Beta."

"What?" Hitchcock boggled. "Preposterous."

"It's true," Reese said helplessly. "And not only that, we think Alpha and Beta have been passing it back and forth ever since it was formed. They have rather eccentric orbits around each other, you see, and they come rather close together every forty-five years. If the planet is in the right part of its orbit when they're closest together, the other star captures it."

"Does this happen very often?" Hitchcock asked sarcastically.

Reese made a helpless gesture. "It's different every time," he explained. "It might stay with one star for a hundred thousand years, or maybe just for a couple of hundred. Each time it's traded, it takes up a different orbit—that is, different from any it's ever had before. The next time it happens will be three and a half thousand years from now."

Hitchcock sniffed. "This is very interesting, if true," he said. "But it has nothing to do with the deplorable way you have treated the natives."

"It has everything to do with how we treat them," Reese insisted. "You see, every time the planet changed orbits, it's climate has been drastically altered. We have a lot of geological evidence of that. I guess Alpha and Beta are more similar than most binary pairs, but there's still quite a difference in their radiation. And the various orbits the planet took put it at different distances out from them."

"I presume this has some significance," Hitchcock interrupted testily.

Reese nodded. "We're almost certain that the living things on this planet can endure great extremes of climate—if they couldn't, they'd have died out long ago. It's even possible that life here was wiped out com-

pletely by some of the changes—it might have happened hundreds of times before the cycle we're seeing now got started. I don't suppose we'll ever know for sure."

Hitchcock looked down at him with a fastidious expression on his face. "Never have I heard such a preposterous idea," he declared. "As if the spark of life could be snapped off and on like an electric lamp."

Reese had heard of people who thought like that, but he had never met one before. It was like meeting something out of the dark ages. "I was trying to emphasize how . . . how hardy the life-forms on this planet must be," he explained diplomatically. "How . . . how *adaptable*. We think they have the capacity to evolve hundreds of times faster than on any other planet. So you see, being here is a wonderful opportunity to see evolution at work. And—"

"You have not yet explained," Hitchcock reminded him again, "why you have neglected the welfare of the natives here . . . why you vivisect them, and—"

So he was back where he started, Reese thought. It was discouraging. "Why, I thought it was obvious," he explained. "The floppers aren't really intelligent—yet. But they do have the . . . the potential to *become* intelligent. It's really almost inevitable in a situation like this—that is, with an unpredictably erratic environment, intelligence is almost certain to develop sometime, because intelligence is the one specialization that gives an animal the ability to live in a whole lot of different environments. You see, we're not just studying the evolution process here—we're . . . we're watching the development of intellect. Sooner or later, somewhere on this planet, the floppers are almost certain to become . . . to become *intelligent*. I mean, intelligent the way a . . . a human being is intelligent. And we want to be here. We want to see it happen. We've never had the chance to see it happen in an animal before."

Hitchcock scowled. "You speak as if men were animals," he criticized. "As if an animal could have a mind."

"Well, human beings are a form of animal," Reese pointed out.

"That," Hitchcock snapped, "is nonsense. Dangerous nonsense. I want to hear no more of it." He hitched up his camera's shoulder strap. "As for this matter of intellect, I have only your word they are not intelligent right now. I will have to have proof, Mr. Reese. I must have proof."

Ben Reese gave up. He could not prove a thing to a man who refused to believe.

INTERLUDE

It was a good time to hunt. No wind blew loose snow on the screecher's tracks, blotting them. No mistiness obscured the distance, and the sky's light shimmered on the white land. Qua-orellee kept his eyes tightly lidded to lessen the glare.

The tracks were new. The beast could not be very far ahead. Qua-orel-

lee loped along, following them, but he stayed well aside of the trail for fear the snow would open under him like a mouth and devour him.

He had seen it happen, once. He and some other people were following the tracks of a bushy-tailed runner, and one of the people went close to the creature's trail. A hole opened under him and he was gone. Qua-orellee and the other people fled instantly. Since that time, Qua-orellee had never gone closer than three body-lengths to any creature's trail—not even his own.

The screecher's tracks vanished over the crest of a rise. Qua-orellee veered away from the trail, to reach the crest well away from where the screecher had been. It was hard to climb the slope with only his rear legs. He dropped down and hobbled along using one of his front limbs. In the flipperlike hand of the other, he clutched his rock.

His rock was a treasure—his only possession. He would need it when he came upon the screecher and had to kill it. It was hard to find a rock of a good shape and size for killing beasts with, but a rock was wonderfully better than ice. Ice broke easily. It didn't keep its shape. And, too, it took a much stronger blow to kill with it.

He never let the rock out of his sight, and rarely out of his hand. He clasped it to him when he slept, and he slept in his own secret place. Any other of the people would eagerly

kill him—if they dared to try—to possess that rock.

He topped the rise. Below him, the screecher's trail turned down along the valley, away from him. Qua-orellee let out a high, hacking cry, to tell the people who had joined him in the hunt that the screecher had turned in a new direction. Shrill, rasping calls came back from either side of him, repeating the news. Then another cry came from down-valley—the beast had been seen.

Qua-orellee clutched his rock against him and plunged eagerly down the slope. His big, flipper-feet and short legs made him stumble. He rolled all the way to the bottom in a cloud of snow, but he didn't let go of his rock. No matter what happened, he would never let go of his rock.

He stood up and shook the snow out of his fur. Up-valley, two more people—not encumbered with rocks—were bounding down the hillside on all fours. They continued across the valley and up the other slope. When they reached the crest, they headed toward where the screecher had been seen. Qua-orellee stayed in the trough of the valley. He followed the trail.

The valley curved around the bulk of a massive, steep hill. As he rounded the turn, Qua-orellee saw the screecher far ahead. Three people up on the ridge had gotten abreast of the beast, and one of them was lolloping down into the valley to head it off. On the ridge on the other side of the valley, the two who had crossed over were rapidly catching up, running on all fours. Qua-orellee was far behind. He hurried as fast as he could on his short legs and large feet.

The other people closed down into the trough of the valley, forming a wide-spaced crescent-circle line in front of the screecher. They had picked up chunks of ice and ice-spears. They confronted the beast.

The screecher stopped. It hunched down, as if to leap. They advanced toward it, ice weapons brandished. For a long moment, the screecher did not move. Then, with a snarl, it turned and retreated up the valley toward Qua-orellee.

Qua-orellee rushed to meet it. It saw him and veered away—started up the side of the valley. One of the people, galloping along in pursuit, headed it off. It swung back down into the valley, toward Qua-orellee. Qua-orellee stopped and stood erect, holding his rock high above him in both hands.

The beast charged. Its muscles pulsed and slackened rhythmically. It screamed its rage and savagery. Unflinching, Qua-orellee tensed himself to smash his rock down on the beast's skull. He watched the beast surge toward him, screeching.

Fearlessly, he waited.

III.

Ahead, the land loomed in the cold mist, a high mass of darkness rising out of the gray, frosty sea. Hitchcock cringed from it as it rushed overwhelmingly toward him, but then the pilot sent the skimmer sailing toward

the crest. Hitchcock looked down dizzily at the crumbling, ice-crusted cliff. Sudden gusts of wind slammed into the small craft. It bucked and jolted, and the pilot fought silently. The engine surged.

Then they were over the land. The winds fell away. Hitchcock saw spread before him a desolate plain of ice and crumbling stone, and beyond, towering high, the white mountains.

But not one living thing.

The pilot twisted around and looked to the man in the midship seat. "Want to check the traps?" he asked. His parka hood was pushed back, and the wind mask dangled from his throat like a bib.

"Yeah," Muller said. He had a snarling voice. "Check 'em. He—" He meant Hitchcock. "He wants to see how we work—that's part of it. But they won't have caught anything."

The pilot nodded, shrugged, and turned front again. The skimmer leaped forward.

Hitchcock lifted his camera. The utter lifelessness of the rock-littered plain was oppressive. It was something the people back home ought to see. This scene, more than any words he could say to them, would impress on them how dreadful Xi Scorpii was.

Muller twisted around to face him. Reluctantly, Hitchcock put down the camera and waited for him to speak.

"We'll see if our traps 've caught anything," Muller said. "If they haven't, we'll have to go catch our own."

"What? Do you hunt them?" Hitchcock demanded. The mere idea was appalling.

"We got to get specimens somehow," Muller told him.

The skimmer settled down close to the ground and streaked over the plain. The weathered boulders sprawled kaleidoscopically across their path, momentarily slashing at them, then vanished in the distance behind. Ahead, the glacier-choked mountains rose sharply into high, wispy clouds.

"How's it look?" Muller asked. "Pretty bare, huh?" He chuckled. "Wait a couple of months. Right now, it's the tail end of summer."

"Summer?" Hitchcock wondered incredulously. Here and there, a few hardy plants dug their roots into chinks in the rock, clinging to existence. Their segmented limbs and stems were frost-burst and coated with rime. Their fleshy, gray-green spines were spread in plaintive supplication to the distant sun.

Tentatively, Hitchcock raised his camera.

"Yeah, summer," Muller repeated. "We get about a whole year of it—one out of four. We're closer to the sun, then. Sometimes the temperature gets up as high as fifteen, here in the tropics—sometimes for weeks at a stretch."

"Only fifteen?" Hitchcock gestured at the rock-strewn, snowless plain. "Why isn't the snow—?"

"Fifteen centigrade," Muller explained shortly. "But it just thaws out close to the ocean. The other side of

these mountains, there's plenty of snow. You'll see."

The mountains bulked massively over them. The snow-sheathed slopes and bare rock cliffs reared steeply upward like a titan's wall. For several minutes, the skimmer cruised along that wall, then swung directly toward it where a glacier oozed from a narrow valley and poured down onto the plain.

The glacier's front was like a cliff, sheer and awesome, leaning outward. Berg-sized fragments, broken from it, lay in rubble at its feet. Engine snarling, the skimmer rose before the pebble-pocked wall.

Strong, battering bursts of wind hit the craft as it cleared the edge. Its engine screamed as it forced its way forward into the cold air flowing down from the mountains. Yawning fissures and dark, rippling veins of embedded pebbles streaked past beneath them.

Hitchcock lifted his camera again. The glacier imprinted itself on his tape. "Where are we going?" he asked.

"The other side of the mountains," Muller said. "Where the floppers are."

Hitchcock looked up at the mountains. The valley had curved. Mountains rose skyward all around them.

"But aren't floppers—" How he hated that silly word! "Don't floppers live back there?"

"Not many," Muller said. "That section of coast is cut off from the rest, and there's nothing to live on in winter. Mostly, they stick to the snow country."

"But . . . snow country?" It sounded ominous. "How can they live?"

"They get along," Muller said.

The glacier swelled upward steeply where it squeezed between two mountain shoulders. The skimmer sailed loftily over the crest—flew onward into the heart of the mountains.

"How?" Hitchcock wanted to know. "What do they live on?"

"They take in each other's wash," Muller said.

"I don't understand," Hitchcock said blankly.

"They gnaw each other's bones. Put it that way," Muller told him.

The skimmer descended from the mountains to a land of low hills smothered in snow. The sky was cloudlessly blue, and sunlight shimmered blindingly on the frozen, white wasteland. Hitchcock adjusted his camera to minimum sensitivity, to compensate for the glare.

"There it is," Muller said. "Flopper country."

Hitchcock thought of a baron showing off his domain from a castle's wall.

"Where are they?" he asked.

Muller snorted. "Oh, they're out there. But it's a lot of land, and not many floppers. Our last census put it at about one for every twenty square miles. And without a body heat spotter, half the time you don't see 'em." He handed Hitchcock a pair of sun goggles.

The skimmer struck out across the rolling land. It stayed high over the hills. "The traps don't signal," the

pilot announced. "Check 'em anyway?"

"Naw. Skip it," Muller grumbled. "Just waste our time."

He twisted around to speak to Hitchcock. "Traps don't catch much, these days," he said. "They're getting too smart to get caught."

"Oh?" Hitchcock asked, interested.

"We use pit traps," Muller explained. "Any other kind 'd be no good in this kind of country. They caught a lot of 'em, a couple hundred years ago. Not any more."

"I see," Hitchcock said. He was almost delighted. At least the poor creatures weren't completely at the mercy of these men.

"You know what I think?" Muller confided. "I think all we ever caught was dumb ones—the smart ones knew enough not to get caught. Now the dumb ones 've died out—there's nothing but smart ones left. So we don't catch 'em. Not with traps, anyhow."

"But you catch them?" Hitchcock inferred.

"Yeah. Sometimes," Muller said. He called forward to the pilot. "Head for that place we found all the tracks last week. Maybe they'll still be around."

"How?" Hitchcock wanted to know. "How do you catch them?"

"You'll see," Muller answered. He rummaged in a compartment under his feet and brought out a net. He unfolded it and laid it in a long, narrow roll on the cowling beside himself and Hitchcock, up against the cockpit's transparent canopy. He hooked lanyards from the exposed corners to grommets inside the cockpit, just under the rim.

"Dr. Muller," Hitchcock said, almost pleading, "haven't you done *anything* to help these poor creatures? Do you simply let them *live* in this horrible country? And starve? Freeze? Die—?"

"Why not?" Muller wondered. "They're just a bunch of animals."

"Why . . . why it's your human duty," Hitchcock protested, shuddering.

"Look," Muller said with a firm, inflexible patience. "We're scientists. We're here to study these critters—watch 'em and see if they evolve. If we tried to help 'em, we'd mess things up. We couldn't tell what happened naturally and what happened because we made it happen. Anyway, they aren't any worse off than if we hadn't discovered this planet."

"Dr. Muller," Hitchcock said, and there was condemnation in his tone, "you haven't one spark of humanity in you."

Muller laughed. "Good thing I don't, or I'd be no good here," he said. "Look, mister. These critters have it hard—they've got to live in this country, or they die. And if they live, it's because they've adapted. And if they adapt, it's because they're evolving. Do you want to get in the way of that? Do you?"

"It's indecent!" Hitchcock sputtered. "Criminal! You'd let these poor creatures die and . . . and suffer without lifting a hand! Why, they have the same right to live that you

do. I will see them granted that right."

"Go ahead," Muller sneered. "Just don't interfere with our work. This here's the biggest research project in the universe."

"Tracks," the pilot reported.

Hitchcock looked out. Far below, a thin trail threaded across the crest of a low hill and down a steep slope. The skimmer paused and settled groundwards. The trail became the dragging tracks of a clumsy, struggling animal—the flattish footprints close-spaced and scuffed, as if the feet had not been lifted clear of the snow.

"It's a flopper, all right," Muller decided. "Cruise around—let's see if there's more."

The pilot kept them low. They followed the low ridge and crossed several more trails, all of them headed in the same direction. "Looks like a hunting pack to me," the pilot judged.

"That's what it is," Muller confirmed. And to Hitchcock, "They just started hunting like this about forty years ago. Most of 'em still hunt by themselves, but every once in a while we find signs of 'em working together—like this."

Hitchcock let his camera scan the pattern of tracks in the snow. "Is it significant?" he asked.

"Yeah," Muller said. "They're not gregarious critters. Like I said, most of 'em hunt by themselves. This is the first sign we've had of 'em getting together—they're developing a social sense."

"Civilization?" Hitchcock wondered, awed.

"It's the start of it," Muller said. "Right here."

The pilot had turned the skimmer to follow the hunting pack. Muller pointed down at one of the trails in the snow. "That's the tracks of the thing they're after."

It looked very much like the other trails—slightly messier, with the footprints overlapping in a complicated pattern. Hitchcock gave his camera a long, careful look while the skimmer swept up the slope of the low hill and down the other side into the deep valley.

"It's just another sign they're turning smart," Muller said. "Them hunting in packs, I mean. That's evolution working. It takes a lot of brains to stay alive in a country like this."

"Do you mean to tell me," Hitchcock wondered, "that *this* is why you refuse to help them—so you can watch their desperate struggles? To . . . to satisfy your own curiosity?"

"Sure," Muller said. He sounded very satisfied with himself. "Can you think of a better reason? Besides, we may have to fight 'em some day. It'll be a good idea to know all we can about 'em."

"But what possible reason could we have for fighting these . . . these pitiful creatures?" Hitchcock protested.

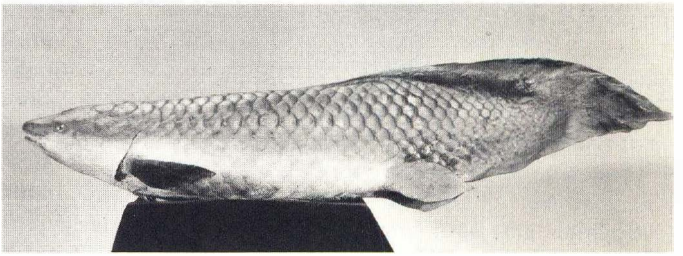
"If they get smarter than we are," Muller told him, "we *better* fight 'em. And I've got lots of evidence they're going to."

That seemed to settle that. Hitch-

(Continued on page 137)

BEYOND THE PHYLA

By Isaac Asimov



The Lungfish wasn't handsome, graceful, or clever . . . but he picked a winning maneuver. He started the move to dry land...

All photographs by Courtesy of the American Museum of Natural History

You hear a lot of malarky about there being no such thing as "general superiority." The whole history of evolution is, very simply, the search for, and achievement of, general superiority. Every time any species sought to win the race by special superiority . . . well, take a look at what specialization yielded!

IN MY recent article—"March of the Phyla"—I concluded that there were two broad divisions—"phyla"—of living creatures that were more advanced than any others, in the sense that they had the greatest control over their environment. These two were the phylum, Arthropoda—or "arthropods," including lobsters, spiders, centipedes, insects and so on—

The amphibians followed the lungfish's start; they developed true legs, and true lungs. But if you look at this X ray of a young bullfrog, you'll see why they were still pretty clumsy. Why alligators waddle, and frogs hop: the thigh bones are straight, and there is no true pelvis. The saurians invented the pelvis and the 45° angle for the upper femur later.

and the phylum Chordata—or "chordates," including fish, snakes, birds, men and so on.

I carefully did not try to make a decision as to which of the two was *the* most advanced. On the one hand, being men, and, therefore, chordates, it seems natural to us that the chordates are the more advanced. On the other hand, it is undeniable that the mass of arthropod life in existence is far greater than the mass of chordate life.

Also, man may be ruler of the Earth, but he has certainly failed to control those insects that annoy him, despite heroic efforts. Annoying chordates, on the other hand, have generally gone down under the human onslaught; sometimes with embarrassing rapidity.

Perhaps that is the reason many of us have the unhappy feeling that when and if chordates—including even man—pass from the scene, insects—the most successful of the arthropods—will still be proceeding in quiet business-as-usual fashion.

Despite any uncertainties we may have, however, if we restrict ourselves to the chordate individual and the arthropod individual, it is strictly no contest—with the chordate the obvious winner.

To see why, consider life on land.

Land-life is a rather minor offshoot of life in general, since some-

thing like five-sixths of the total mass of living matter dwells in the oceans. However, control of the environment, which is the measure of the "advancement" of an organism is potentially possible to a much greater extent on land than in the sea. Consequently, land-life has the odds very much in its favor in the competition for dominance. Why this is so, is simply explained.

Life in the sea is surrounded by water, while life on land is surrounded by air. Water is about seventy times as viscous as air at ordinary temperatures and is that much more difficult to move through. There's the key point.

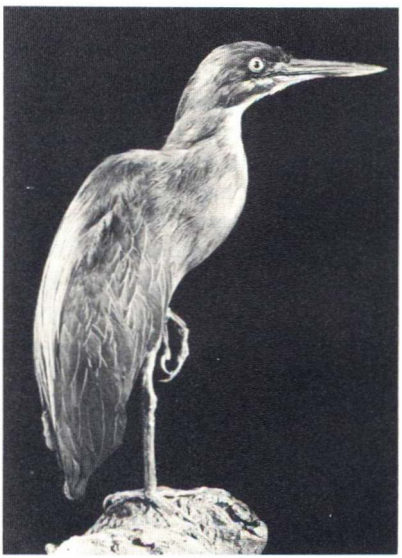
A creature capable of rapid motion is in better control of its environment and therefore more advanced—all other things being equal—than a creature not capable of rapid motion. But a sea creature designed for rapid motion must be streamlined, otherwise an impractical amount of energy is consumed in overcoming watery resistance. Examples of streamlining are to be seen at a glance in the sharks and fish.

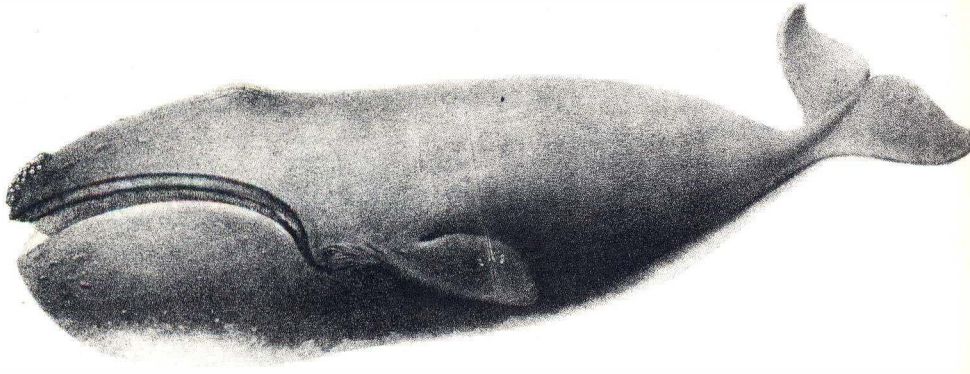
Creatures on land, however, may be designed for rapid movement through the much less viscous air without being streamlined. Still, when the descendants of a line of non-streamlined land creatures return to the sea, streamlining sets in. You can see a little of it in otters and ducks, more of it in seals and penguins, and the near perfection of it in the porpoises and whales.

The disadvantage of streamlining is this: it discourages the existence of appendages which would break streamlining and destroy efficiency of motion. But it is by use of appendages that creatures can best handle the environment and bend it to their will. An opossum uses its tail to swing from a branch, an elephant its trunk to manipulate large and small objects, a raccoon its paws, a monkey its hands and so on.

In short, a streamlined creature cuts itself off from attack upon the

This fellow's a different kind of amphibian—a Green Heron. The great family Aves developed the warm-blooded trick independently... but they lost out because they specialized the forelimbs as wings. This gave them mobility—but cost them dexterity.





This may be a Right Whale, but he's wrong, evolutionarily. Specialization on size and swimming meant no manipulatory organs.

environment. The whale is the most dramatic example of this. The whale is one of the two types of creatures with a brain that is larger than the human brain. The other type is the elephant, an undeniably intelligent animal.

The brain of the whale, unlike that of the elephant, is not only larger than a man's brain, it is also more intensely convoluted. There is a reasonable possibility, therefore, that a whale might be—potentially, at least —more intelligent than a man. After all, porpoises and dolphins, small relatives of the whale are undeniably intelligent, more so than most mammals, and a porpoise to a sperm whale, may be as a monkey to a man.

But suppose a whale were potentially more intelligent than a man, how could it show that intelligence? It has a tail and two flippers that are perfectly adapted for powerful swimming and for nothing else. It has no appendages with which to manipulate the outside world and, thanks to the necessity for streamlining, can have none. What intelligence the whale has must remain strictly potential; a prisoner of the viscosity of water.

Or consider the giant squid, a member of the phylum, Mollusca. Certainly in all the world there is no more highly advanced creature that is neither arthropod nor chordate. In some ways, in fact, it goes all arthropods and chordates one better. It has large eyes, for instance, larger than any other in the world, similar to and possibly potentially better than the eyes independently invented by the chordates.

The squid has ten appendages in the form of tentacles which can writhe like so many snakes, each exquisitely sensitive and equipped with vacuum disks for tight grips. Yet these do not affect the streamlining for when the squid chooses to put on speed, its streamlined mantle cleaves

the water while the tentacles trail behind without interfering. In fact, since the squid moves rapidly by jet propulsion it doesn't even need the fins or flippers that in sharks, fish or whales unavoidably break the perfect pattern of streamline.

But the viscosity of water is nevertheless victorious, even over the super-flexible arrangement of the squid. Those tentacles must move through water when they manipulate their environment and can only do so in slow-motion. (Try swinging a bat under water and you'll see what I mean.)

To summarize then, the appendage is rare in the sea, and the quickly-moving appendage nonexistent. The quickly moving appendage is, however, common among land creatures, and it is that which makes land species, not sea species, lords of the Earth.

However, there are also disadvantages involved in living on land. One arises in connection with gravity. In the sea, thanks to the buoyancy of water, gravity is virtually nonexistent. It is almost as easy for a fish to swim upward as downward.

On land, however, the pull of gravity is just about undiluted by the tiny air-buoyancy effect for any creature at the multicellular level. All living creatures invading the land must cope with it one way or another.

Until arthropod and chordate came along, all types of animal life that invaded the land were defeated by gravity. They coped by surrendering and moved on land only by slowly crawling, with the body in contact with the surface at all or almost all points. Watch an earthworm.

The development of shells by mollusks, which in the sea represented an advance, was, on land, actually a handicap. The land snail must not only fight the effect of gravity on its own body; it must carry the weight of a shell upon its back.

Now a crawling creature which needs all its energy to move in slow, ungainly fashion can scarcely develop fast-moving appendages. Therefore, the prime advantage of land-life is lost for them. Below the level of arthropod and chordate, then, the most advanced forms of life are in the sea.

To develop fast-moving appendages, a land creature needs supporting legs to lift the main portion of the body clear of the ground in defiance of gravity. But legs of soft tissue alone will never support a body of even moderate bulk. Legs need stiffening. Both arthropods and chordates include types of creatures with stiffened legs; and to decide which of the two types is more advanced, let's find out which type uses the more efficient type of stiffening.

In the case of the arthropod, the stiffening is on the outside of the leg in the form of chitin. In the case of the chordate, it is on the inside of the leg in the form of bone. In general an exoskeleton—one on the outside—is the better for purposes of defense. An endoskeleton—one on the inside

—is the better for structural strength. (Thus, a knight wears his armor on the outside and a skyscraper wears its steel girders on the inside.)

Furthermore, an exoskeleton limits growth. If the soft tissues within grow, the hard unyielding exoskeleton must be discarded, or growth must stop. In the arthropods, the exoskeleton is periodically discarded and replaced by a new and larger one. A great deal of vital energy goes into the perpetual manufacture of exoskeletons. What's more, during the interval of molting, the organism is fairly defenseless.

An endoskeleton does not limit growth. The bones within may freely be extended by accretion and the soft tissue about it yield and, in fact, matches the growth easily.

The chordate individual can, therefore, grow larger than the arthropod individual and be stronger. Chordate muscles, slung on internal beams rather than on an external shell are

The elephant went in for defense-through-size—which meant he needed all four limbs to carry his tons around. The effort to compensate by an overdeveloped nose didn't prove adequate.

more efficient. By all odds, the larger, stronger, faster chordate has better control of its environment and is, therefore, more advanced than the arthropod.

(Don't be fooled by stories to the effect that grasshoppers can jump so many times their own length and that ants can lift so many times their own weight and that if either were the size of a man it could do wonders. Actually, if either were the size of a man and could remain alive, it is quite certain that a grasshopper could not drive his bulk in a jump that was as long as a man's, nor could an ant lift as much as a man could.)

To be sure, not all chordates are equally advanced. The phylum, Chordata, is divided into nine classes and of these the first three include degenerate descendants of very primitive chordates. These now-living descendants rather resemble worms and mollusks outwardly and only a zoologist would find reason for placing them in the same phylum with ourselves.

Nevertheless, these primitive creatures—or their more respectable ancestors—first stiffened their bodies with an inner rod of cartilage—a substance resembling chitin in terms of flexibility and toughness, though quite different chemically.

In addition, the first chordates apparently invented segmentation as well as hemoglobin—both of which were earlier and independently invented by the Annelida, a phylum to which the earthworm belongs. They also made entirely novel advances by developing a liver in which many of the chemical tasks of the body were efficiently concentrated, and gill arches, which made respiration more efficient.

But this, obviously, is not particularly designed to make gravity-conquering land-life possible.

The next class of chordates, Cyclostomata—of which the lamprey is the most familiar example—made a step in that direction by extending the one stiffening rod of cartilage into a complete skeleton, thus much strengthening the body and making it far less wormlike. In addition, they invented eyes—independently of the mollusk invention. The circulatory system also underwent improvements; a two-chambered heart was developed to drive the blood through the blood vessels and blood cells were developed in which hemoglobin might be kept. Both advances made the transport of food, oxygen, and waste matter more efficient.

Next comes the class of Pisces. This is divided into several subclasses of which the most primitive, Elasmobranchii—sharks, et cetera—invented some of our most useful conveniences; jaws and teeth, and two pairs of limbs.

The skeletons of both the lampreys and the sharks, while complete, are only of cartilage. This is sufficient stiffening for life in the water—the sharks are quite successful at it, too—but is not strong enough to support a moderately bulky creature against the gravitational force it would meet on land.

But another Piscian subclass, Teleostei, invented a method whereby the skeleton was reinforced by inorganic salts such as calcium phosphate. Cartilage was thus converted to bone and the Teleostei are the "bony fish."

Further changes are necessary for land-life. An organism must be able to utilize the oxygen of the atmosphere directly. In this direction, the teleostians had invented an air bladder by which it could increase or decrease its buoyancy at will, thus helping in vertical swimming. In some members of another Piscian subclass, Crossopterygii—the "lungfish"—the air-bladder became a lung.

The crossopterygians are an example of the fact that it is often a loser in the game of life that makes a major advance. The crossopterygians were, for one reason or another, less successful at coping with their environment than the teleostians were. Most of the crossopterygian species are now extinct. Some descendants still exist by learning how to make do with environments so undesirable that the teleostians had no reason to follow them there, successful as the latter were in the lush pastures of the open sea. The crossopterygians retreated to stagnant water, to the oceanic abyss —and to the land. We are descended from the third group.

The next class of Chordata is Amphibia—of which frogs and toads are the best-known modern representatives. They made the transition. Amphibian lungs, working full-time in adult life, were given a circulatory system of their own, which made a three-chambered heart a necessity. In addition, the amphibians invented the ear. (In general, air being more transparent than water, sense-impressions reach out farther into the environment on land than in the sea. Land creatures could more profitably sharpen their senses than sea creatures could. Sharper senses imply an increase in control of the environment and this, too, helps make land-life more advanced than sea-life.)

So it came about that amphibians were the first chordates to invade land, raise their bodies up on legs, and walk. They walked slowly and clumsily, to be sure, but they walked.

Toward the end of the paleozoic era, the chordate amphibians and the arthropod scorpions and insects competed on land and for the first time, a chordate victory began to show signs of inevitability.

But amphibians were still tied to the sea, or at least to a watery environment of some sort, during the period of birth and early development. It was the next class, Reptilia —the reptiles—that made the crucial invention—an egg that could be hatched on land.

Such an egg had first to be enclosed by a membrane which was porous to gases—so that the developing embryo could breath—but which would retain water so that the embryo would not dry up. In order for such an egg to be fertilized, fertilization must take place before the shell was developed and hence sperm had to be released within the female and not merely over the already-laid eggs.

Again, the egg had to be large enough to contain the food and water needed by the embryo during the entire period of development. This meant the embryo must develop special membranes with which it might handle the food contents of the egg.

The reptiles developed all this and became truly a land animal. Some of them also put the final touches on the circulatory system by developing the fourth—and last—chamber of the heart so that two complete and coordinating blood pumps existed.

The reptiles reached their heights in the Mesozoic Era when giant dinosaurs shook the earth.

But the conquest of gravity meant

The horse—and the Zebra is a horse—and antelope families specialized in speed-for-defense. Mobility —but, like the bird family, it cost them dexterity.

that only one of the disadvantages of land-life had been conquered. There was another one: temperature variation.

The temperature of the sea is virtually constant. Through almost all of its volume this constant temperature is fairly close to the freezing point. In a thin surface skin in the tropics, it is higher but, in that restricted area, still moderately constant.

Once a creature adapts itself to the temperature of its region of the sea, it needs no further adaptation to cope with changes.

On land, however, temperature varies widely. Land creatures can try to avoid that by living under rocks, in crevices, in burrows or in caves, by moving south in the winter and north in the summer, by hibernating through cold weather or by estivating through warm weather. These are all withdrawals, however, and avoidance mechanisms.

Success lies always in the direction of the offense. It was necessary to invent a device which would insure constant temperature within the body whatever—within reason—the temperature might be outside the body.

Two different groups of early reptiles made the necessary discovery independently, even before the great age of Reptiles had begun. One group developed into the class of Mammalia —mammals, like us—and the other, somewhat later, into the class of Aves —birds. Both had internal air-conditioning, a way of storying heat in such controlled fashion that body temperature was kept within narrow limits.

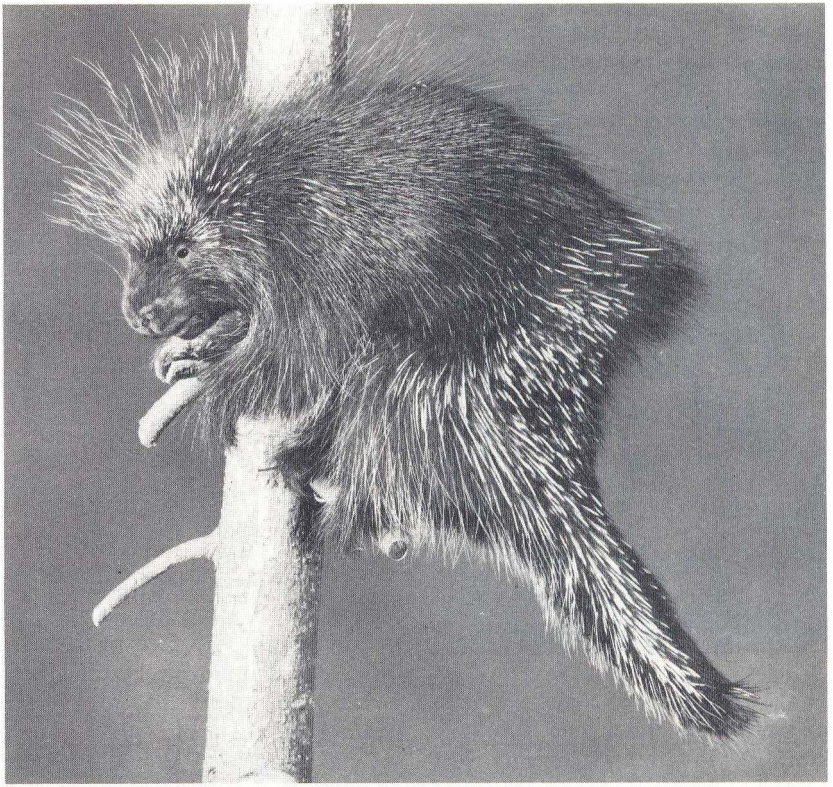
In both cases, the body temperature was maintained considerably higher than the usual temperature of the environment. There was reason for this, since chemical reactions—and therefore the bodily movements and metabolism that result—speed up with higher temperature. The highest temperature at which there is not too much damage to delicate protein molecules therefore implies best control of the environment and highest advancement.

But to maintain a high body temperature meant cutting down the rate of loss of heat to the atmosphere. This was done by keeping a layer of relatively motionless air next the body —still air being one of the best insulators.

The birds do this by trapping air among a set of modified scales called feathers; mammals by trapping it among a set of modified scales called hairs. (The feathers are the more efficient of the two, by the way.)

The birds took to the air, rediscovering three-dimensional travel, which the amphibians had lost on leaving the sea. In doing so however, birds found that the aerodynamic facts of life limited their size drastically, thus also limiting their potentialities for advance. Flight also involved the thorough commitment of one pair of limbs to the formation of wings—beautiful for their job but for nothing else.

So the future lay with the mammals which retained all four limbs



Porky the Porcupine has dexterity, little mobility, and a high-power defense technique. Like armor—an essentially passive defense. That is not the way to win.

relatively uncommitted and retained, furthermore, the possibility of large size.

The advantages of mammals over reptiles were, eventually, decisive. By possession of a constant internal temperature, they could be in full activity during the night and during the cold seasons, when reptiles were sluggish and at a relative disadvantage.

The possession of hair, moreover, meant the exposure of a soft skin to the environment and this is important.

The early chordates made a number of attempts to add, over and above the internal stiffening of bone, an external shield of some sort. The temptation to seek out protection is apparently almost irresistible. The earliest fish were armor-plated as

The Bat is a backslider—a true mammal, he's sought to substitute mobility for dexterity, and has gone into the blind alley of the birds.

were the early amphibians and reptiles.

The cost was too high in every case. The armored creatures only succeeded in making mollusks of themselves. Armor decreased the all-important mobility; it substituted passive defense for offense, which was unhealthy; and it put up a barrier between the outer world and the inner organism. The armored creatures invariably fell before the onslaughts of the unarmored ones. The last survivals today are the turtles, which are the most primitive and least successful of the large groups of reptiles in existence today.

By converting scales into hair, the mammals became that much more sensitive to their environment, that much more able to respond to it, and by responding, control. Some early mammals made one last attempt to develop an external armor and went under. Their remaining descendants are the armadillos.

Temperature control did one more thing for mammals—and birds, too. It made necessary the invention of extended child care. Or, if you care to be more dramatic, warm blood invented mother-love.

Temperature control is more easily maintained in a large organism than in a small one. (All parts of the mass of an organism produce heat, but heat is lost only at the surface. A small creature has more surface per unit volume, hence loses heat at a greater rate.) This means that the most critical time in the life of a mammal, as far as heat-control is concerned, is when he is smallest; when he is young or, most of all, when he is an embryo.

A sea creature can leave its eggs where laid and go away. The constant temperature of the sea will take care of it. A land creature without temperature control can take rudimentary precautions. A turtle, for instance, might bury its eggs in the warm sand and leave matters to the somewhat uncertain sun.

A land creature with temperature-

control—a bird, for instance—can't fool around. Its eggs require not only warmth but a certain constant temperature. There is not enough living tissue within the egg to supply that temperature, so it must be supplied from without; specifically, from the mother's body.

Under conditions of temperature control, then, survival of the species requires the development of instincts that will keep birds building nests, incubating eggs to the hatching stage, and feeding the young—all at considerable inconvenience to themselves.

The result, however, is a sharp decrease in infant mortality among birds as compared with reptiles. Inasmuch as the young bird is relieved of certain environmental stresses to which young reptiles are subjected, this represents an evolutionary advance in birds over reptiles.

The mammals go even further—in stages. The class, Mammalia, is divided into three subclasses. The first is Prototheria, which includes the duck-bill platypus. These still show many reptilian characteristics and are imperfectly warm-blooded, but they have hair, which no true reptile has.

The Prototheria lay eggs, as reptiles do, but the embryo has proceeded in its development quite a way by the time the egg is laid, so that the incubation period, with all its special dangers, is cut down.

Furthermore, the Prototheria are the first to invent a special food supply for the infant, adjusted perfectly to its nutritional needs. This is milk, formed in the body of the mother and fed to the child via special "mammary glands"—whence the word "Mammalia."

The next subclass of Mammalia is Metatheria which includes marsupials such as opossums and kangaroos. Here another step is taken. The laying of the egg is so long delayed that it hatches first. It is an embryo at an early stage in its development that actually emerges. These embryos have just enough strength to make their way to the mammary-glands of the mother, which are usually enclosed in a special pouch. In this pouch, the young complete their development.

The third and last subclass of Mammalia is Eutheria, or what we call the "placental mammal." Here the young develop to a much greater extent within the body of the mother. A special organ, the placenta, is developed, through which the developing embryo can absorb food from the mother's circulatory system and into which it can discharge wastes. This makes longer gestation period possible; periods long enough in some cases so that the young are born almost capable of caring for themselves.

The development of mammary glands in the platypus reduces the environmental stress on the young to a level even below that among the birds. The pouch among the marsupials lowers it further, and the placenta among the placentals lowers it still further.

The comparison shows itself plainly in the fact that where the three

subclasses of mammals competed directly, the placentals won out. Except for a few species of opossums in the Americas—where they persist by sheer powers of fertility—the only egg-laying mammals and marsupials that remain are those in Australia. Australia separated from other land areas before the placentals developed. Elsewhere, where placentals entered, the others went out.

The placental mammals are thus the current rulers of Earth.

Again, not all placental mammals are equally advanced. One thing that marks them off from one another is the development of the brain. Even the simpler mammals surpass in brain-power the rest of organized life, but some mammals are brainier than others.

The good brain-development of the mammals is probably the consequence of life on dry land, on soft skin and the improvement of the sense organs generally. Mammals were, in consequence, buried under a large mass of sense impressions and there was consequently survival value in the further development of an accounting system—so to speak—to sort out those impressions and devise responses.

But one thing further is needed. There is still the question of appendages, which is the greatest gift of life on land. But to be maximally useful, an appendage must be useful in a variety of ways. There is always the danger of over-specialization.

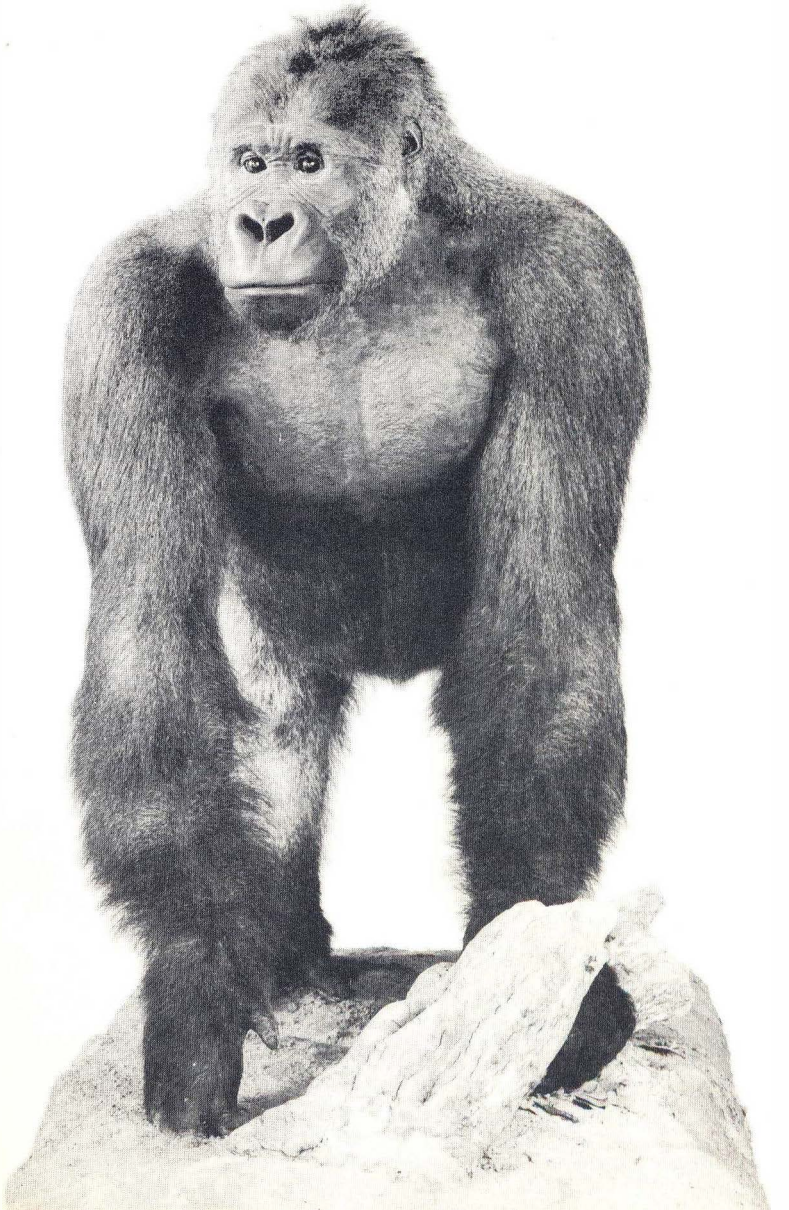
Thus, I have mentioned the wing of the bird. It is a fast-moving appendage, but it can do only one thing. Similarly, the marvelously organized legs of horses, deer and antelope are excellent devices for outracing the enemy, but they are no longer useful for anything else.

On the other hand, the raccoons and bears walk flat-footedly on their heel in primitive fashion—as we ourselves do—and their paws can be used for a variety of tasks. The members of the dog family and also some of the rodents retain the ability to use their paws as exploring devices. The elephant has developed a trunk that is the nearest thing any land creature owns to the tentacle of a squid.

The use of any such appendage increases the number of sense-impressions the animal must handle. Again the brain enlarges and its ability intensifies. (The whale is an exception; it has a large complicated brain with no generalized appendages. Perhaps its brain is a legacy from an intelligent land-living ancestor—nothing is known of the ancestors of whales, after all. Or perhaps it is only a response to the need for co-ordinating fifty to one hundred fifty tons of living matter.)

Obviously, the variously-useful appendage reaches a climax in the order of Primates—the monkeys, apes and us—in which at least two, and sometimes all four, of the limbs end in hands in which the individual fingers are capable of more or less independent motions. In the more advanced members of the Primates, one of the

The Primate, even the gorilla, is remarkably unspecialized. Whales, elephants, and dolphins have brains larger than his. He's so primitive he retains five toes on each limb, unlike the highly evolved zebra with only one. About the only thing he's lost is the tail. But he's retained mobility, agility, and dexterity.



fingers, the thumb, is well developed and faces the other four, converting the hand into a possible pincer.

The primates are, not surprisingly, the brainiest of the mammals, and man, with the best-developed hand, is, not surprisingly, the brainiest of the Primates.

By using his brains, man was able to extend the two most fundamental inventions of land-life generally. He learned to control fire and thus extended the notion of warm-bloodedness. Other mammals and birds might control the internal temperature, man controlled the external temperature as well. Man also developed the systematic use of tools, which equipped him with artificial fast-moving appendages, each of which might be thoroughly specialized. He gained all the advantages of specialization without abandoning any of the advantages of nonspecialization.

And so man is the lord of the universe and—

Where do we go from here?

It is possible to imagine a bigger and better man, a "superman," but that need not be the answer. Bigger and better dinosaurs just ended in extinction. Bulk alone is not everything. Neither is brainpower alone.

Actually, multicellularity may be played out. It may be that the multicellular organism has reached its limit. There has been no new phylum of organisms established in perhaps 600,000,000 years. Within the phylum of Chordata—the last-established—there has been no new class established in at least 250,000,000 years. Within the class of Mammalia —the most advanced of the chordates —nothing better than the placental mammal has been established in 100,000,000 years.

The great experiments may be over. What we are now facing is merely a refinement and a re-refinement of existing experiments.

But all this has happened once before.

A billion years ago, one-celled life had reached its peak. After many victories, such as the discovery of food storage and of photosynthesis, cells reached their limits. Evolution came to a dead end, or would have but for an entirely new breakthrough. Cells developed into cell colonies and then into multicellular organisms.

Now multicellularity has reached its dead end, too. Is there room for a new breakthrough? Can there be, once again, a new combination to a higher order of creature, a multiorganismic being. Such a combination must be more than merely physical, since physical combination would just make a larger multicellular organism. (In fact, the physical combination of organisms was tried, after a fashion, with the invention of segmentation. It was an advance but not nearly as fundamental a one as multicellularity.)

Fortunately, we have examples of nonphysical combinations of multicellular organisms.

Many varieties of creatures herd together in groups that act with a certain primitive co-ordination. They

move together, feed together. If one is frightened, all flee. They may even combine for protection against a common enemy—though generally they merely run and devil take the hindmost. Or they may combine to hunt prey and then, often, quarrel over the spoils.

Such herds, or packs, or schools are the equivalent of cell colonies on the cellular level. Although it may be convenient for groups to keep together, it is not vital. Each individual in the herd can, if necessary, survive on its own.

We must look for something more than that.

In my last article, I used one main criterion to distinguish between a multicellular organism and a mere cell colony. In a multicellular organism, individual cells become so specialized that they can no longer live independently and the component cells are subordinated to the group to the point where only group-consciousness exists.

No group of organisms display these characteristics to the full, but there are signs of beginnings. The clearest cases are among the phylum, Arthropoda, and in its most advanced and most recently established class—Insecta, the insects.

The three main groups of "social insects" are the bees, the ants—both belonging to the order, Hymenoptera—and the termites—belonging to the order, Isoptera. All three display specializations among constituent organisms just as multicellular organisms display specializations among constituent cells. In the case of termites, the specializations go so far as to make life impossible for certain individuals outside the society—one of the hallmarks of a true multi-organismic creature. The termite queen cannot live without her attendants. Termite soldiers have mandibles so large they cannot feed themselves. They must be fed by workers.

Furthermore, such societies are more advanced than any individual organism, not only of their own type but of any type. A society of even primitive individuals can beat even a very advanced individual who happens to be on his own. When the army ants go marching, there is only one way the big-game hunter—elephant-gun and all—can save himself. He has to get out of the way, and fast.

There is a classic story called "Leiningen and the Ants" which tells of a plantation owner who found his land in the way of a marching column of army ants and decided to stand his ground and nght. Leiningen was a most superior individual, brave, resourceful, intelligent and he fought like a demon. He managed just barely to get out of the fight with his life.

You might think the odds were terrific—millions of ants against one human—but you'd be wrong. The odds were exactly even numerically; *one* man versus *one* ant society.

To be sure, lots of individual ants were killed but that didn't affect the

ant-society. Leiningen lost skin and blood, trillions of his individual cells, but he recovered and did not feel the loss.

Outside the class of insects and the phylum of arthropods, there is only one example of a society that begins to be more than an organism-colony. That is, of course, the human society. It includes specialized individuals—not physically specialized, to be sure, but mentally specialized. Some of them are so specialized they cannot live outside the society—and there is the hallmark again.

I, for instance, am city-bred and have lived—with moderate success—as part of a complex society all my life. I eat only too well, alas, but I cannot raise food; I have no experience in gathering food, I cannot even cook. I drive a car, but do not even know how to lift the hood. I own a house, but cannot repair any part of it. I watch television and use a number of appliances, including an electric typewriter, but am helpless in the face of electrical wiring.

Without the continuing and intensive help of other members of the human society, I would not survive long. Alone on Robinson Crusoe's island, I could only hope for a quick death in preference to a slow one. I think there are millions like me.

But now what is it that holds a society together; a true society where the component individual is willing to die for the good of the society. In the case of the insects, it is something we call "instinct" a compulsive, robot-like behavior that deprives the individual insect of choice of action. The individual insect is not only *willing* to die for the group, he *cannot* do anything else.

But what holds together a human society? Certainly not instinct. The nearest thing we have to an instinct in the matter is one which says, "To hell with the others. Cut and run." Often, this instinct is obeyed. The surprising thing is that often it is not obeyed.

I said earlier that intelligence was not enough in itself. Obviously, if it is joined to other qualities that are disadvantageous, extinction will follow. An intelligent animal that is too limited in the climate it can tolerate, or the food it can eat, or the parasites it can resist, is not going to succeed. The elephant and the great apes are examples of intelligent failures.

But when the first man-ape rose to his hind legs what made him a success when the gorilla was and is a failure?

I say that for hundreds of thousand of years, the early ape-men were on the borderline of failure. It was the crucial breakthrough of the formation of a tribal society that really set him on the road to mastery. Not merely packs, mind you, after the fashion of baboons, but a true society in which the whole was something more than the sum of the parts.

What made this possible, it seems to me, was the development of a means of communication that was complex enough and flexible enough to express abstract ideas—to be some-

thing more than a mere squeal of fright or a simple warning cry.

By means of such communication—peculiar, as far as we know, to Homo sapiens—the amassed learning of one generation could be passed on to another. A young man absorbed in his youth what had taken an old man all his life to learn, and then the young man went on to learn more on his own. A new and larger body of knowledge was passed on to the generation after.

But with learning from the old came a reverence for the old; a new feeling that only human beings could have—tradition.

"This is the way things are done; this is the way things have always been done; this is the way our ancestors said it should be done; and because their spirits watch us and must not be angered, this is the way things *must* and *will* be done."

There is no use belaboring the point. We all know the power of tradition. It will hold a society together almost as firmly as instinct will. Call it "duty" or "patriotism" or "altruism" and any one of us can bring himself or herself to the point where he or she will give up individual life for the good of the group—which might be a small one called the family, a larger one called the nation, or a still larger one called mankind.

And if it was oral communication that launched the tribe and the first cultures; it was written communication that launched the cities and the first civilizations.

But are the city and the ant-hill the final expression of the multi-organismic being? It seems to me most certainly not. Both are only at the beginnings of society-potential.

The insect societies have succeeded, much more than has the human society, in physically specializing their members and in generalizing consciousness from the individual to the society. However, their method of doing this has cost them flexibility. Each individual insect in the society may make only the most limited responses to given stimuli.

The human society has specialized far less and has retained far more of individuality, but it has compensated for that by retaining a most successful flexibility.

The next step, it seems to me, would be the combination of the two—a society which combines an insect-like consciousness of the whole with a humanlike flexibility.

What type of organism, then, will attain this next major step in evolution?

To answer the question, let's look at the overall record of evolution so far. All through evolutionary history, it seems, once a particular type of organism has made a major advance, it is a sub-type of that type and then a sub-sub-type of that sub-type that makes the next major advances. There is no coming from behind in evolution.

In other words, once the chordates are evolved and by dint of internal skeletons prove to be clearly more in control of the environment than are

the mollusks, the die is cast. Further evolution merely increases the lead of chordates generally over mollusks generally. In the same way, land chordates increased their lead over sea chordates, mammals increased their lead over reptiles and humans over nonhumans. No group, having once relinquished the lead, ever gave rise to descendants that regained the lead.

Thus, at the phylum level, Chordata and Arthropoda are clearly in first and second place, respectively, from the moment of first clear-cut development half a billion years ago or so, and have never relinquished those positons. They are less in danger of relinquishing the lead now, in fact, than they have ever been before; a lead that is so secure that no new phyla have even been tried ever since the rise of the Chordates.

Both phyla are divided into classes. Within Chordata, Mammalia lead all other classes. Within Arthropoda, Insecta lead all other classes. The mammals and insects have been increasing their lead ever since their first clear-cut development and are in less danger of losing it than ever before.

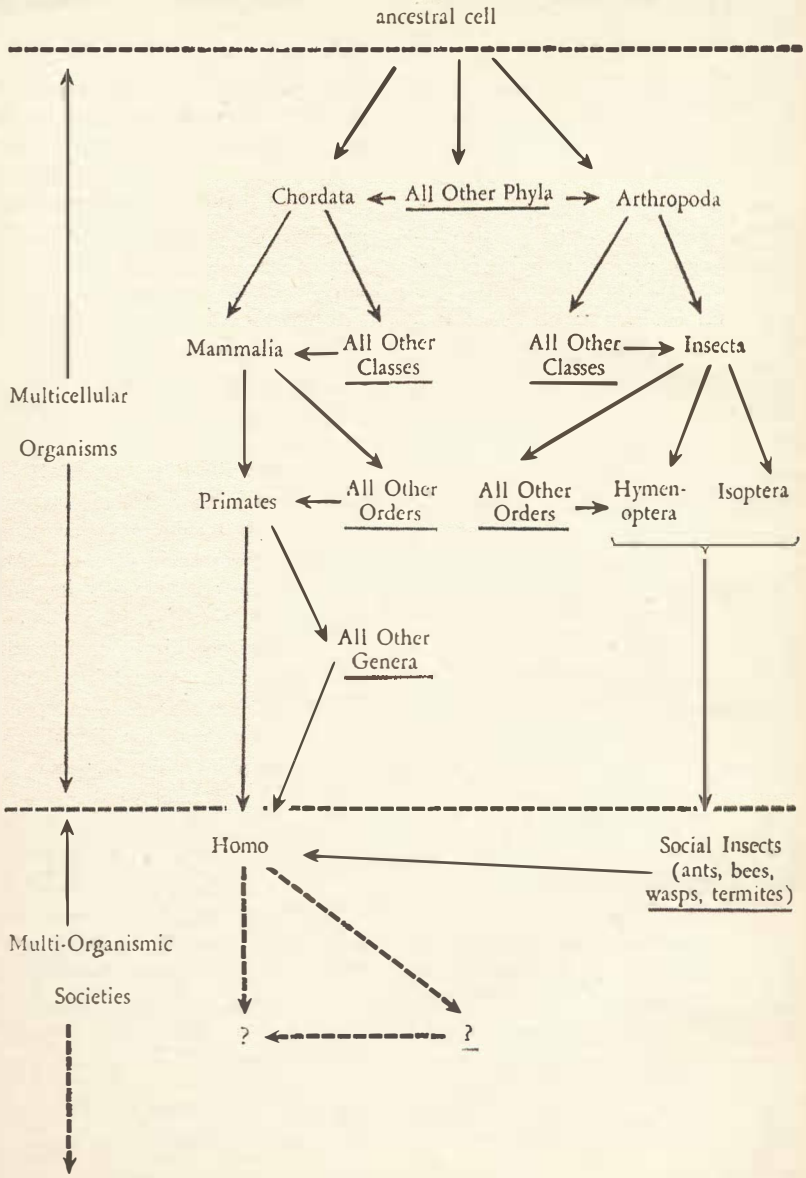
This process continues, as shown in the accompanying figure, where the arrows do *not* indicate lines of descent but only the direction of increasing control of the environment. An underlining of a group of organisms symbolizes "dead end."

On the past record, then, it would seem that the next step would have to be taken by subdivisions of the "winners" of the last step; subdivisions, in other words, which are descendants either of the social insects or of man.

Now it seems to me that insects must be ruled out. In the first place, the insect societies are clearly in second place to human-society as far as control of environment is concerned and there is no coming from behind in evolution. (Remember I don't say that insects may not out-survive man despite this.) Secondly, they are already too specialized and too inflexible to reverse their ground and gain the necessary flexibility for a higher multi-organismic society. In evolution, specialization is invariably a one-way street and moves only in the direction of more specialization.

The only possible ancestor of the multi-organismic society, then, is man who is, physically, a relatively unspecialized animal except for his brain; and mentally, thanks to his relatively poor supply of instincts, is equally unspecialized.

The possibility that man will be the ancestor of the multi-organismic society is strengthened by the fact that he represents, for the first time in evolutionary history, an organism which is consciously aware of the competition of other organisms and will surely make a special effort to wipe out any new group which threatens his own overall superiority. Superchimpanzees, unless overwhelmingly superior from the first, will almost certainly be erased as soon as they are recognized for what they are—barring some individuals retained for scientific observation.


ancestral cell
Chordata
All Other Phyla
Arthropoda
Mammalia
All Other Classes
All Other Classes
Insecta
Multicellular Organisms
Primates
All Other Orders
All Other Orders
Hymen-optera
Isoptera
All Other Genera
Homo
Social Insects (ants, bees, wasps, termites)
Multi-Organismic Societies
?
?

So it might seem that eventually, a family of human beings that are joined together on a nonphysical level—psi forces?—into a multi-organismic society may be established—or, for all most of us know, has been. If they are not recognized for what they are too early, they will take over. In this magazine—which, for one thing, published the unforgettable "Slan"—there is no necessity to beat *that* particular drum.

A more classic device for evolution is to suppose man to be divided into groups which are completely separated geographically, so that the gradual summing of mutations produces separate species no longer capable of interbreeding. One such new species may then develop the multi-organismic society and will then be to the remaining species as man is to the other mammals—or, perhaps, as man is to the amoeba.

Of course, on Earth there is no longer any chance for a complete geographic separation of any group of men and women over a period long enough to make that work, barring a devastating nuclear war that leaves only remnants of survivors and a completely disintegrated technology.

However, the time may be coming when colonies will be established on worlds other than Earth, on worlds outside the Solar system, perhaps. "Geographic" isolation may then be possible. Men venturing out into space may be like the crossopterygian fish venturing out onto land. They leave as experimenters and end as victors.

It is, of course, repugnant to a human individual at the present stage of his development to think of himself as a mere unit in a multi-organismic society, without will of his own and, whenever necessary, liable to be sacrificed, cold-bloodedly, to the overall good.

But is that the way it will be? It's extremely difficult to imagine what being a part of a multi-organismic society will be like but suppose we consider the analogous situation of cells in a muticellular organism.

Component cells cannot live apart from the organism, but within that organism they maintain themselves as biochemical units. They produce their own enzymes, conduct their own reactions, have membranes that separate them from their fellows, grow and reproduce on their own in many cases.

In a multi-organismic society, the individual may well retain a good deal of mental and physical independence. He may think for himself and have his own individuality; and *also* be part of the greater whole.

As for being sacrificed cold-bloodedly—not unless it were necessary. Skin cells die as a matter of course while the organism lives, but Americans die as a matter of course while the nation lives. Other cells may die on occasion for the good of the whole, but even in our own imperfect society, so must policemen, firemen and soldiers.

We do not allow our cells to be killed for no reason. Thanks to a sensation known as "pain" we take

good care of our component cells and would not as much as endure a scratch or a pin-prick if we could avoid it. A multi-organismic society would be as careful of its components and would undoubtedly feel something akin to pain at any harm to its components.

And then there would be a positive gain. In passing from a cell to a group of cells, it becomes possible for the cell-totality to appreciate abstract beauties such as those of a symphony or of a mathematical equation that the cells separately could never conceive of. There may be the cellular equivalent of these beauties in the waverings of a water current or in the engulfing of a tiny organic fragment, but who can argue that a man does not achieve a more exalted rapport with the universe than an amoeba can. Or what man can imagine that the individual cells of his body—which must share somehow in the complexity of his relations to the universe—would rather return to being just so many amoebas?

And, by analogy, who knows what unimaginable sensations, what new levels of knowledge, what infinite insights into the universe will become possible for a multi-organismic society. Surely there will be something then that will compare with a symphony as heard by a man, as that symphony compares with a wavering water current as felt by an amoeba.

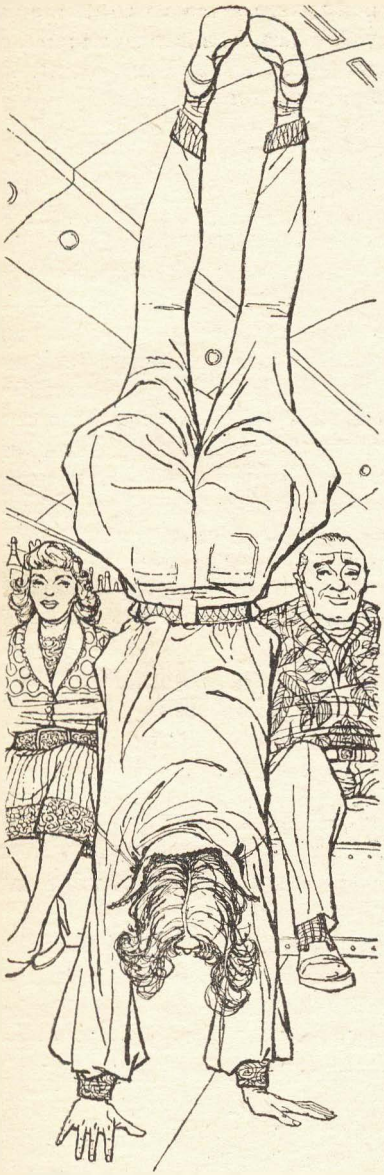
THE END

IN TIMES TO COME

It may seem a little hard to believe . . . but Poul Anderson actually succeeds in stepping up the level of magnificent comic-logic yarn-spinning in the next installment of "High Crusade," which will, of course, be with us next month. I sincerely regret the absolute impossibility of running that lovely yarn as a single piece—but it simply can't be done.

Featured next month on the cover will be "Adaptation," by Mack Reynolds. Reynolds—who's been visiting more than one cultural area of this world—has some comments on human cultures. Like Poul Anderson, he holds that "ignorant" and "stupid" are not infrequently confused—which can be a very, very serious mistake. Those ignorant savages, now . . . ripe for the exploitation of a millennium-more-advanced Earth culture . . .

THE EDITOR.



Illustrated by van Dongen

SUBSPACE · ·

I.

"ALL passengers, will pay attention, please?" All the high-fidelity speakers of the starship *Procyon* spoke as one, in the skillfully-modulated voice of the trained announcer. "This is the fourth and last cautionary announcement. Any who are not seated will seat themselves at once. Prepare for take-off acceleration of one and one-half gravities; that is, everyone will weigh one-half again as much as his normal Earth weight for about fifteen minutes. We lift in twenty seconds; I will count down the final five seconds . . . Five . . . Four . . . Three . . . Two . . . One . . . Lift!"

The immense vessel rose from her berth; slowly at first, but with

There has always been, and will always be, the problem of surviving the experience that any trained expert can handle...when there hasn't been any first survivor to be an expert! When no one has ever gotten back to explain what happened....

· SURVIVORS

By EDWARD E. SMITH, Ph.D.

ever-increasing velocity; and in the main lounge, where many of the passengers had gathered to watch the dwindling Earth, no one moved for the first five minutes. Then a girl stood up.

She was not a startlingly beautiful girl; no more so than can be seen fairly often, of a summer afternoon, on Seaside Beach. Her hair was an artificial yellow. Her eyes were a deep, cool blue. Her skin, what could be seen of it—she was wearing breeches and a long-sleeved shirt—was lightly tanned. She was only about five-feet-three, and her build was not spectacular. However, every ounce of her one hundred fifteen pounds was exactly where it should have been.

First she stood tentatively, flexing her knees and testing her weight. Then, stepping boldly out into a clear space, she began to do a high-kicking acrobatic dance; and went on doing it as effortlessly and as rhythmically as though she were on an Earthly stage.

"You mustn't *do* that, Miss!" A stewardess came bustling up. Or, rather, not exactly bustling. Very few people, and almost no stewardesses, either actually bustle in or really enjoy one point five gees. "You really *must* resume your seat, Miss. I must insist . . . Oh, you're Miss Warner . . ."

She paused.

"That's right. Barbara Warner. Cabin two eight one."

"But really, Miss Warner, it's regulations, and if you should fall . . ."

"Foosh to regulations, and *pfui* on 'em. I won't fall. I've been wondering, every time out, if I could

do a thing, and now I'm going to find out."

Jackknifing double, she put both forearms flat on the carpet and lifted both legs into the vertical. Then, silver slippers pointing motionlessly ceilingward, she got up onto her hands and walked twice around a vacant chair. She then performed a series of flips that would have done credit to a professional acrobat; the finale of which left her sitting calmly in the previously empty seat.

"See?" she informed the flabbergasted stewardess. "I *could* do it, and I didn't . . ."

Her voice was drowned out in a yell of approval as everybody who could clap their hands did so with enthusiasm. "More!" "Keep it up, gal!" "Do it again!"

"Oh, I didn't do that to show off!" Barbara Warner flushed hotly as she met the eyes of the nearby spectators. "Honestly I didn't—I just *had* to know if I could." Then, as the applause did not die down, she fairly scampered out of the room.

For one hour before the *Procyon*'s departure from Earth and for three hours afterward, First Officer Carlyle Deston, Chief Electronicist, sat attentively at his board. He was five feet eight inches tall and weighed one hundred sixty-two pounds net. Just a little guy, as spacemen go. Although narrow-waisted and, for his heft, broad-shouldered, he was built for speed and maneuverability, not to haul freight.

Watching a hundred lights and half that many instruments, listening to two phone circuits, one with each ear, and hands moving from switches to rheostats to buttons and levers, he was completely informed as to the instant-by-instant status of everything in his department.

Although attentive, he was not tense, even during the countdown. The only change was that at the word "Two" his right forefinger came to rest upon a red button and his eyes doubled their rate of scan. If anything in his department had gone wrong, the *Procyon*'s departure would have been delayed.

And again, well out beyond the orbit of the moon, just before the starship's mighty Chaytor engines hurled her out of space as we know it into that unknowable something that is hyperspace, he poised a finger. But Immergence, too, was normal; all the green lights except one went out, needles dropped to zero, both phones went dead, all signals stopped. He plugged a jack into a socket below the one remaining green light and spoke:

"Procyon One to Control Six. Flight Eight Four Nine. Subspace Radio Test One. How do you read me, Control Six?"

"Control Six to Procyon One. I read you ten and zero. How do you read me, Procyon One?"

"Ten and zero. Out." Deston flipped a toggle and the solitary green light went out.

Perfect signal and zero noise. That was that. From now until

Emergence—unless something happened—he might as well be a passenger. Everything was automatic, unless and until some robot or computer yelled for help. Deston leaned back in his bucket seat and lighted a cigarette. He didn't need to scan the board constantly now; any trouble signal would jump right out at him.

Promptly at Dee plus Three Zero Zero—three hours, no minutes, no seconds after departure—his relief appeared.

"All black, Babe?" the newcomer asked.

"As the pit, Eddie. Take over." Eddie did so. "You've picked out your girl friend for the trip, I suppose?"

"Not yet. I got sidetracked watching Bobby Warner. She was doing handstands and handwalks and forward and back flips in the lounge—under one point five gees yet. *Wow!* And after that all the other women looked like a dime's worth of catmeat. She doesn't stand out too much until she starts to move, but then—Oh, *brother!*" Eddie rolled his eyes, made motions with his hands, and whistled expressively. "Talk about poetry in motion! Just walking across a stage, she'd bring down the house and stop the show cold in its tracks."

"O. K., O. K., don't blow a fuse," Deston said, resignedly. "I know. You'll love her undyingly; all this trip, maybe. So bring her up, next watch, and I'll give her a gold badge. As usual."

"You . . . how *dumb* can you get?" Eddie demanded. "D'you think I'd even *try* to play footsie with *Barbara Warner?*"

"You'd play footsie with the Archangel Michael's sister if she'd let you; and she probably would. So who's Barbara Warner?"

Eddie Thompson gazed at his superior pityingly. "I know you're ten nines per cent monk, Babe, but I *did* think you pulled your nose out of the megacycles often enough to learn a *few* of the facts of life. Did you ever hear of Warner Oil?"

"I think so." Deston thought for a moment. "Found a big new field, didn't they? In South America somewhere?"

"Just the biggest on Earth, is all. And not only on Earth. He operates in all the systems for a hundred parsecs around, and he never sinks a dry hole. Every well he drills is a gusher that blows the rig clear up into the stratosphere. Everybody wonders how he does it. My guess is that his wife's an oil-witch, which is why he lugs his whole family along wherever he goes. Why else would he?"

"Maybe he loves her. It happens, you know."

"Huh?" Eddie snorted. "After twenty years of her? Comet-gas! Anyway, would *you* have the sublime gall to make passes at Warner Oil's heiress, with more millions in her own sock than you've got dimes?"

"I don't make passes."

"That's right, you don't. Only at

books and tapes, even on ground leaves; more fool you. Well, then, would you *marry* anybody like that?"

"Certainly, if I loved . . ." Deston paused, thought a moment, then went on: "Maybe I wouldn't, either. She'd make me dress for dinner. She'd probably have a live waiter; maybe even a butler. So I guess I wouldn't, at that."

"You nor me neither, brother. But *what* a dish! What a lovely, luscious, toothsome *dish!*" Eddie mourned.

"You'll be raving about another one tomorrow," Deston said, unfeelingly, as he turned away.

"I don't know; but even if I do, *she* won't be anything like *her,*" Eddie said, to the closing door.

And Deston, outside the door, grinned sardonically to himself. Before his next watch, Eddie would bring up one of the prettiest girls aboard for a gold badge; the token that would let her—under approved escort, of course—go through the Top.

He himself never went down to the Middle, which was passenger territory. There was nothing there he wanted. He was too busy, had too many worthwhile things to do, to waste time that way . . . but the hunch was getting stronger and stronger all the time. For the first time in all his three years of deep-space service he felt an overpowering urge to go down into the very middle of the Middle; to the starship's main lounge.

He knew that his hunches were infallible. At cards, dice, or wheels he had always had hunches and he had always won. That was why he had stopped gambling, years before, before anybody found out. He was that kind of a man.

Apart from the matter of unearned increment, however, he always followed his hunches; but this one he did not like at all. He had been resisting it for hours, because he had never visited the lounge and did not want to visit it now. But *something* down there was pulling like a tractor, so he went. He didn't go to his cabin; didn't even take off his side-arm. He didn't even think of it; the .41 automatic at his hip was as much a part of his uniform as his pants.

Entering the lounge, he did not have to look around. She was playing bridge, and as eyes met eyes and she rose to her feet a shock-wave swept through him that made him feel as though his every hair was standing straight on end.

"Excuse me, please," she said to the other three at her table. "I must go now." She tossed her cards down onto the table and walked straight toward him; eyes still holding eyes.

He backed hastily out into the corridor, and as the door closed behind her they went naturally and wordlessly into each other's arms. Lips met lips in a kiss that lasted for a long, long time. It was not a passionate embrace—passion would come later—it was as though each of them, after endless years of boot-

less, fruitless longing, had come finally home.

"Come with me, dear, where we can talk," she said, finally; eying with disfavor the half-dozen highly interested spectators.

And a couple of minutes later, in cabin two hundred eighty-one, Deston said: "So *this* is why I had to come down into passenger territory. You came aboard at exactly zero seven forty-three."

"Uh-uh." She shook her yellow head. "A few minutes before that. That was when I read your name in the list of officers on the board. First Officer, Carlyle Deston. I got a tingle that went from the tips of my toes up and out through the very ends of my hair. Nothing like when we actually saw each other, of course. We both knew the truth, then. It's wonderful that you're so strongly psychic, too."

"I don't know about that," he said, thoughtfully. "All my training has been based on the axiomatic fact that the map is *not* the territory. Psionics, as I understand it, holds that the map *is*—practically—the territory, but can't prove it. So I simply don't know *what* to believe. On one hand, I have had real hunches all my life. On the other, the signal doesn't carry much information. More like hearing a siren when you're driving along a street. You know you have to pull over and stop, but that's all you know. It could be police, fire ambulance—*anything*. Anybody with any psionic ability at all ought to do a lot better than that, I should think."

"Not necessarily. You've been fighting it. Ninety-nine per cent of your mind doesn't *want* to believe it; is dead set against it. So it has to force its way through whillions and skillions of ohms of resistance, so only the most powerful stimuli—'maximum signal' in your jargon, perhaps?—can get through to you at all." Suddenly she giggled like a schoolgirl. "You're either psychic or the biggest wolf in the known universe, and I know you aren't a wolf. If you hadn't been as psychic as I am, you'd've jumped clear out into subspace when a perfectly strange girl attacked you."

"How do you know so much about me?"

"I made it a point to. One of the juniors told me you're the only virgin officer in all space."

"That was Eddie Thompson."

"Uh-huh." She nodded brightly.

"Well, is that bad?"

"Anything else but. That is, he thought it was terrible—outrageous—a betrayal of the whole officer caste—but to me it makes everything just absolutely perfect."

"Me, too. How soon can we get married?"

"I'd say right now, except . . ." She caught her lower lip between her teeth and thought. "No, no 'except'. Right now, or as soon as you can. You can't, without resigning, can you? They'd fire you?"

"Don't worry about that," he grinned. "My record is good enough,

I think, to get a good ground job. Even if they fire me for not waiting until we ground, there's lots of jobs. I can support you, sweetheart."

"Oh, I know you can. I wasn't thinking of *that.* You wouldn't *like* a ground job."

"What difference does that make?" he asked, in honest surprise. "A man grows up. I couldn't have you with me in space, and I'd like that a lot less. No, I'm done with space, as of now. But what was that 'except' business?"

"I thought at first I'd tell my parents first—they're both aboard—but I decided not to. She'd scream bloody murder and he'd roar like a lion and none of it would make me change my mind, so we'll get married first."

He looked at her questioningly; she shrugged and went on: "We aren't what you'd call a happy family. She's been trying to make me marry an old goat of a prince and I finally told her to go roll her hoop—to get a divorce and marry the foul old beast herself. And to consolidate two empires, he's been wanting me to marry a multi-billionaire—who is also a louse and a crumb and a heel. Last week he *insisted* on it and I blew up like an atomic bomb. I told him if I got married a thousand times I'd pick every one of my husbands myself, without the least bit of help from either him or her. I'd keep on finding oil and stuff for him, I said, but that was all . . ."

"Oil!" Deston exclaimed, involuntarily, as everything fell into place in his mind. The way she walked; poetry in motion . . . the oil-witch . . . two empires . . . more millions than he had dimes . . . "Oh, you're Barbara Warner, then."

"Why, of course; but my friends call me 'Bobby'. Didn't you—but of course you didn't—you never read passenger lists. If you did, you'd've got a tingle, too."

"I got plenty of tingle without reading, believe me. However, I never expected to—"

"Don't say it, dear!" She got up and took both his hands in hers. "I know how you feel. I don't like to let you ruin your career, either, but *nothing* can separate us, now that we've found each other. So I'll tell you this." Her eyes looked steadily into his. "If it bothers you the least bit, later on, I'll give every dollar I own to some foundation or other, I swear it."

He laughed shamefacedly as he took her in his arms. "Since that's the way *you* look at it, it won't bother me a bit."

"Uh-huh, you *do* mean it." She snuggled her head down into the curve of his neck. "I can tell."

"I know you can, sweetheart." Then he had another thought, and with strong, deft fingers he explored the muscles of her arms and back. "But those acrobatics in plus gee—and you're trained down as hard and fine as I am, and it's my business to be—how come?"

"I majored in Physical Education and I love it. And I'm a Newmar-

tian, you know, so I teach a few courses—"

"Newmartian? I've heard—but you aren't a colonial; you're as Terran as I am."

"By blood, yes; but I was born on Newmars. Our actual and legal residence has always been there. The tax situation, you know."

"I don't know, no. Taxes don't bother me much. But go ahead. You teach a few courses. In?"

"Oh, bars, trapeze, ground-and-lofty tumbling, acrobatics, aerialistics, high-wire, muscle-control, judo—all that kind of thing."

"Ouch! So if you ever happen to accidentally get mad at me you'll tie me right up into a pretzel?"

"I doubt it; very seriously. I've tossed lots of two-hundred-pounders around, of course, but they were *not* space officers." She laughed unaffectedly as she tested his musculature much more professionally and much more thoroughly than he had tested hers. "Definitely I couldn't. A good big man can always take a good little one, you know."

"But I'm not big; I'm just a little squirt. You've probably heard what they call me?"

"Yes, and I'm going to call you 'Babe', too, and mean it the same way they do. Besides, who wants a man a foot taller than she is and twice as big? You're just *exactly* the right size!"

"That's spreading the good old oil, Bobby, but I'll never tangle with you if I can help it. Buzz-saws are small, too, and sticks of dynamite. Shall we go hunt up the parson—or should it be a priest? Or a rabbi?"

"Even *that* doesn't make a particle of difference to you."

"Of course not. How could it?"

"A parson, please." Then, with a bright, quick grin: "We *have* got a lot to learn about each other, haven't we?"

"Some details, of course, but nothing of any importance and we'll have plenty of time to learn them."

"And we'll love every second of it. You'll live down here in the Middle with me, won't you, all the time you aren't actually on duty?"

"I can't imagine doing anything else," and the two set out, arms around each other, to find a minister. And as they strolled along:

"Of course you won't actually *need* a job, ever, or my money, either. You never even thought of dowsing, did you?"

"Dowsing? Oh, that witch stuff. Of course not."

"Listen, darling. All the time I've been touching you I've been learning about you. And you've been learning about me."

"Yes, but—"

"No buts, buster. You have really tremendous powers, and they *aren't* latent, either. All you have to do is quit fighting them and *use* them. You're ever so much stronger and fuller than I am. All I can do at dowsing is find water, oil, coal, and gas. I'm no good at all on metals—I couldn't feel gold if I were perched right on the roof of Fort Knox; I couldn't feel radium if it were

frying me to a crisp. But I'm *positive* that you can tune yourself to anything you want to find."

He didn't believe it, and the argument went on until they reached the "Reverend's" quarters. Then, of course, it was dropped automatically; and the next five days were deliciously, deliriously, ecstatically happy days for them both.

II.

At the time of this chronicle the status of interstellar flight was very similar to that of intercontinental jet-plane flight in the nineteen-sixties. Starships were designed by humanity's best brains; carried every safety device those brains could devise. They were maintained and serviced by ultra-skilled, ultra-trained, ultra-able crews; they were operated by the *creme-de-la-creme* of manhood. Only a man with an extremely capable mind in an extremely capable body could become an officer of a subspacer.

Statistically, starships were the safest means of transportation ever used by man; so safe that Very Important Persons used them regularly, unthinkingly, and as a matter of course. Statistically, the starships' fatality rate per million passenger-light-years was a small fraction of that of the automobiles' per million passenger-miles. Insurance companies offered odds of tens of thousands to one that any given star-traveler would return unharmed from any given star-trip he cared to make.

Nevertheless, accidents happened. A chillingly large number of lives had, as a total, been lost; and no catastrophe had ever been even partially explained. No message of distress or call for help had ever been received. No single survivor had ever been found; nor any piece of wreckage.

And on the Great Wheel of Fate the *Procyon*'s number came up.

In the middle of the night Carlyle Deston came instantaneously awake —feeling with his every muscle and with his every square inch of skin; listening with all the force he could put into his auditory nerves; while deep down in his mind a huge, terribly silent voice continued to yell: "DANGER! DANGER! DANGER!"

In a very small fraction of a second Carlyle Deston moved—and fast. Seizing Barbara by an arm, he leaped out of bed with her.

"We're abandoning ship—get into this suit—quick!"

"But what . . . but I've *got* to dress!"

"No time! Snap it up!" He practically hurled her into her suit; clamped her helmet tight. Then he leaped into his own. "Skipper!" he snapped into the suit's microphone. "Deston. Emergency! Abandon ship!"

The alarm bells clanged once; the big red lights flashed once; the sirens barely started to growl, then quit. The whole vast fabric of the ship trembled and shuddered and shook as though it were being maul-

ed by a thousand impossibly gigantic hammers. Deston did not know and never did find out whether it was his captain or an automatic that touched off the alarm. Whichever it was, the disaster happened so fast that practically no warning at all was given. And out in the corridor:

"Come on, girl—sprint!" He put his arm under hers and urged her along.

She did her best, but in comparison with his trained performance her best wasn't good. "I've never been checked out on sprinting in spacesuits!" she gasped. "Let go of me and go on ahead. I'll follow—"

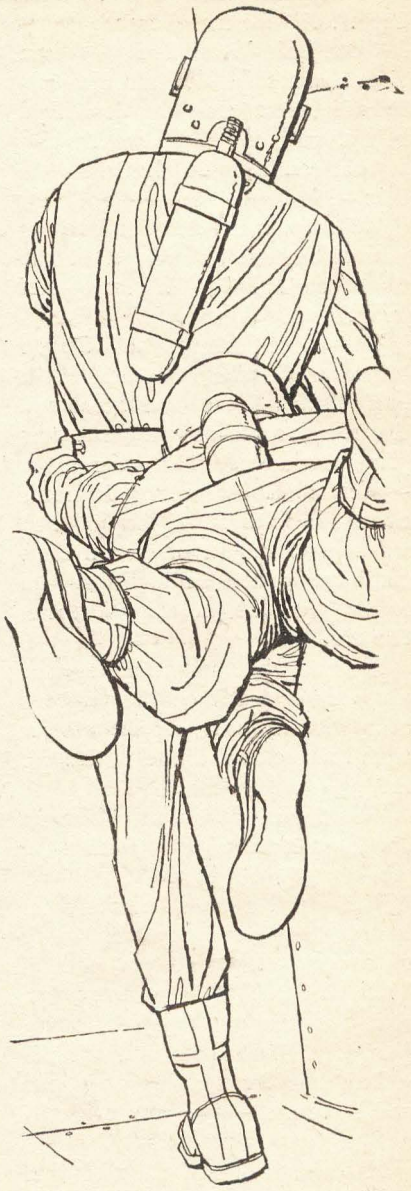
Everything went out. Lights, gravity, air-circulation—everything.

"You haven't been checked out on free fall, either. Hang onto this tool-hanger here on my belt and we'll travel."

"Where to?" she asked, hurtling through the air much faster than she had ever gone on foot.

"Baby Two—that is, Lifecraft Number Two—my crash assignment. Good thing I was down here in the Middle; I'd never have made it from up Top. Next corridor left, I think." Then, as the light of his headlamp showed numbers on the wall: "Yes. Square left. I'll swing you."

He swung her and they shot to the end of the passage. He kicked a lever and the lifecraft's port swung open—to reveal a blaze of light and a startled, gray-haired man.



"What happened . . . What hap . . .?" the man began.

"Wrecked. We've had it. We're abandoning ship. Get into that cubby over there, shut the door tight behind you, and *stay there!*"

"But can't I do something to help—?"

"Without a suit and not knowing how to use one? You'd get burned to a cinder. Get in there—and *jump!*"

The oldster jumped and Deston turned to his wife. "Stay here at the port, Bobby. Wrap one leg around that lever, to anchor you. What does your telltale read? That gauge there—your radiation meter. It reads twenty, same as mine. Just pink, so we've got a minute or so. I'll roust out some passengers and toss 'em to you—you toss 'em along in there. Can do?"

She was white and trembling; she was very evidently on the verge of being violently sick; but she was far from being out of control. "Can do, sir."

"Good girl, sweetheart. Hang on one minute more and we'll have gravity and you'll be O. K."

The first five doors he tried were locked; and, since they were made of armor plate, there was nothing he could do about them except give each one a resounding kick with a heavy steel boot. The sixth was unlocked, but the passengers—a man and a woman—were very evidently and very gruesomely dead.

So was everyone else he could find until he came to a room in which a man in a spacesuit was floundering helplessly in the air. He glanced at his telltale. Thirty-two. High in the red, almost against the pin.

"Bobby! What do you read?"

"Twenty-six."

"Good. I've found only one, but we're running out of time. I'm coming in."

In the lifecraft he closed the port and slammed on full drive away from the ship. Then, wheeling, he shucked Barbara out of her suit like an ear of corn and shed his own. He picked up a fire-extinguisher-like affair and jerked open the door of a room a little larger than a clothes closet. "Jump in here!" He slammed the door shut. "Now strip, quick!" He picked the canister up and twisted four valves.

Before he could get the gun into working position she was out of her pajamas—the fact that she had been wondering visibly what it was all about had done nothing whatever to cut down her speed. A flood of thick, creamy foam almost hid her from sight and Deston began to talk—quietly.

"Thanks, sweetheart, for not slowing us down by arguing and wanting explanations. This stuff is DEKON—short for 'Decontaminant, Complete; Compound, Adsorbent, and Chelating, Type DCQ-429.' Used soon enough, it takes care of radiation. Rub it in good, all over you—like this." He set the foam-gun down on the floor and went vigorously to work. "Yes, hair, too.

Every square millimeter of skin and mucous membrane. Yes, into your eyes. It stings 'em a little, but that's a lot better than going blind. And your mouth. Swallow six good big mouthfuls—it's tasteless and goes down easy.

"Now the soles of your feet—O. K. The last will hurt plenty, but we've *got* to get some of it into your lungs and we can't do it the hospital way. So when I slap a gob of it over your mouth and nose inhale hard and deep. Just once is all anybody can do, but that's enough. And don't fight. Any ordinary woman I could handle, but I can't handle you fast enough. So if you don't inhale deep I'll have to knock you cold. Otherwise you die of lung cancer. Will do?"

"Will do, sweetheart. Good and deep. No fight," and she emptied her lungs.

He slapped it on. She inhaled, good and deep; and went into convulsive paroxysms of coughing. He held her in his arms until the worst of it was over; but she was still coughing hard when she pulled herself away from him.

"But . . . how . . . about . . . you?" She could just barely talk; her voice was distorted, almost inaudible. "Let . . . me . . . help . . . you . . . quick!"

"No need, darling. Two other men out there. The old man probably won't need it—I think I got him into the safe quick enough—the other guy and I will help each other. So lie down there on the bunk and take it easy until I come back here and help you get the gunkum off. So-long for half an hour, pet."

Forty-five minutes later, while all four were still cleaning up the messes of foam, something began to buzz sharply. Deston stepped over to the board and flipped a switch. The communicator came on. Since everything aboard a starship is designed to fail safe, they were, of course, in normal space. On the visiplates hundreds of stars blazed in vari-colored points of hard, bright light.

"Baby Two acknowledging," Deston said. "First Officer Deston and three passengers. Deconned to zero. Report, please."

"Baby Three. Second Officer Jones and four passengers. Deconned to-—"

"Thank God, Herc!" Formality vanished. "With *you* to astrogate us, we may have a chance. But how'd you make it? I'd've sworn a flying saucer couldn't've got down from the Top in the time we had."

"Same thing right back at you, Babe. I didn't have to come down. We were in Baby Three when it happened." Full vision was on; a big, square-jawed, lean, tanned face looked out at them from the screen.

"Huh? How come? And who's 'we'?"

"My wife and I." Second Officer Theodore "Hercules" Jones was somewhat embarrassed. "I got married, too, day before yesterday. After the way the old man chewed you

out, though, I knew he'd slap irons on me without saying a word, so we kept it dark and hid out in Baby Three. These three are all we could find before our meters went high red. I deconned Bun, then—"

"Bun?" Barbara broke in. "Bernice Burns? How *wonderful!*"

"Formerly Bernice Burns." The face of a platinum-blonde beauty appeared on the screen beside Jones'. "And *am* I glad to see *you,* Barbara, even if I did just meet you yesterday! I didn't know whether I'd ever see another girl's face or not!"

"Let's cut the chat," Deston said then. "Herc, give me course, blast, and time for rendezvous . . . hey! My watch stopped!"

"So did mine," Jones said. "So just hold one gravity on eighteen dash forty-seven dash two seventy-one and I'll correct you as necessary."

After setting course, and still thinking of his watch, Deston said: "But it's nonmagnetic. It never stopped before."

The gray-haired man spoke. "It was never in such a field before. You see, those two observations of fact invalidate twenty-four of the thirty-eight best theories of hyper-space. But tell me—am I correct in saying that none of you were in direct contact with the metal of the ship when it happened?"

"We avoid it in case of trouble. You? Name and job?" Deston jerked his head at the younger stranger.

"I know *that* much. Henry Newman. Crew-chief, normal space jobs, unlimited."

"Your passengers, Herc?"

"Vincent Lopresto, financier, and his two bodyguards. They were sleeping in their suits, on air-mattresses. Grounders. Don't like subspace—or space, either."

"Just so." The gray-haired man nodded, almost happily. "We survivors, then, absorbed the charge gradually—"

"But what the—" Deston began.

"One moment, please, young man. You perhaps saw some of the bodies. What were they like?"

"They looked . . . well, not exactly as though they had exploded, but—" he paused.

"Precisely." Gray-Hair beamed. "That eliminates all the others except three—Morton's, Sebring's, and Rothstein's."

"You're a specialist in subspace, then?"

"Oh, no, I'm not a specialist at all. I'm a dabbler, really. A specialist, you know, is one who learns more and more about less and less until he knows everything about nothing at all. I'm just the opposite. I'm learning less and less about more and more; hoping in time to know nothing at all about everything."

"In other words, a Fellow of the College. I'm glad you're aboard, sir."

"Oh, a Theoretician?" Barbara's face lit up and she held out her hand. "With dozens of doctorates in everything from Astronomy to Zool-

ogy? I've never met . . . I'm *ever* so glad to meet you, Doctor—?"

"Adams. Andrew Adams. But I have only eight at the moment. Earned degrees, that is."

"But what were you doing in this lifecraft? No, let me guess. You were X-ray-eying it and fine-toothing it for improvements made since your last trip, and storing the details away in your eidetic memory."

"Not eidetic, by any means. Merely very good."

"And how many metric tons of apparatus have you got in the hold?" Deston asked.

"Less than six. Just what I *must* have in order to—"

"Babe!" Jones' voice cut in. "Course change. Stay on alpha eighteen. Shift beta to forty-four and gamma to two sixty-five."

Rendezvous was made. Both lifecraft hung motionless relative to the *Procyon*'s hulk. No other lifecraft had escaped. A conference was held.

Weeks of work would be necessary before Deston and Jones could learn even approximately what the damage to the *Procyon* had been. Decontamination was automatic, of course, but there would be literally hundreds of hot spots, each of which would have to be sought out and neutralized by hand. The passengers' effects would have to be listed and stored in the proper cabins. Each body would have to be given velocity away from the ship. And so on. Every survivor would have to work, and work hard.

The two girls wanted to be together. The two officers almost *had* to be together, to discuss matters at unhampered length and to make decisions. Each was, of course, almost as well versed in engineering as he was in his own specialty. All ships' officers from First to Fifth had to be. And, as long as they lived or until the *Procyon* made port, all responsibility rested: First, upon First Officer Deston; and second, upon Second Officer Jones. Therefore Theodore and Bernice Jones came aboard Lifecraft Two, and Deston asked Newman to flit across to Lifecraft Three.

"Not me; I like the scenery here better." Newman's eyes raked Bernice's five-feet-eight of scantily-clad sheer beauty from ankles to coiffure. "If you're too crowded—I know a lifecraft carries only fifty people—go yourself."

"As a crew-chief, you know the law." Deston spoke quietly—too quietly, as the other man should have known. "I am in command."

"You ain't in command of *me,* pretty boy!" Newman sneered. "You can play God when you're on sked, with a ship-full of trained dogs to bite for you, but out here where nobody has ever come back from I make my own law—with *this!*" He patted his side pocket.

"Draw it, then!" Deston's voice now had all the top-deck rasp of his rank. "Or crawl!"

The First Officer had not moved; his right hand still hung quietly at his side. Newman glanced at the

girls, both of whom were frozen; at Jones, who smiled at him pityingly; at Adams, who was merely interested. "I . . . my . . . yours is right where you can get at it," he faltered.

"You should have thought of that sooner. But, this once, I won't move a finger until your hand is in your pocket."

"Just wing him, Babe," Jones said then. "He looks strong enough, except for his head. We can use him to shovel out the gunkum and clean up."

"Uh-uh. I'll have to kill him sometime, and the sooner the better. Square between the eyes. Do you want a hundred limit at ten bucks a millimeter on how far the hole is off dead center?"

The two girls gasped; stared at each other and at the two officers in horror; but Jones said calmly, without losing any part of his smile: "I don't want a dime's worth of that. I've lost too much money that way already." At which outrageous statement both girls knew what was going on and smiled in relief.

And Newman misinterpreted those smiles completely; especially Bernice's. The words came hard, but he managed to say then. "I crawl."

"Crawl, what?"

"I crawl, sir. You'll want my gun—"

"Keep it. There's a lot more difference than *that* between us. How close can you count seconds?"

"Plus or minus five per cent, sir."

"Close enough. Your first job will be to build some kind of a brute-force, belt-or-gear thing to act as a clock. You will really work. Any more insubordination or any malingering at all and I'll put you into a lifecraft and launch you into space, where you can make your own laws and be monarch of all you survey. Dismissed! Now—flit!"

Newman flitted—fast—and Barbara, turning to her husband, opened her mouth to speak and shut it. No, he would have killed the man; he would have *had* to. He still might have to. Wherefore she said instead: "Why'd you let him keep his pistol? The . . . the *slime!* And after you actually saved his life, too!"

"With some people what's past doesn't count. The other was just a gesture. Psychology. It'll slow him down, I think. Besides, he'd have another one as soon as we get back into the *Procyon.*"

"But you can lock up *all* their guns, can't you?" Bernice asked.

"I'm afraid not. How about the other three, Herc?"

"With thanks to you, Barbara, for the word; slime. If Lopresto is a financier, I'm an angel, with wings and halo complete. Gangsters; hoodlums; racketeers; you'd have to open every can of concentrate aboard to find all their spare artillery."

"Check. The first thing to do is—"

"One word first," Bernice put in. "I want to thank you, First Off—no,

not First Officer, but I could hardly—"

"Sure you can. I'm 'Babe' to us all, and you're 'Bun'. As to the other, forget it. You and I, Herc, will go over and—"

"And I," Adams put in, definitely. "I must photograph everything, before it is touched; therefore I must be the first on board. I must do some autopsies and also—"

"Of course. You're right," Deston said. "And if I haven't said it before, I'm tremendously glad to have a Big Brain along . . .oh, excuse that crack, please, Dr. Adams. It slipped out on me."

Adams laughed. "In context, I regard that as the highest compliment I have ever received. To you youngsters my advanced age of fifty-two represents senility. Nevertheless, you men need not 'Doctor' me. Either 'Adams' or 'Andy' will do very nicely. As for you two young women—"

"I'm going to call you 'Uncle Andy'," Barbara said, with a grin. "Now, Uncle Andy, you being a Big Brain—the term being used in its most complimentary sense—and the way you talked, one of your eight doctorates is in medicine."

"Of course."

"Are you any good at obstetrics?"

"In the present instance I am perfectly safe in saying—"

"Wait a minute!" Deston snapped. "Bobby, you are *not*—"

"I am too! That is, I don't suppose I *am* yet, since we were married only last Tuesday, but if he's competent—and I'm *sure* he is—I'm certainly *going* to! If we get back to Earth I *want* to, and if we don't, both Bun and I have *got* to. Castaways' Code, you know. So how about it, Uncle Andy?"

"I know what you two girls are," Adams said, quietly. "I know what you two men must of necessity be. Therefore I can say without reservation that none of you need feel any apprehension whatever."

Deston was about to say something, but Barbara forestalled him. "Well, we can *think* about it, anyway, and talk it over. But for right now, I think it's high time we all got some sleep. Don't you?"

It was; and they did; and after they had slept and had eaten "breakfast" the three men wafted themselves across a couple of hundred yards of space to the crippled starship. Powerful floodlights were rigged.

"What . . . a . . . mess." Deston's voice was low and wondering. "The whole Top looks as though she'd crash-landed and spun out for eight miles. But the Middle and Tail look untouched."

Inside, however, devastation had gone deep into the Middle. Bulkheads, walls, floors, structural members; were torn, sheared, twisted into weirdly-distorted shapes impossible to understand or explain. And, much worse, were the *absences;* for in dozens of volumes, of as many sizes and of shapes incompatible with any three-dimensional geometry,

every solid thing had vanished—without leaving any clue whatever as to where or how it had gone.

After three long days of hard work, Adams was satisfied. He had taken pictures as fast as both officers could process the film; he had covered many miles of tape with words only half of which either spaceman could understand. Then, finally, he said:

"Well, that covers the preliminary observations as well as I know how to do it. Thank you, boys, for your forbearance and your help. Now, if you'll help me find my stuff and bring some of it—a computer and so on—up to the lounge?" They did so; the "and so on" proving to be a bewildering miscellany indeed. "Thank you immensely, gentlemen; now I won't bother you any more."

"You've learned a lot, Doc, and we haven't learned much of anything." Deston grinned ruefully. "That makes you the director. You'll have to tell us, in general terms, what to do."

"Oh? I can offer a few suggestions. It is virtually certain: One, that no subspace equipment will function. Two, that all normal-space

equipment, except for some items you know about, will function normally. Three, that we can't do anything about subspace without landing on a planet. Four, that such landing will require extreme—I might almost say fantastic—precautions."

Although both officers thought that they understood Item Four, neither of them had any inkling as to what Adams really meant. They did understand thoroughly, however, Items One, Two, and Three.

"Hell's jets!" Deston exclaimed. "Do you mean we'll have to blast *normal* to a system?"

"It isn't as bad as you think, Babe," Jones said. "Stars are much thicker here—we're in the center somewhere—than around Sol. The probability is point nine plus that any emergence would put us less than point four light-years away from a star. A couple of them show disks. I haven't measured any yet; have you, Doc?"

"Yes. Point two two, approximately, to the closest."

"So what?" Deston demanded. "What's the chance of it having an Earth-type planet?"

"Any solid planet will do," Adams said. "Just so it has plenty of mass."

"That's still quite a trip." Deston was coming around. "Especially since we can't use more than one point—"

"One point *zero* gravities," Jones put in.

"Over the long pull—and the women—you're right," Deston agreed, and took out his slide rule. "Let's see . . . one gravity, plus and minus . . . velocity . . . time . . . it'll take about eleven months?"

"Just about," Jones agreed, and Adams nodded.

"Well, if that's what the cards say, there's no use yowling about it," and all nine survivors went to work.

Deston, besides working, directed the activities of all the others except Adams; who worked harder and longer than did anyone else. He barely took time out to eat and to sleep. Nor did either Deston or Jones ask him what he was doing. Both knew that it would take five years of advanced study before either of them could understand the simplest material on the doctor's tapes.

III.

The tremendous engines of the *Procyon* were again putting out their wonted torrents of power. The starship, now a mere spaceship, was on course at one gravity. The lifecraft were in their slots, but the five and the four still lived in them rather than in the vast and oppressive emptiness that the ship itself now was. And socially, outside of working hours, the two groups did not mix.

Clean-up was going nicely, at the union rate of six hours on and eighteen hours off. Deston could have set any hours he pleased, but he didn't. There was plenty of time.

Eleven months in deep space is a fearfully, a tremendously long time.

"Morning," "afternoon," "evening," and "night" were, of course, purely conventional terms. The twenty-four-hour "day" measured off by the brute-force machine that was their masterclock carried no guarantee, expressed or implied, as to either accuracy or uniformity.

One evening, then, four hard-faced men sat at two small tables in the main room of Lifecraft Three. Two of them, Ferdy Blaine and Moose Mordan, were playing cards for small stakes. Ferdy was of medium size; compact rather than slender; built of rawhide and spring steel. Lithe and poised, he was the epitome of leashed and controlled action. Moose was six-feet-four and weighed a good two-forty—stolid, massive, solid. Ferdy and Moose; a tiger and an elephant; both owned *in fee simple* by Vincent Lopresto.

The two at the other table had been planning for days. They had had many vitriolic arguments, but neither had made any motion toward his weapon.

"Play it my way and we've got it made, I tell you!" Newman pounded the table with his fist. "Seventy *million* if it's a cent! Heavier grease than your lousy spig Syndicate ever even *heard* of! I'm as good an astrogator as Jones is, and a damn sight better engineer. In electronics I maybe ain't got the theory Pretty Boy has, but at building and repairing the stuff I've forgot more than he ever will know. At *practical* stuff, and that's all we give a whoop about, I lay over both them sissies like a Lunar dome."

"Oh, yeah?" Lopresto sneered. "How come you aren't ticketed for subspace, then?"

"For hell's sake, act your age!" Newman snorted in disgust. Eyes locked and held, but nothing happened. "D'ya think I'm dumb? Or that them subspace Boy Scouts can be fixed? Or I don't know where the heavy grease is at? Or I can't make the approach? Why ain't *you* in subspace?"

"I see." Lopresto forced his anger down. "But I've got to be *sure* we can get back without 'em."

"You can be *damn* sure. I got to get back myself, don't I? But get one thing down solid. *I* get the big peroxide blonde."

"You can have her. Too big. I like the little yellowhead a lot better."

Newman sneered into the hard-held face so close to his and said: "And don't think for a second *you* can make me crawl, you small-time, chiseling punk. Rub *me* out after we kill them off and you get nowhere. You're dead. Chew on that a while, and you'll know who's boss."

After just the right amount of holding back and objecting, Lopresto agreed. "You win, Newman, the way the cards lay. Have you ever planned this kind of an operation or do you want me to?"

"You do it, Vince," Newman said, grandly. He had at least one of the

qualities of a leader. "Besides, you already have, ain't you?"

"Of course. Ferdy will take Deston—"

"No he won't! He's *mine*, the louse!"

"If you're *that* dumb, all bets are off. What are you using for a brain? Can't you see the guy's chain lightning on ball bearings?"

"But we're going to surprise 'em, ain't we?"

"Sure, but even Ferdy would just as soon not give *him* an even break. *You* wouldn't stand the chance of a snowflake in hell, and if you've got the brains of a louse you know it."

"O. K., we'll let Ferdy have him. Me and you will match draws to see who—"

"I can draw twice to your once, but I suppose I'll have to prove it to you. I'll take Jones; you will gun the professor; Moose will grab the dames, one under each arm, and keep 'em out of the way until the shooting's over. The only thing is, when? The sooner the better. Tomorrow?"

"Not quite, Vince. Let 'em finish figuring course, time, distance, all that stuff. They can do it a lot faster and some better than I can. I'll tell you when."

"O. K., and I'll give the signal. When I yell 'NOW' we give 'em the business."

Newman went to his cabin and the muscle called Moose spoke thoughtfully. That is, as nearly thoughtfully as his mental equipment would allow.

"I don't like that ape, boss. Before you gun him, let me work him over just a little bit, huh?"

"It'll be quite a while yet, but that's a promise, Moose. As soon as his job's done he'll wish he'd never been born. Until then, we'll let him think he's Top Dog. Let him rave. But Ferdy, any time he's behind me or out of sight, watch him like a hawk. Shoot him through the right elbow if he makes one sour move."

"I get you, boss."

A couple of evenings later, in Lifecraft Two, Barbara said: "You're worried, Babe, and everything's going so smoothly. Why?"

"Too smoothly altogether. That's why. Newman ought to be doing a slow burn and goldbricking all he dares; instead of which he's happy as a clam and working like a nailer . . . and I wouldn't trust Vincent Lopresto or Ferdinand Blaine as far as I can throw a brick chimney by its smoke. This whole situation stinks. There's going to be shooting for sure."

"But they couldn't do *anything* without you two!" Bernice exclaimed. "It'd be suicide . . . and with no motive . . . *could* they, Ted, possibly?"

Jones' dark face did not lighten. "They could, and I'm very much afraid they intend to. As a crew-chief, Newman is a jack-leg engineer and a very good practical 'troncist; and if he's what I *think* he is—" He paused.

"Could be," Deston said, doubtfully. "In with a mob of normal-

space pirate-smugglers. I'll buy that, but there wouldn't be enough plunder to—"

"Just a sec. So he's a pretty good rule-of-thumb astrogator, too, and we're computing every element of the flight. As for motive—salvage. With either of us alive, none. With both of us dead, can you guess within ten million bucks of how much they'll collect?"

"Blockhead!" Deston slapped himself on the forehead. "I never even *thought* of that angle. That nails it down solid."

"With the added attraction," Jones went on, coldly and steadily, "of having two extremely desirable female women for eleven months before killing them, too."

Both girls shrank visibly, and Deston said: "Check. I thought that was the main feature, but it didn't add up. This does. Now, how will they figure the battle? Both of us at once, of—"

"Why?" Barbara asked. "I'd think they'd waylay you, one at a time."

"Uh-uh. The survivor would lock the ship in null-G and it'd be like shooting fish in a barrel. Since we're almost never together on duty . . . and it won't come until after we've finished the computations . . . they'll think up a good reason for *everybody* to be together, and that itself will be the tip-off. Ferdy will probably draw on me—"

"And he'll kill you," Jones said, flatly. "So I think I'll blow his brains out tomorrow morning on sight."

"And get killed yourself? No . . . much better to use their own trap—"

"We *can't!* Fast as you are, you aren't in *his* class. He's a professional—probably one of the fastest guns in space."

"Yes, but . . . I've got a . . . I mean I think I can—"

Bernice, grinning openly now, stopped Deston's floundering. "It's high time you fellows told each other the truth. Bobby and I let our back hair down long ago—we were both tremendously surprised to know that both you boys are just as strongly psychic as we are. Perhaps even more so."

"Oh . . . so *you* get hunches, too?" Jones demanded. "So you'll have plenty of warning?"

"All my life. The old alarm clock has never failed me yet. But the girls can't start packing pistols now."

"I wouldn't know how to shoot one if I did," Bernice laughed. "I'll throw things I'm very good at that."

"Huh?" Jones asked. He didn't know his new wife very well, either. "What can *you* throw straight enough to do any good?"

"Anything I can reach," she replied, confidently. "Baseballs, medicine balls, cannon balls, rocks, bricks, darts, discus, hammer, javelin—what-have-you. In a for-real battle I'd prefer . . . chairs, I think. Flying chairs are really hard to cope with. Knives are too . . . uh-uh, I'd much rather have you fellows do the actual executing. I'll start wearing a couple of knives in leg-sheaths,

but I won't throw 'em or use 'em unless I absolutely have to. So who will I knock out with the first chair?'

"I'll answer that," Barbara said, quietly. "If it's Blaine against Babe, it'll be Lopresto against Herc. So you'll throw your chairs or whatever at that unspeakable oaf Newman."

"I'd rather brain him than anyone else I know, but that would leave that gigantic gorilla to . . . why, he'd . . . listen, you'll simply *have* to go armed."

"I always do." Barbara held out her hands. "Since they don't want to shoot us two—yet—these are all the weapons I'll need."

"Against a man-mountain like that? You're *that* good? Really?"

"Especially against a man-mountain like that. I'm that good. Really," and both Joneses began to realize what Deston already knew—just how deadly those harmless-seeming weapons could be.

Barbara went on: "We should have a signal, in case one of us gets warning first. Something that wouldn't mean anything to them . . . musical, say . . . Brahms. That's it. The very instant any one of us feels their intent to signal their attack he yells 'BRAHMS!' and we *all* beat them to the punch. O. K.?"

It was O.K., and the four—Adams was still hard at work in the lounge—went to bed.

And three days later, within an hour after the last flight-datum had been "put in the tank," the four intended victims allowed themselves to be inveigled into the lounge. Everything was peaceful; everyone was full of friendship and brotherly love. But suddenly "BRAHMS!" rang out, with four voices in absolute unison; followed a moment later by Lopresto's stentorian "NOW!"

It was a very good thing that Deston had had ample warning, for he was indeed competing out of his class. As it was, his bullet crashed through Blaine's head, while the gunman's went harmlessly into the carpet. The other pistol duel wasn't even close! Lopresto's hand barely touched his gun.

Bernice, even while shrieking the battle-cry, leaped to her feet, hurled her chair, and reached for another; but one chair was enough. That fiercely but accurately-sped missile knocked the half-drawn pistol from Newman's hand and sent his body crashing to the floor, where Deston's second bullet made it certain that he would not recover consciousness.

Barbara's hand-to-hand engagement took about one second longer. Moose Mordan was big and strong; and, for such a big man, was fairly fast physically. If he had had time to get his muscles ready, he might have had a chance. His thought processes, however, were lamentably slow; and Barbara Warner Deston was almost as fast physically as she was mentally. Thus she reached him before he even began to realize that this pint-sized girl actually intended

to hit him; and thus it was that his belly-muscles were still completely relaxed when her small but extremely hard left fist sank half-forearm-deep into his solar plexus.

With an agonized *"WHOOSH!"* he began to double up, but she scarcely allowed him to bend. Her right hand, fingers tightly bunched, was already boring savagely into a selected spot at the base of his neck. Then, left hand at his throat and right hand pulling hard at his belt, she put the totalized and concentrated power of her whole body behind the knee she drove into his groin.

That ended it. The big man could very well have been dying on his feet. To make sure, however—or to keep the girl from knowing that she had killed a man?—Deston and Jones each put a bullet through the falling head before it struck the rug.

Both girls flung themselves, sobbing, into their husband's arms.

The whole battle had lasted only a few seconds. Adams, although he had seen almost everything, had been concentrating so deeply that it took those few seconds for him actually to realize what was going on. He got up, felt of Newman's head, then looked casually at the three other bodies.

"Oh, I *killed* him, Carl!" Barbara sobbed, convulsively. "And the worst of it is, I really *meant* to! I *never* did anything like that before in my whole life!"

"You didn't kill him, Barbara," Adams said.

"Huh?" She raised her head from Deston's shoulder; the contrast between her streaming eyes and the relief dawning over her whole face was almost funny. "Why, I did the foulest things possible, and as hard as I possibly could. I'm *sure* I killed him."

"By no means, my dear. Judo techniques, however skillfully and powerfully applied, do not and can not kill instantly. Bullets through the brain do. I will photograph the cadavers, of course, and perform the customary post-mortem examinations for the record; but I know already what the findings will be. These four men died instantly of gunshot wounds."

With the four gangsters gone, life aboardship settled down quickly into a routine. That routine, however, was in no sense dull. The officers had plenty to do; operating the whole ship and rebuilding the mechanisms that were operating on jury rigging or on straight "breadboard" hookups. And in their "spare" time they enjoyed themselves tremendously in becoming better and better acquainted with their wives. For Bernice and Jones, like Barbara and Deston, had for each other an infinite number of endless vistas of personality; the exploration of which was sheerest delight.

The girls—each of whom became joyously pregnant as soon as she could—kept house and helped their husbands whenever need or opportunity arose. Their biggest chore,

however, was to see to it that Adams got sleep, food, and exercise. For, if left to his own devices, he would never have exercised at all, would have grabbed a bite now and then, and would have slept only when he could no longer stay awake.

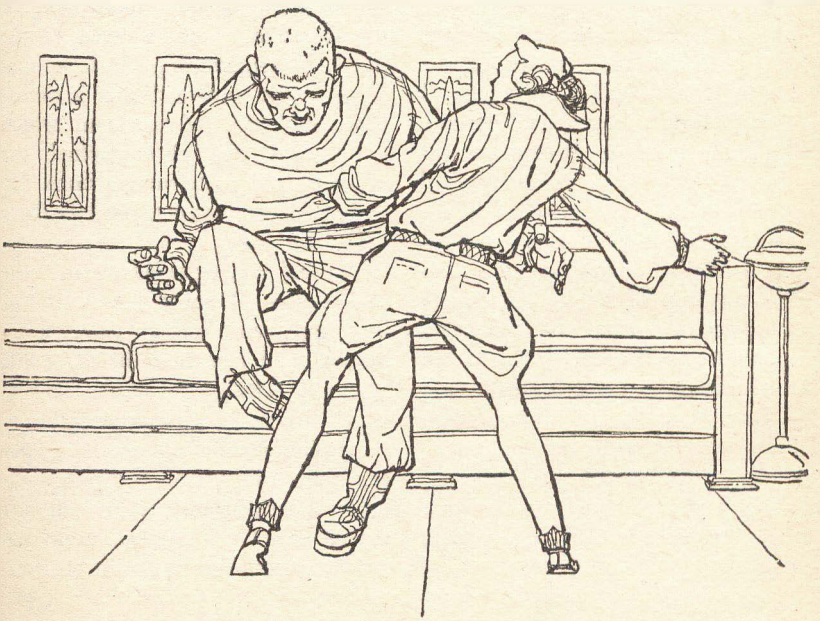
"Uncle Andy, why don't you *use* that Big Brain of yours?" Barbara snapped at him one day. "For a man that's actually as smart as you are, I *swear* you've got the least sense of anybody I know!"

"But it's necessary, my dear child," Adams explained, unmoved. "This material is new. There are many extremely difficult problems involved, and I have less than a year to work on them. Less than *one year;* and it is a task for a team of specialists and all the resources of a research center."

To the officers, however, Adams went into more detail. "Considering the enormous amounts of supplies carried; the scope, quantity, and quality of the safety devices employed; it is improbable that we are the first survivors of a subspace catastrophe to set course for a planet."

After some argument, the officers agreed.

"While I cannot as yet detect it, classify it, or evaluate it, we are carrying an extremely heavy charge of an unknown nature; the residuum of a field of force which is possibly more or less analogous to the electromagnetic field. This residuum



either is or is not dischargeable to an object of planetary mass; and I'm virtually certain that it is. The discharge may be anything from an imperceptible flow up to one of such violence as to volatilize the craft carrying it. From the facts: One, that in the absence of that field the subspace radio will function normally; and Two, that no subspace-radio messages have ever been received from survivors; the conclusion seems inescapable that the discharge of this unknown field is in fact of extreme violence."

"Good God!" Deston exclaimed. "Oh . . . *that* was what you meant by 'fantastic precautions,' back there?"

"Precisely."

"But what can we *do* about it?"

"I don't know. I . . . simply . . . do . . . not . . . know." Adams lost himself in thought for over a minute. "This is all *so* new . . . I know *so* little . . . and am working with such *pitifully* inadequate instrumentation— However, we have months of time yet, and if I am unable to arrive at a conclusion before arrival—I don't mean a rigorous analysis, of course, but merely a stop-gap, empirical, pragmatic solution—we will simply remain in orbit around that sun until I do."

IV.

The *Procyon* bored on through space, at one unchanging gravity of acceleration. It may not seem, at first glance, that one gravity would result in any very high velocity; but when it is maintained steadily for days and weeks and months, it builds up to a very respectable speed. Nor was there any question of power, for the *Procyon*'s atomics did not drive the ship, but merely energized the "Chaytors"—the Chaytor Effect engines that tapped the energy of the expanding universe itself.

Thus, in less than six months, the *Procyon* had attained a velocity almost half that of light. At the estimated mid-point of the flight the spaceship, still at one gravity of drive, was turned end-for-end; so that for the ensuing five-and-a-fraction months she would be slowing down.

A few weeks after the turnover, Adams seemed to have more time. At least, he devoted more time to the expectant mothers, even to the point of supervising Deston and Jones in the construction of a weirdly-wired device by means of which he studied and photographed the unborn child each woman bore. He said nothing, however, until Barbara made him talk.

"Listen, you egregious clam," she said, firmly, "I know darn well I've been pregnant for at *least* seven months, and I ought to be *twice* this big. Our clock isn't *that* far off; Carl said that by wave lengths or something it's only about three per cent fast. And you've been pussyfooting and hem-hawing around all this time. Now, Uncle Andy, I want the *truth*. *Are* we in for a lot of trouble?"

"Trouble? Of course not. *Certainly* not. No trouble at all, my dear. Why, you've seen the pictures—here, look at them again . . . see? Absolutely normal fetus—yours, too, Bernice. *Perfect!* No malformations of any kind."

"Yes, but for what *age?*" Bernice asked, pointedly. "Four months, say? I see, I was exposed to a course in embryology myself, once."

"But *that's* the interesting part of it!" Adams enthused. "Fascinating! And, indubitably, supremely important. In fact, it may point out the key datum underlying the solution of our entire problem. If this zeta field is causing this seemingly peculiar biological effect, that gives us a tremendously powerful new tool, for certain time vectors in the generalized matrix become parameters. Thus, certain determinants, notably the all-important delta-prime-sub-mu, become manipulable by . . . but you aren't *listening!*"

"I'm listening, pops, but nothing is coming through. But thanks much, anyway. I feel a lot better, knowing I'm not going to give birth to a monster. Or *are* you sure, really?"

"Of *course* I'm sure!" Adams snapped, testily, and Barbara led Deston aside.

"Have you got the *slightest* idea of what he was talking about?" she asked.

"Just the slightest, if any. Either that time is relative—no, that's so elementary he wouldn't mention it. Maybe he's figured out a *variable* time of some kind or other. Anyway, you girls' slowness in producing has given the old boy a big lift, and I'm mighty glad of it."

"But aren't you *worried,* sweetheart? Not even the least little bit?"

"Of course not," and Deston very evidently meant just that.

"I am. I can't help but be. Why aren't you?"

"Because Doc isn't, and he knows his stuff, believe me. He can't lie any better than a three-year-old, and he's *sure* that all four of you are just as safe as though you were in God's lefthand hip pocket."

"Oh—that's right. I never thought of it that way. So I *don't* have anything to worry about, do I?" She lifted her lips to be kissed; and the kiss was long and sweet.

Time flew past until, one day a couple of weeks short of arrival, Adams rushed up to Deston and Jones. "I have it!" he shouted, and began to spout a torrent of higher—very *much* higher—mathematics.

"Hold it, Doc!" Deston held up an expostulatory hand. "I read you zero and ten. Can't you delouse your signal? Whittle the stuff down to our size?"

"W-e-l-l-," the scientist looked hurt, but did consent to forego the high math. "The discharge *is* catastrophic; in energy equivalent something of the order of magnitude of ten thousand discharges of lightning. And, unfortunately, I do *not* know what it is. It is virtually certain, however, that we will be able to dis-

sipate it in successive decrements by the use of long, thin leads extending downward toward a high point of the planet."

"Wire, you mean? What kind?"

"The material is not important except in that it should have sufficient tensile strength to support as many miles as possible of its own length."

"We've got dozens of coils of hook-up wire," Deston said, "but not too many *miles* and it's soft stuff."

"*Graham* wire!" Jones snapped his finger.

"Of course," Deston agreed. "Hundreds of miles of it. Float the senser down on a Hotchkiss—"

"Tear-out." Jones objected.

"Bailey it—spidered out to twenty or so big, flat feet. That'll take metal, but we can cannibal the whole Middle without weakening the structure."

"Sure . . . surges—backlash. Remote it."

"Check. Remote everything to Baby Two, and—"

"Would you mind delousing *your* signal?" Adams asked, caustically.

" 'Scuse, please, Doc. A guy *does* talk better in his own lingo, doesn't he? Well, Graham wire is one-point-three-millimeter-diameter, ultra-high-tensile steel wire. Used for re-wrapping the Grahams, you know."

"No, I don't know. What are Grahams?"

"Why, they're the intermediates between the Chaytors . . . O. K., O. K., they're something like bottles, that have to stand terrifically high pressures."

"That's what I want to know. Such wire will do very nicely. Note now that our bodies must be grounded very thoroughly to the metal of the ship."

"You're so right. We'll wrap the girls in silver-mesh underwear up to the eyeballs, and run leads as big as my wrist to the frame."

The approach was made, and the fourth planet out from that strange sun was selected as a ground. That planet was not at all like Earth. It had very little water, very little atmosphere, and very little vegetation. It was twice as massive as Earth; its surface was rugged and jagged; one of its stupendous mountain ranges had sharp peaks more than forty thousand feet high.

"There's one thing more we must do," Adams said. "I have barely begun to study this zeta field, and this one may very well be unique—irreplaceable. We must, therefore, launch all the lifecraft—except Number Two, of course—into separate orbits around this sun, so that a properly-staffed and properly-equipped expedition can study it."

"Your proper expedition might get its pants burned off, too."

"There is always that possibility; but I will insist on being assigned to the project. This information, young man, is *necessary*."

"O. K., Doc," and it was done; and in a few days the *Procyon* hung

motionless, a good five hundred miles high, directly above the highest, sharpest mountain peak they had been able to find.

The Bailey boom, with its spider-web-like network of grounding cables and with a large pulley at its end, extended two hundred feet straight out from the side of the ship. A twenty-five-mile coil of Graham wire was mounted on the remote-controlled Hotchkiss reel. The end of the wire was run out over the pulley; a fifteen-pound weight, to act both as a "senser" and to keep the wire from fouling, was attached; and a few hundred feet of wire were run out.

Then, in Lifecraft Two—as far away from the "business district" as they could get—the human bodies were grounded and Deston started the reel. The wire ran out—and ran—and ran—and ran. The full twenty-five miles were paid out, and still nothing happened. Then, very slowly, Deston let the big ship move straight downward. Until, finally, it happened.

There was a blast beside which the most terrific flash of lightning ever seen on Earth would have seemed like a firecracker. In what was almost a vacuum though she was, the whole immense mass of the *Procyon* was hurled upward like the cork out of a champagne bottle. And as for what it *felt* like—since the five who experienced it could never describe it, even to each other, it is obviously indescribable by or to anyone else. As Bernice said long afterward, when she was being pressed by a newsman: "Just tell 'em it was the living end," and that is as good a description as any.

The girls were unwrapped from their silver-mesh cocoons and, after a minute or so of semihysterics, were as good as new. Then Deston stared into the 'scope and gulped. Without saying a word he waved a hand and the others looked. It seemed as though the entire tip of the mountain was gone; had become a seething, flaming volcano on a world that had known no vulcanism for hundreds of thousands of years.

"And what," said Deston finally, "do you suppose happened to the other side of the ship?"

The boom, of course, was gone. So were all twenty of the grounding cables which, each the size of a man's arm, had fanned out in all directions to anchorages welded solidly to the vessel's skin and frame. The anchorages, too, were gone; and tons upon tons of high-alloy steel plating and structural members for many feet around where each anchorage had been. Steel had run like water; had been blown away in gusts of vapor.

"Shall I try the radio now, Doc?" Deston asked.

"By no means. This first blast would, of course, be the worst, but there will be several more, of decreasing violence."

There were. The second, while it volatilized the boom and its grounding network, merely fused portions

of the anchorages. The third took only the boom itself; the fourth took only the dangling miles of wire. At the sixth trial nothing—apparently—happened; whereupon the wire was drawn in and a two-hundred-pound mass of steel was lowered until it was in firm and quiescent contact with the solid rock of the planet.

"Now you may try your radio," Adams said.

Deston flipped a switch and spoke, quietly but clearly, into a microphone. "*Procyon One* to Control Six. Flight Eight Four Nine. Subspace Radio Test Ninety-Five—I think. How do you read me, Control Six?"

The reply was highly unorthodox. It was a wild yell, followed by words not directed at Deston at all. "Captain Reamer! Captain French! Captain Holloway! ANYBODY! It's the *Procyon!* The *PROCYON,* that was lost a year ago! Unless some fool is playing a dumb joke."

"It's no joke—I hope." Another voice, crisp and authoritative, came in; growing louder as its source approached the distant pickup. "Or somebody will rot in jail for a hundred years."

"*Procyon One* to Control Six," Deston said again. His voice was not quite steady this time; both girls were crying openly and joyfully. "How do you read me, Frenchy old horse?"

"It *is Procyon One*—the Runt himself— Hi, Babe!" the new voice roared, then quieted to normal volume. "I read you eight and one. Survivors?"

"Five. Second Officer Jones, our wives, and Dr. Andrew Adams, a Fellow of the College of Advanced Study. He's solely responsible for our being here, so—"

"Skip that for now. In a lifecraft? No, after this long, it must be the ship. Not navigable, of course?"

"Not in subspace, and only so-so in normal. The Chaytors are O.K., but the whole Top is spun out and the rest of her won't hold air—air, hell! She won't hold shipping crates! All the Wesleys are shot, and all the Q-converters. Half the Grahams are leaking like sieves, and—"

"Skip that, too. Just a sec—I'll cut in the downstairs recorder. Now start in at your last check and tell us what's happened since."

"It's a long story."

"Unwind it, Runt, I don't give a damn how long it is. Not a full-detailed report, just hit the high spots—but don't leave out anything really important."

"Wow!" Jones remarked, audibly. "Wottaman Frenchy! Like the exurbanite said to the gardener: 'I don't want you to work hard—just take big shovelfulls and lots of 'em per minute'."

"That's enough out of you, Herc my boy. You'll be next. Go ahead, Babe."

Deston went ahead, and spoke almost steadily for thirty minutes. He did not mention the gangsters; nor any personal matters. Otherwise, his report was accurate and complete. He

had no idea that everything he said was going out on an Earth-wide hookup; or that many other planets, monitoring constantly all subspace channels, were hooking on. When he was finally released Captain French said, with a chuckle:

"Off the air for a minute. You've no idea what an uproar this has stirred up already. They let them have all your stuff, but we aren't putting out a thing until some Brass gets out there and gets the real story—"

"That *is* the real story, damn it!"

"Oh, sure, and a very nice job, too, for an extemporaneous effort—if it was. Semantics says, though, that in a couple of spots it smells like slightly rancid cheese, and . . . no-no, keep still! Too many planets listening in—*verbum sap.* Anyway, THE PRESS smells something, too, and they're screaming their lungs out, especially the sob-sisters. Now, Herc, on the air, you're orbiting the fourth planet of a sun. What sun? Where?"

"I don't know. Unlisted. We're in completely unexplored territory. Standard reference angles are as follows"—and Jones read off a long list of observations, not only of the brightest stars of the galaxy, but also of the standard reference points, such as S-Doradus, lying outside it. "When you get that stuff all plotted, you'll find a hell of a big confusion; but I *hope* there aren't enough stars in it but what you can find us sometime."

"Off the air—for good, I hope. Don't make me laugh, Buster, Your probable center will spear it. If there's ever more than one star in any confusion *you* set up, I'll eat all the extras. But there's a dozen Big Brains here, gnawing their nails off up to the wrist to talk to Adams all the rest of the night, so put him on and let's get back to sleep, huh? They're cutting this mike now."

"Just a minute!" Deston snapped. "What's your time?"

"Three, fourteen, thirty-seven. So go back to bed, you night-prowling owl."

"Of what day, month, and year?" Deston insisted.

"Friday, Sep—" French's voice was replaced by a much older one; very evidently that of a Fellow of the College.

After listening for a moment to the newcomer and Adams, Barbara took Deston by the arm and led him away. "Just a little bit of *that* gibberish is a bountiful sufficiency, husband mine. So I think we'd better take Captain French's advice, don't you?"

Since there was only one star in Jones' "Confusion" (by the book, "Volume of Uncertainty") finding the *Procyon* was no problem at all. High Brass came in quantity and the entire story—except for one bit of biology—was told. Two huge subspace-going machine shops also came, and a thousand mechanics, who worked on the crippled liner for almost three weeks.

Then the *Procyon* started back for

Earth under her own subspace drive, under the command of Captain Theodore Jones. His first, last, and only subspace command, of course, since he was now a married man. Deston had wanted to resign while still a First Officer, but his superiors would not accept his resignation until his promotion "for outstanding services" came through. Thus, Ex-Captain Carlyle Deston and his wife were dead-heading, not quite back to Earth, but to the transfer-point for the planet Newmars.

"Theodore Warner Deston is going to be born on Newmars, where he should be," Barbara had said, and Deston had agreed.

"But suppose she's Theodora?" Bernice had twitted her.

"Uh-uh," Barbara had said, calmly. "I just *know* he's Theodore."

"Uh-huh, I know." Bernice had nodded her spectacular head. "And we wanted a girl, so she is. Barbara Bernice Jones, her name is. A living doll."

Although both pregnancies were well advanced, neither was very near full term. Thus it was clear that both periods of gestation were going to be well over a year in length; but none of the five persons who knew it so much as mentioned the fact. To Adams it was only one tiny datum in an incredibly huge and complex mathematical structure. The parents did not want to be pilloried as crackpots, as publicity-seeking liars, or as being unable to count; and they knew that nobody would believe them if they told the truth; even—or especially?—no medical doctor. The more any doctor knew about gynecology and obstetrics, in fact, the less he would believe any such story as theirs.

Of what use is it to pit such puny and trivial things as *facts* against rock-ribbed, iron-bound, entrenched AUTHORITY?

The five, however, *knew;* and Deston and Jones had several long and highly unsatisfactory discussions; at first with Adams, and later between themselves. At the end of the last such discussion, a couple of hours out from the transfer point, Jones lit a cigarette savagely and rasped:

"Wherever you start or whatever your angle of approach, he *always* boils it down to this: 'Subjective time is measured by the number of learning events experienced.' I ask you, Babe, what does that mean? If anything?"

"It sounds like it ought to mean *something,* but I'll be damned if I know what." Deston gazed thoughtfully at the incandescent tip of his friend's cigarette. "However, if it makes the old boy happy and gives the College a toehold on subspace, what do *we* care?"

THE END

(Continued from page 82)
cock shuddered with horror. For the first time, he could understand Muller's attitude. It troubled him greatly, and he knew it was wrong. He was sure it was wrong. It had to be!

But he, too, was afraid.

The quarry's trail turned to follow the valley. The pilot banked the skimmer sharply to turn after it. "Those tracks look new," he observed.

"A couple of hours or less," Muller agreed. The skimmer rocketed down the valley. Hitchcock leaned forward, peering ahead. He held his camera ready to use.

"Are they very far ahead?" he asked.

"Hard to tell," Muller answered. "They can move pretty fast when they want to." He pointed to a set of tracks that paralleled the tracks of the quarry. "That boy was using three legs—sort of like an ape when it's running. They do that when they're in a hurry—or else all four."

"They run like *animals*?" Hitchcock demanded. He had a vision of the bumbling, shambling creatures bounding along on all four legs like beasts. The thought was appalling.

The skimmer skidded around the curve of a high, moundlike hill. And there they were. Still far ahead and indistinct in the sun-glare, they were nevertheless unmistakable. Floppers—eight or ten of them.

"Pull back," Muller snapped.

The skimmer bucked and shuddered as the pilot slammed it to a stop against the windblast of its fans. Quickly, they slipped back around the curve of the hill.

"Now you'll see how we do it," Muller told Hitchcock. "Better get buttoned up. It's cold out there." He helped Hitchcock with the unfamiliar clasps of his wind mask, and made sure his parka was zipped tight.

Then he got busy in his own part of the cockpit. Hitchcock leaned forward to see. When he had his own wind mask in place, and his parka was tight, Muller opened the canopy on the side where the net lay rolled on the cowling. A blast of cold air burst into the cockpit. Hitchcock felt it even through his thick clothes. It leaked in through his mask and around the brow ridge of his goggles. Painfully, it invaded his nose as he breathed.

Muller pointed to the grommet near Hitchcock's knee, where the net was secured. "Is it tied down good?" he asked. His mask muffled his voice. Hitchcock glanced down negligently and nodded.

Not that he cared if it was tied down properly or not. It was revolting merely to think of using a net to capture a flopper. Such things were unfair—unsportsmanlike.

But Muller accepted the answer. "Let's go!" he barked.

The pilot leaned forward, pushing the control stick all the way front. The skimmer tilted forward. The engine surged.

They skittered around the curve of the hill, then straightened out and drove. Hitchcock felt the icy wind smash against him. Intense cold leak-

ed through his parka's fastenings. The wind thundered around him. He raised his camera and focused it on the place far ahead where the floppers were gathered. The skimmer hurtled forward like a boat on the crest of a wave.

Muller held a set of binoculars up against his goggles, studying the scene ahead. "They got the thing surrounded," he announced. "One of 'em's got a—" He stopped. "Get that one!" he rapped out. "The first one we come to. He's the one we want!"

Hitchcock could make them out, now. A line of floppers was driving a sinuous, short-legged beast toward another flopper. That flopper was standing still, its back to the skimmer. It held something over its head with both of its flipperlike paws. The beast was gliding toward it like a snake.

"That's the one we want!" Muller yelled again into the icy wind.

Muller pushed the rolled net over the skimmer's side. It unrolled and flapped sluggishly in the wind. The skimmer rocked.

They were very close, now, and traveling fast. The wind roared around them—it beat at their clothes. A vast plume of wind-lifted snow blew up behind them. Hitchcock held his camera fixed on the flopper. The scene exploded into largeness before them.

At the last moment, the pilot spun the skimmer broadside, setting the net to scoop up the flopper. At that instant, Hitchcock reached down and wrenched the net's anchor cord from the grommet near his knee.

Because he was doing that, his camera did not record what followed. The net, robbed of half its support, bunched into a bundle which clubbed the flopper from behind and tumbled it into the snow. A large, ragged, heart-shaped rock flew from its paws.

The skimmer hurtled onward from its own momentum. The pilot fought to slow it down. Hitchcock raised his camera again.

He got what happened next on the tape—the catlike pounce of the beast, the desperate struggling of the flopper, and the sudden gush of incredible turquoise blood on the white snow.

"You see?" Hitchcock cried triumphantly. "You see? *That's* how you make them live! You murderers!"

IV.

It was days later that Hitchcock commanded Muller to show how he measured the floppers' intelligence.

Consistently, as his investigation progressed, he had heard their intelligence disparaged. It was a lie and a conspiracy, of course, but he was gradually forced to the realization that the ultimate success or failure of his mission would depend on whether he could turn up evidence to prove they *were* intelligent.

Muller smiled and took him into the laboratory.

At first, what he saw was not encouraging. The problem tests were fantastically simple. In fact, when he

tried them, their solutions were practically obvious. But he did force Muller to concede that the floppers could do them, too.

"Yeah, they do 'em," Muller said sneeringly. "They do 'em almost as good as you do."

Then they came to some problems not so easy. Problems like the firemoat, in which—to reach a scrap of food—the flopper had to cross a wide bed of flame-bright coals.

Baffled, Hitchcock paced back and forth along the edge, his hollow-jowled face made ruddy by the heat. There wasn't any way he could do it. No way at all. Finally, he gave up. He stopped and turned back to Muller. "This is impossible," he protested.

"Yeah?" Muller smiled. He walked over, picked up a mat from the floor, and threw it across the hot, eye-searing coals.

"How should I have known it was fireproof?" Hitchcock protested. He was using his camera again, recording the problem and its solution.

"How did you know it wasn't?" Muller answered. "You should have tried it, to find out."

"But you can't expect an . . . an untrained savage to think of *that*," Hitchcock argued.

Muller shrugged. "It's a tough trick, all right," he admitted. "But we've had a few floppers do it."

"Impossible," Hitchcock snapped.

"Not those floppers," Muller snorted. "They were *smart*."

"What?" Hitchcock wondered. He wasn't sure he'd heard right. "Not really!"

Muller shrugged and smiled. "We have had a few smart ones," he admitted.

Hitchcock paused, inwardly jubilant, but he pretended not to be especially impressed. Like a hunter catching sight of his prey, he decided to wait—to bide his time and hope that Muller, unsuspecting, would make further revelations.

The man had the proof he—Hitch cock—needed. That was all he had to know. Before he was done, that proof would be his.

There were more problems, most of them even more difficult. Hitchcock managed to solve very few of them, in spite of his heightened vigilance. Muller didn't explain how he expected floppers to solve them, when even a man was baffled. He just smiled.

Hitchcock used his camera to record the ones that stopped him. If the floppers were considered stupid on the basis of tests like these, it was good proof that they *were* intelligent.

Then they came to the maze problems. Hitchcock blundered through the first few simple ones and came out pleased with his own accomplishment, but annoyed because he couldn't use them for evidence.

"Well, at least *these* are simple enough," he snapped.

"We just use those to give 'em an idea what a maze is," Muller told him. He conducted Hitchcock into another room, where a gigantic panel of signal lights covered a whole wall. He opened a door and motioned

Hitchcock inside. Confidently, Hitchcock walked in.

The door clicked behind him. When he turned, there wasn't a sign of where the door had been.

An awful, trapped feeling seized him. He pounded on the wall and shouted. No one answered. The tunnels around him swallowed the sounds without an echo.

He started to run.

endlessly. They curved and zigzagged and circled back on themselves. He lost all sense of direction—all sense of distance and time. Trying to trace back his steps, he took a wrong turn. Blank walls stopped him. A downspiraling tunnel descended to a pool of black, utterly motionless water. Wearily, he turned around and climbed up again.

Then he stopped, breathing hard

Half a minute later, out of breath, he stopped.

This wasn't like the other ones. This one was *hard.*

He looked around. Nothing looked familiar. He couldn't even be sure which way he'd come.

He was lost.

Appalled and fearful, he started to search. It was useless. The passageways branched and intersected from the climb. The tunnel forked and other tunnels led off from it. Any one of them could be the right one. Or none of them. Blank-minded, frustrated, Hitchcock lifted his camera and slowly swung it in a full circle.

Let the people back home see this, he thought. Let them see the endless convolutions—the total formlessness of this maze. Let them judge for

themselves how well it measured a person's intelligence.

And it was because of things like this they said the floppers were animal stupid! It was ridiculous. Why, even a man as intelligent as himself couldn't find his way through. The most brilliant man alive couldn't do it.

"Had enough, Hitchcock?" Muller's voice asked.

Startled, Hitchcock whirled. He was completely alone. "Where are you?" he demanded. "Show yourself."

"Had enough?" Muller asked again tauntingly.

The tunnels twisted around him crazily, shapelessly. A man was a fool to keep trying. He might spend days in this place. Why, he could starve! "Yes! YES!" Hitchcock cried. "Where are you?"

"Wait there," Muller told him. "I'll come get you."

Legs aching with fatigue, Hitchcock slouched against the smooth wall. Why, it was outrageous! The silly rabbit warren didn't even have a place to sit down!

Sigurd Muller came strolling along the passageway less than two minutes later. "How was it?" he asked, smiling raffishly.

Hitchcock straightened up. "How can you believe that this . . . this silly game gives the slightest indication of a person's intelligence? It's absolutely foolish."

Muller chuckled. "I don't know," he said easily. "It gave me a good look at yours."

Hitchcock sputtered. "Young man, no person could possibly find his way out."

"Yeah?" Muller wondered. "Follow me." He jerked a thumb over his shoulder, turned, and walked off in that direction.

"But you *know* the way out," Hitchcock protested. He had to scurry to catch up with Muller.

Muller didn't look back. "It isn't easy," he admitted, walking along almost jauntily. "But some people do it the first time through. We've even had some floppers do it."

"Chance," Hitchcock declared, breathing hard to match Muller's pace. "Pure chance."

Muller shook his head. "It wasn't chance," he said. He was very sure. "You don't get through a thing this tricky just with luck. Not fast, you don't. You either just hunt till you hit it, or you think up a method. If you hunt, you're a good long time getting out. But if you're real smart, you think up a method. Those floppers were smart."

"I was told," Hitchcock said pointedly, "that these natives are not intelligent."

"You were, huh?" Muller growled. He shrugged. "They must've been talking about the tame ones that do our muscle work for us. They *are* dumb. So are a lot of the wild ones, but there's been some smart ones, too. There's even been a few so smart none of these tests showed their limits. And let me tell you, that *is*

smart. I get scared when I think about 'em."

Then, suddenly, they emerged from the maze. Hitchcock stopped and looked around. They were in the same room he had entered the maze from. The door he had gone through was there in the opposite wall.

"Want to try it again?" Muller asked.

"No thank you," Hitchcock snapped. "I've had quite enough of these childish games."

Wryly, carelessly, Muller smiled. "Anything else you want to see?"

"Yes," Hitchcock said firmly. "I want you to show me proof of these intelligent floppers."

Muller nodded cockily. "I figured you would," he said. "I got it all ready for you."

He led Hitchcock from the testing rooms to a small, file-jammed office. The files were a primitive type, as if the scientists here had never heard of memory crystals. Muller bent over the librarian's console and punched out a combination. A folder dropped into the delivery slot.

Muller passed it to Hitchcock, and motioned him to the desk. Hitchcock sat down and spread the folder's contents in front of him.

It wasn't an impressive display. The data-tables were meaningless. The multi-colored photo plates were nothing but abstract designs. Nevertheless, Hitchcock held his camera over them and recorded them slowly, page by page.

Then Muller's shadow fell across the desk. His finger prodded the stacked data pages. "This is how they went through the tests," he said. With a twist of the hand he fanned the sheets out and pulled free a set of seven pages. He laid them on top of the others. "These are how a scientist candidate scored—I put 'em in to compare with."

Hitchcock separated the four sets of papers and laid them on the desk —the one of the scientist candidate and three containing the scores floppers had made. He tried to compare the records, glancing randomly from one set to another. But all four were confusingly similar, and the complex mass of numbers, plus and minus signs, and symbols meant nothing to him.

Muller brushed Hitchcock's hands out of the way. He traced a fingertip across the laid-out sequence of the scientist candidate's scores. Three quarters of the way through the record, he paused.

"Up to here," he said, "he was even with 'em. They missed a few and he missed a few—they came out even. But from here on—"

His finger traced to the end of the record, then transferred to the corresponding section of the record of one of the floppers. Instantly, Hitchcock saw that the two were radically different.

"From here on," Muller continued, "they were way ahead of him—faster and slicker. They didn't miss hardly one. And those jobs were *tough*. Just to give you an idea—" He pointed to a spot not quite halfway through the

test sequence. "Here's where *you* pegged out."

Astonished, Hitchcock looked down at the expanse of records. The scientist candidate must have been a genius to score so far above him. And those floppers—he could not comprehend such intelligence. It didn't matter that he didn't understand the notations or the things they made reference to. Now that it had been pointed out to him, the meaning of those tabulations was plain. He held his camera up and recorded them again.

Muller slapped the photo plates down on top of the papers. "As for these—" he said. "These are brain tissue." He indicated three sheets of eight photos each. "These came from the floppers—the smart ones. And these"—he tapped another set—"are a man's brain. I figured you'd want to compare them, but don't trust it too far—floppers' brain aren't made the same. This one's"—he pointed to the fifth set of photos—"from a normal flopper—one of the boys we keep around to do the work for us."

Hitchcock tried to study the photo plates—tried to discover the similarities and the differences in them. But his eye was not trained—he didn't know what to look for. The plates were as meaningless as the data sheets had been. Again, Sigurd Muller helped him.

"We use a variable intensity dye," he explained. "Where it's thin, it shows up red—where it's heavy, it's blue. We put it in one cell on each plate."

He tapped one of the photo plates—the human one—where a blue splotch lay against a pale green-yellow background. Rootlike arms spread out from the splotch in all directions, branching and rebranching into countless red filaments thinner than hairs.

"That's one brain cell," he said. "Those"—he indicated the arms and the red filaments—"are how it makes connections with the other cells. Put a lot of 'em together and you've got a whole network of connections. This one's different from the others, but all of 'em have connections like that. That's what makes for intelligence—connections."

Hitchcock frowned. These things were difficult to grasp. "Repeat that," he requested.

"Take it this way," Muller said. "Intelligence depends on a lot of units being tied up together in a network of communication—a lot of connections and a lot of channels of contact. The smarter you are, the more interconnections you've got, and it goes the same the other way around. So there's two ways you can be smart, if you've got a big enough brain case to start with. You can have ordinary-size brain cells with a lot of these connecting threads, or you can have a lot of cells smaller than normal. Now—look what we've got here."

He tapped the plate with the human brain cells on it. "Here we've got normal size cells with a whole mess of connections." He moved his

finger on to the samples from the normal flopper. "This boy was dumb —these pictures are the same scale. The cells are almost as big, and they don't have anywhere near as many contacts."

Hitchcock was using his camera where Muller pointed. He could see that everything was exactly as Muller described it. Muller shifted to the three sets taken from the intelligent floppers. "Now look at these," he was saying.

The cells were much smaller—not half the size of the cells from the normal flopper—and connecting filaments radiated out from them, proliferating endlessly. They looked like spiderwebs.

Hitchcock caught his breath. Why, minds built of cells like these would be incalculably powerful.

Muller smiled at him. "You catch on easy," he said.

"Why, they . . . how magnificent!" Hitchcock exclaimed.

This was the proof he wanted—proof that he was told a lie when he was told the flopppers were mindless, dumb animals. Proof—undeniable proof—that the floppers were people, and that therefore they were entitled to the fundamental rights of all human beings.

But then an unsettling question—a moment of doubt—came into his thoughts. "How . . . how did you obtain these . . . these wonderful specimens?"

Muller snorted. "How do you think? You don't think we'd let 'em run around loose, do you?"

Hitchcock was aghast. "You killed them!"

"Sure," Muller said. "So what? They're only animals."

INTERLUDE

The deadfall had mashed the small animal practically flat, but some of its springy bones flexed back into shape when Kosh-korrozasch levered the ice block off it. He could see what it had looked like.

What he saw astonished him. It was unlike any creature he had ever seen.

Expertly, he tore off a hind leg. A strip of flank peeled off with it. He squatted in the shelter of a rock ledge and gobbled it, bones and all. Then he tore off the other hind leg.

His hunger subsided then. He paused to examine the carcass more slowly. He had thought he knew all the creatures in the world—their shape, their habits, what they could do, and how they tasted. But this was not one of them.

It made him wonder.

A cold wind-gust blasted him, ruffing his pelt. He hardly noticed. He pondered how it was possible an animal could exist anywhere in the world, and he had not seen it till now. Never, till now, had he seen an animal he did not recognize—not since cubhood, when he was freshly come from his parent's pouch.

From his high vantage, here in a cleft where the land reached a narrow, white tendril up into the mountains, Kosh-korrozasch looked out at

the world. The white, featureless land spread wide and far in the seven directions, and the mountains that surrounded the land were rough and massive—dark, and patched with white on their slopes. And there, out in the middle of the land where no mountain belonged, the great, lonely peak rose jaggedly to a flat crest. It was as if one of the monsters that lurked underground had been frozen at the moment it was smashing its way up to freedom.

Kosh-korrozasch had been everywhere in that world—had trod every part of the white, cold land—had searched all the tendrils of land that probed into the mountains—searched all the way to their ends, to where the mountains themselves blocked his way. And he had struggled nearly to the top of the great, lonely peak, there in the middle of the land; he had scraped the scale-food from the rocks up there, on the side where the wind rarely came.

He had learned where there was food in the world, and where there was none. He had learned how to find it, to trap it, to stalk it, and kill it. He knew all he needed to know about the world, and all the animals in it.

. . . Except this one dead thing his trap had killed. He wrenched the rearward half of the body from the rest of it, and ate it slowly. It was good tasting food. It filled him with a sense of well-being—of having eaten. Eating was too rare a pleasure. Kosh-korrozasch had been part-starved all his life.

But the creature's strangeness still nagged him. He crumbled the thing's foreleg in his maw, and pondered. It was only then that the thought came to him.

It was a strange thought—strange and frightening. But it excited him, and his paws trembled while he ate the rest of the carcass. He ate slowly, savoring the pleasure of food, feeling the thrill and the wonder of his new thought.

Perhaps there was something beyond the edge of the world. Perhaps the creature had come from there.

Life was hard, here in this world. A being starved all his life, and died of hunger. A person spent all his life seeking food, building traps, while the dull ache of hunger gnawed his belly, driving him endlessly on, never satisfied.

Kosh-korrozasch paused when he had finished eating. Using the turquoise blood-dribble of his eating for a bait, he rebuilt the ice-block deadfall. He might never come back here—he knew that—but he might. And if he came back, he might be needing desperately the food it might kill while he was gone.

When it was built, he went away. Climbing upslope, he followed the tendril of land that reached up into the mountains toward the edge of the world. If an animal could enter the world from outside, perhaps he could leave it the same way.

A person searched for food all his life. Slowly, Kosh-korrozasch climbed toward the edge of the world, searching.

V.

In thirty-two hours, the supply ship would leave this planet for Lambda Serpentis. Adam Hitchcock felt fine.

He would be glad to leave. The dome was like a prison. Outside, the wind was bitter cold and the sea crashed endlessly on the island's rocky shore. The domesticated floppers were always underfoot, brainlessly stupid. His quarters had none of the comforts a civilized man was accustomed to, and the food they served him was abominably plain.

His endurance had been rudely tested. He was impatient to return to civilization.

But he was satisfied. His mission had been a complete success. He had found out the facts—he knew the truth, and as soon as he returned home everyone would know the truth. The suffering natives would be given —finally—the aid denied them for so long.

And the record of his Society for Humane Practices would remain a record of unblemished success. Truly, he had reason to be proud.

Before he left, though, he had one more task. It was not important—actually only a mere formality: to give the scientists a chance to correct the conditions he had exposed. They would refuse him, of course—he expected that—but when they refused, they would lose their right to protest when he aroused public censure against them.

He walked into the office of Ben Reese. Reese, engrossed in the mounds of paper on his desk, did not see him at once.

"I'm a fair man," Hitchcock proclaimed.

Ben Reese looked up, startled. His paperwork was like a fortress around him. "Did I ever say you weren't?" he wondered innocently.

Implacably, Hitchcock went on. "I have proof," he declared, "absolute proof—that the natives of this planet are being maltreated and enslaved, that their needs have been ignored, and that your people have been hounding them to death. Nevertheless, I give you fair warning: if you do not correct these conditions, I shall be compelled to make a public report of my findings. If you force me to do that, I will not be responsible for anything that happens afterward."

Reese listened in silence. "We're concerned with scientific research here," he explained apologetically. "Not welfare. To . . . . to follow your demands would mean the end of everything we've worked for . . . everything we've hoped for—"

Doubletalk, of course. Hitchcock had expected that. He wasn't fooled.

"Everything you've worked for!" he repeated scathingly. "The deliberate suppression of a people as deserving of human rights as you or I! In clear conscience, I cannot stand by and permit this to go on! I shall—"

Reese raised a placating hand. "That is not true," he protested. He actually seemed embarrassed. "You forget, Mr. Hitchcock—they are animals, not people. Their minds are primitive . . . undeveloped."

"That," Hitchcock accused, "is a lie! I have definite proof that they are even more intelligent than men. *Any* men. I say you are deliberately suppressing them because you fear what they could become!"

Gesturing helplessly, Reese said softly, "I have not seen this evidence."

"Another lie!" Hitchcock accused. He shook his fist. "Do you expect me to believe," he stormed, "that one of your men could have this evidence and you did not know of it? The whole idea is preposterous."

"But I *don't* know of it," Reese insisted. He sounded almost reasonable. "What proof? Where did you get it?"

"Your man in charge of intelligence testing showed me some of his records," Hitchcock stated. "And some photographs of brain tissue. They prove conclusively that the floppers . . . that the natives of this planet have minds as good as yours or mine."

Ben Reese was like a man stunned. "I know nothing about this," he protested blankly. "Are you . . . are you sure the evidence really proves that? I mean, perhaps you didn't understand—"

"If Dr. Muller had not helped me," Hitchcock replied, "the evidence would have meant nothing at all."

Reese shook his head. "This is hard to believe," he confessed. "Did . . . did he say why he was showing you these things?"

"He showed them to me," Hitchcock said, "because I asked him to. He was very co-operative, in spite of his contempt for them, which . . . he made absolutely no attempt to conceal. He said—almost in so many words—that you are doing everything you can to suppress them. He was *proud* of it!"

Reese looked worried. His idle hands, unnoticed, were nervously tearing notepad paper into progressively smaller and smaller bits. A pile of confetti-sized fragments collected on his blotter.

Hitchcock felt a wonderful exhilaration. He had the man totally helpless.

He was about to rise, repeat his ultimatum, and walk out, when Reese turned to the phone at his elbow, saying, "Excuse me a moment. Please."

Without waiting for a reply, he punched out a number. The phone's light blinked. A voice rasped from the speaker.

"Brains department. Muller speaking."

"Sigurd?" Reese asked. "This is Ben. Would you mind coming down here? Something has come up."

"Yeah? Like what?"

"I'd much rather you came down," Reese said mildly. "It's rather complicated."

Muller made an annoyed sound, but then he said, "I'll come." The phone's light went out.

Reese turned back to Hitchcock. "We'll wait till he gets here," he proposed. "All right?"

Reluctantly, Hitchcock sat back and folded his arms. Scowling, he waited.

This was something he hadn't expected.

Not that it made any difference, of course. Reese was caught in an impossible position. All he could possibly do was try to justify himself.

Hitchcock settled back to wait. He was supremely confident. Just let him try to justify himself. Just let him try!

He could not do it.

VI.

Ben Reese was deeply troubled. Adam Hitchcock was a well-intentioned fool, and his ability to understand was limited, but Sigurd must have shown him something. Whatever else had happened—whatever else he had been told—Hitchcock must have seen something.

Ben Reese tried to imagine what it could have been. He couldn't. He would have to wait. Sigurd Muller would have to explain.

Reese pretended to be busy with his papers. It was all the excuse he could think of to not talk to Hitchcock while they waited. But he couldn't work. There was a lot that still had to be gone over before the *Wayfarer* went back to Lambda Serpentis, but until Muller came and the matter was settled, he could not put his mind to it.

Then Muller walked in, his pointed beard jutting like a prow. He glanced around quickly, noticed Hitchcock, but didn't even pause. "What's up?" he asked jauntily. He grabbed a chair, whirled it around, and straddled it.

Reese put his papers aside. "Mr. Hitchcock tells me the floppers are intelligent," he explained. "That you showed him proof of it."

Muller's eyes shifted from Reese to Hitchcock, then back again. "He did, huh?" he said neutrally.

"This was the first I'd heard of it," Reese said pointedly.

Muller shrugged. "So what?" he said. "If you'd look at the reports I turn in—" He gestured at the papers on the desk.

"I have read your reports," Reese said. "I studied them carefully. You did not mention this development."

"Yeah?" Muller challenged. "Who're you saying that for? Me or him?" He jerked a thumb at Hitchcock.

Reese didn't let himself be steered off. "Do you confirm it?" he persisted.

Muller glanced at Hitchcock again before he answered. "Yeah," he admitted. "There's been a few smart ones turn up."

So it was true! Reese wanted to shout with excitement. "How many?" he asked breathlessly.

"Three," Muller said, holding up fingers. "Three of 'em so smart they scare you. And all from the same country. There's a lot more up there, too—running loose."

"You're sure of that?" Reese ask-

ed. It was more than he dared to believe.

"Yeah," Muller said grimly. "There's been a population jump, up there, and everything else has stayed the same. How would you figure it?"

Reese nodded slowly. He sighed. Put together like that, the evidence was good enough—the conclusion was valid. He turned to Hitchcock. "Is this what he told you?"

"Substantially," Hitchcock affirmed.

Reese turned back to Muller. A suspicion had grown in him, ugly and fearful. Now he had to destroy it—or see it confirmed.

"He tells me you showed him test records," he said cautiously. "And

photos of brain tissue. Were they authentic?"

"Sure they're authentic," Muller retorted. "You think I'd fake a thing like that? Look—all I did was show him around, and show him how we work, and I answered his questions and let him see everything he wanted to see. You got any objections to that?"

Reese shook his head. "To that? No," he conceded. "But these brain tissue samples—I presume you took them from the different sections of their brains."

"I know how to take specimens," Muller answered defiantly.

Reese felt sick and old. "You killed them," he decided. "All three."

"Right," Muller snapped. He smiled with clenched teeth, fiercely proud of himself.

"Sigurd," Reese said reproachfully, "you've done a terrible thing." He turned to Hitchcock again.

"I wish this hadn't come out while you were here," he confessed. "I can only say that I heard nothing about these intelligent ones until now, and that Sigurd killed them without my knowledge. If I had known, I would have stopped him. He acted against regulations and against our policies. I am grateful to you for exposing him."

Muller shot to his feet, his hands fisted. "Exposing me!" he snarled. "Why you little—"

With an effort, Reese kept his voice even. "You may go now, Sigurd," he said. "I . . . I suggest that you start packing. You have"—he glanced at the clock—"thirty hours before the ship leaves. If anyone asks, tell them that you resigned, and that I accepted your resignation."

Muller's face turned savage with rage. He hurled the chair out of his way and walked up to the desk until it bumped his knees. "You don't make a goat of me that easy," he threatened through his teeth. He jerked a thumb at Hitchcock. "What about him? You can't shut *him* up. What are you going to do? Pat him on the head and tell him be good?"

Reese glanced at Hitchcock. There was a firmness of decision on the man's hollow-jowled face—a look of holy purpose about his eyes. As he watched, the man rose to his feet with solemn dignity, a bone-lean figure clad in black.

"You're a very clever man, Mr. Reese," he conceded with gleeful ferocity. "But not clever enough. You cannot deny the things I have seen with my own eyes. Nor can you lay all the blame at the feet of your underlings. What this man has done"—he gestured at Muller—"has no bearing on the fundamental fact that the welfare of this planet's natives has been willfully and shamefully ignored—and that you have refused to do anything about it. If you do not correct this situation at once, I will expose you to every civilized community in the universe!"

"But you don't understand," Reese protested.

"I have not yet finished," Hitchcock snapped. "In addition, if you still refuse, we—my Society for Human Practices and I—shall do it ourselves. We shall sponsor a public subscription. We shall send food, clothes—all the things these poor people need. As many shiploads as necessary. And we shall see that you and all your scientists are removed from this planet. Your presence here will not be tolerated."

"Have you any idea how much it would cost?" Reese wondered.

"The cost is not important," Hitchcock said. "The public will gladly pay whatever is needed."

Reese conceded the point. The knowledge that he could not win against this man was strong in him. It paralyzed his will. He wished he were a woman, or a child, so he could retreat into the weakness of frustrated tears.

"You've done this sort of thing before, haven't you?" he said bitterly, remembering what he had heard of Hitchcock's doings on other planets.

"I have," Hitchcock confirmed. "I have been very successful at it." He paused, waiting for Reese to speak. Reese said nothing.

"If you have nothing more to say—" he said. He turned toward the door.

Desperately, then, Reese spoke.

"Only this," he said with a firmness he did not feel. Hitchcock turned back and faced him. He tapped a finger on the desk. "I gather from what Sigurd has said that some floppers may be intelligent," he said. He spoke very slowly, deliberately. "Some, but not all. In fact, speaking in terms of the entire planetary population, only a very few are intelligent. All the rest are still animals."

Hitchcock was not impressed. "All of them need our help," he stated. "We cannot and we shall not give it to some and deny it to others, no matter what criterion you propose. I can think of nothing so unthinkable."

"The point I'm trying to make," Reese persisted patiently, "is that . . . that the floppers are in a period of transition. Right now, only some of them are intelligent—only a few. But some day, all of them will be intelligent, because . . . because they are living under arduous conditions, and the intelligent ones are better able to survive—the population increase Sigurd mentioned is evidence of that. So, comparatively speaking, a greater proportion of the intelligent ones will survive to maturity. And the mature ones will tend to live longer than . . . than the ordinary ones—so they will tend to produce more young. It's a perfect example of the natural selection process. But it *won't* happen if we try to help them."

"What?" Hitchcock demanded. "Preposterous!"

"It . . . it's very true," Reese assured him. "You see, if we gave

them everything they need, the intelligent ones wouldn't have an advantage over the ordinary ones—they'd all have an equal life-expectancy. And the ordinary ones outnumber the intelligent ones by a fantastic margin, so—even if the intelligence gene-complex is a dominant—the intelligent ones would be absorbed into the race within a few generations. There wouldn't be anything left of them."

Hitchcock appeared to consider the argument, but his face was set stubbornly. Bitterly, Reese wondered if the man understood a thing he'd said.

Then Hitchcock spoke. "Am I to conclude, then," he said, "that you *want* the natives to suffer? To starve? To . . . to *die?* To battle each other for a scrap of food? Do you admit that this is what you want?"

He had understood part of it, Reese concluded glumly. The ugly part. "I think it is necessary," he had to admit. "I think it is the only way the floppers can advance. Remember, something like this must have happened to our own ancestors. If it hadn't, we would still be mindless brutes."

"Nonsense," Hitchcock snapped. "The fact that our ancestors had no one to help them has nothing to do with it. They would have become men no matter what happened. It was their *destiny* to become men—the same destiny as these poor people, here. Nothing can possibly stand in their way—no man can interfere with destiny. They are suffering and dying because you deliberately neglect their welfare. You have the power to end that suffering, and you are morally bound to do it. To refuse, Mr. Reese, is to turn your back on humanity."

Reese sat perfectly still, a feeling of blind hopelessness crushing down on him. "I think," he said slowly. "I think I know why Sigurd helped you so much. He wants to suppress the intelligent ones. Am I right, Sigurd?"

"Sure I want 'em kept down," Muller snapped. "We'd better, if we know what's good for us. You've seen the wild ones—they're a bunch of animals. Nothing they'd like better than to tear a man apart and eat the pieces."

"On the other hand," Reese put in thoughtfully, "the ones here in the outpost are docile."

Muller disparaged the point with a wave of the hand. "They don't count," he claimed. "They're way off the main track. It's the ones on the mainland that count. If we let *them* get smart, there'll be no stopping 'em. They'll hunt us down. *We'll* be the animals! If we don't stop 'em, they'll chase us right out of the universe. Right now, we can stop 'em. Later on it'll be too late. So we'd better get at it. Right now."

He really believed it, Reese realized wonderingly. He meant every word of it.

"Sigurd, I don't agree," Reese said slowly. He hoped he sounded reasonable. "In the first place, we conducted some personality experi-

ments on them about twenty years ago. We took the offspring of wild floppers and raised them with our tame ones. They developed none of the . . . the bloodthirsty traits of their parents. So I'm sure that this . . . this viciousness we see in them is a characteristic forced on them by their environment."

"Yeah?" Muller scoffed. "But the smart ones aren't growing up here in the dome. They're growing up out there—on the mainland."

Reese nodded. "True," he admitted. "But before they could be any danger to us, they would have to develop a civilization—a technology. And one of the characteristics of a technological civilization is the ability of its people to control their environment. By removing the causes of their viciousness, they would also remove the need for being vicious. Also, I believe they have shown this same viciousness toward each other—to the point of cannibalism. But recently, I understand, some of them have taken to hunting in groups. They have discovered the advantages of co-operation. Don't you think this shows a trend away from . . . from animal savageness? Don't you, Sigurd?"

"You want to take a chance on it?" Muller challenged.

"Taking that chance is the only honorable thing we can do," Reese told him firmly.

"Huh!" Muller snorted. "And how do you think they'll look at us, once they get smart, with us sitting here not doing a thing to help 'em? They'll hate us. They'll hate us like hell!"

Reese hesitated, then shook his head. "No, Sigurd," he decided. "The transition will be a slow, very gradual process. It will be all right to start helping them long before they could become a danger to us. Also, if they do become as intelligent as you say, they will probably understand that they could not have evolved to intelligence if we had tried to help them."

Muller snorted disgustedly. "You're doing a lot of supposing," he said. "Suppose you're wrong? It's the whole future of the human race you're talking about, you know. That's . . . that's *us!*"

Reese nodded. "I know," he admitted placidly. "Whatever we do—whatever we decide—it will be thousands of years before the consequences come. I rather imagine we'll have been forgotten. That puts a terrible responsibility on us. We must try to do what is right."

"And on that basis you refuse to help them?" Hitchcock demanded. "Mr. Reese, I have never heard such a preposterous—!"

So all his arguments and efforts at persuasion had failed. Reese slumped in his chair, his arms on the rests. He wondered what to do. Muller's careful half-truths—Hitchcock's stubborn ignorance—together they were too much to fight. He could do nothing. He was helpless. Defeat and frustration wearied him, and he felt a sick pity for all the

intelligent floppers who would now never be born.

It wasn't fair. It just wasn't fair.

But he did not say it. Thinking it to himself, he realized how futile it was to speak of fairness to these men. And besides, by what right could he ask for fairness—an ideal—from the real world?

Of course it wasn't fair. Nothing was ever completely fair in the real world, because the real world conformed to the physical laws, not the rules of sportsmanship and fair play.

It was a hard, bitter thought to accept, but Ben Reese accepted it. As a scientist, he had to accept it no matter how he felt about it.

And in that recognition, he saw, was the key—the way he could protect the floppers from both these men.

He turned to his phone again. "You will excuse me, won't you?" he requested politely as he punched the number combination. His hand trembled.

Before either Hitchcock or Muller could nod their assent, someone answered the phone. "Clinic," he said.

"Nick?" Reese guessed. "This is Ben. Could you send up a couple of your boys?"

"Sure," the one identified as Nick consented. "But what—?"

"Never mind," Reese said quickly. "Just send them." He broke the connection.

"What's the matter?" Muller wanted to know. "You feel sick?"

Reese ignored the question. "I've changed my mind, Sigurd," he said. "You can stay here."

Muller backed up a step. "Well, now, I don't know," he said warily. He scratched his beard. "I've been here a long time—"

"But Sigurd," Reese urged. "We're going to need you here—at least for the next year. All the information you've held back—"

"It's in my files," Muller said. "You'll find it, if you want it bad enough." He moved toward the door. "I'm going to pack." In a moment, he was gone.

Reese smiled a complacent smile. "There'll be no room for him in the ship," he confided to no one in particular. He leaned forward. "As for you, Mr. Hitchcock . . . sit down, please. There's one thing more I want to say."

Hitchcock paused uncertainly, then resumed his chair. "Let it never be said," he declared, "that I will not hear all arguments."

Reese nodded, pleased. Everything would be all right if he could keep Hitchcock in his office until the boys came from the clinic.

"Mr. Hitchcock," he said, "in a sense, I'm very glad you came."

Hitchcock scowled.

"For one thing," Reese went on, "it was you who . . . who brought out the fact that the floppers are developing intelligence. If you hadn't come, Sigurd might have concealed it for years. Of course, Sigurd was hoping you'd help him to . . . to wipe out the intelligent ones, but that is beside the point."

"Mr. Reese," Hitchcock said sternly. "You cannot convince me that black is white."

"Oh, of course," Reese agreed willingly. "But there are hundreds of shades of gray. The other reason I'm glad you came . . ." He spoke earnestly. "You've forced me to re-examine what we're doing here—to . . . to question the rightness of our doing nothing about the conditions in which the floppers live. It's not an easy thing to be sure of."

"So you admit it!" Hitchcock pounced triumphantly. "You admit—"

Reese silenced him with a gesture. "No," he said firmly, "I do *not* admit it. I have come to the same conclusions I have always held. But now—because of you—I know *why* it is right."

"Impossible," Hitchcock objected. "It is *not* right."

Ben Reese was very patient with him. He could afford to be patient—it used up time, while the boys from the clinic were coming.

"You're a very moral man, Mr. Hitchcock," he said. "I'd be the first to admit it. But—unfortunately—a high moral sense isn't enough. You see, Nature *isn't* moral—it doesn't conform to our concepts of right and wrong, and it isn't limited to conditions where the right and wrong of a matter are easy to decide. There are times when an act that seems morally right can lead to . . . to something horrible. You cannot say a thing is morally right or wrong until you've considered the context in which it happens. And that, Mr. Hitchcock, is where your moral sense fails you."

"I do not need a scientist to tell me the difference between right and wrong," Hitchcock stated stubbornly.

Reese nodded pleasantly. "I expected you'd say that," he admitted. "But you're wrong. Until you know the consequences of an act, you cannot tell whether or not it is moral. And there are times—such as now—when a layman such as yourself does not understand the forces involved. When that happens, you cannot predict the consequences of an act. Therefore, you cannot decide whether it is right or wrong."

"You're wrong!" Hitchcock insisted. "The end *never* justifies the means! *Never*!"

Reese didn't deny it. He said, reasonably, "On the other hand, there are times when no other test applies—when all the possible courses of action look equally bad. And even when you can do something which seems absolutely right, you still have to think of the consequences. If the consequences are bad, the act itself must be bad. Or suppose there is a . . . a morally imperative goal which you can achieve only by doing things which any moral code would condemn."

Hitchcock was incredulous. "Such a thing could not happen," he objected.

"I am talking," Reese said firmly, "about now. About the situation here. That is the problem we have been dealing with here, ever since this outpost was built—whether to help them—give them comfort and security—

and destroy for all time their hope of ever becoming more than animals—or whether we should let nature take its course—allow many to die, and many more to suffer, so that some day their descendants can stand before us as equals."

He shrugged expressively. "We can do only one thing. We must balance the wrong which we know we are doing against the goal we are morally obliged to support. We must go ahead and . . . and try not to let our consciences upset us too much."

"If you must rationalize a thing," Hitchcock stated, "it's wrong. Good does not come from evil!"

Reese shrugged helplessly. "We must do what we think is right," he said practically. "And if our judgments are different from someone else, we must follow our own. We—"

He broke off as the door opened. Two floppers came in, wheeling a stretcher. Each one had a big red cross dyed in the fur on its chest.

Reese pointed at Hitchcock. "That man is sick."

The floppers advanced, their resilient feet rustling softly on the floor. Hitchcock, taken aback by Reese's abrupt statement, thumbed his chest. "Me?" he wondered incredulously.

The floppers came up, one on each side of him. They grabbed his arms close to the shoulder. Hitchcock yipped with surprise, turned his head, and found the solicitous, repulsive face of a flopper only inches from his own.

With a strangled, terrified cry, he lunged from the chair. The floppers kept him from falling headlong on the floor. Wild-eyed, he struggled to get loose from them, but they held on. He kicked at them desperately. They dragged him backwards. His feet flailed the air.

"Make them let me go!" he begged. "Make these filthy monsters let me go!"

Reese sat back and relaxed. He was sorry he had to do this to the man, but it did somehow give him a pleasant feeling.

It wasn't, after all, as if Hitchcock was a really good man.

"I'm afraid I can't do that," he apologized. "They've been taught to take a sick man to the clinic. I couldn't stop them now if I wanted to." He spread his hands helplessly. "As I've said before, they're rather stupid."

One of the floppers moved behind Hitchcock and held both his arms. The other flopper took an ampule from the pouch on its harness. Hitchcock stared at the shiny needle with the fascination of sheer terror. "Don't let him!" he screamed. "Don't let him! It's murder!"

The flopper peeled Hitchcock's sleeve up and stabbed the needle into the fleshy part of his arm. Hitchcock uttered a faltering cry, shuddered, and sagged.

"Oh, it's only a mild sedative," Reese assured him cheerfully. "We wouldn't dare trust them with anything stronger. But you shouldn't have struggled so much."

Hitchcock hung laxly in the flopper's arms. His eyes had a glassy look.

The floppers wrapped a blanket tightly around him. His mouth moved as if he was trying to speak, but no words came out.

"The ship is going to leave without you," Ben Reese said. "I'm sorry about that, because I don't think I'm going to enjoy your company for the next year. We'll tell them . . . I think we'll tell them you're sick. A . . . a local disease—one we don't want to spread on other planets. There aren't any diseases like that, of course, but that doesn't matter."

He was very apologetic about the whole thing.

Hitchcock was making apoplectic noises now. "Outrage! Criminal! I'll have the law on you!" For a man of firm moral fiber, some of his comments were remarkably unprintable.

Ben Reese shrugged. "I'm afraid there isn't any law here," he apologized. "We didn't need any, till you came along. I . . . I'm sorry we have to do this to you, but—well, we can't let you go back to Earth. You'd agitate to have our charter revoked and . . . and then you'd organize this gigantic interstellar aid program, and destroy the floppers' only hope of ever being anything more than animals. We . . . we just can't let you do that."

By this time, Hitchcock was wrapped in the blanket like a mummy. Gently, the floppers lifted him and laid him in the cradlelike stretcher. "You won't get away with this!" he threatened wrathfully.

The floppers fumbled deftly with the straps, securing him. Their digitless hands were remarkably dexterous. All Hitchcock could move was his head and his mouth.

"Oh, we'll have to let you go next year, of course," Reese admitted. He wasn't disturbed by the thought. "But that is a whole year away. We'll have plenty of time to prepare the public for you. If we give them the whole truth now, I rather doubt they'll be much impressed with your partial truths later on. I'll send instructions about that to our business office on Lamda. Just to anounce that the floppers are beginning to evolve should be a good start, and—"

He smiled. He felt wonderful. Perhaps treating Hitchcock this way *was* lousy and unethical, but even Hitchcock himself would have to admit that —when everything was considered— it was definitely a moral act.

The floppers began to wheel Hitchcock out of the room. Hitchcock was raving.

"You can't do this to me!" he protested. "You can't!"

"Really?" Ben Reese wondered innocently. He knew it was cruel, but the temptation was too strong.

"Really, Mr. Hitchcock," he said, "I *must* have proof."

EPILOGUE

Slowly, the procession marched past the bier of the Dead One, who was nameless because he was dead, and who had been their leader. Each one, as he came to the bier, crouched low in obeisance, then moved on. The shaman stood over the bier, his pelt stained green to signify that he per-

sonified the Dead One. He acknowledged each obeisance by raising his arms.

Shokk-elorrisch stood beside the bier, and he also acknowledged the obeisances, for he was the new leader in the Dead One's stead. Already, he held the tool-stone in his hand, and he chanted the four harsh syllables: "My eyes shall find the path for your feet; my hand shall feed you and my pelt shall warm you; I am all of you; I give you my self."

This he spoke to each one who made obeisance to him, and each one responded: "Show me the path!"

The procession shuffled on, and formed ranks beyond the bier. And when the last one had made his obeisance, the three eldest-born from the Dead One's body came forward. They lifted the vine-woven sling which cradled the Dead One. Flanked by Shokk-elorrisch on one side and the shaman on the other—all of them chanting: "You are all of us; your eyes saw the path; your hand fed us; your pelt warmed our bodies. We are grateful; we honor you; we sanctify the memory of you; we give you back to yourself!"

Chanting this, their tread matched to the chant, they advanced to the edge of the cliff. There they stopped, and the cadenced rhythm of their chant broke with the cry, "We cast you out!" and they hurled the Dead One into the foaming sea.

And the sons of the Dead One and the shaman turned to Shokk-elorrisch. They made obeisance to him, and they said: "Show us the path!"

But Shokk-elorrisch did not answer, nor did he show them any sign that he heard. Standing at the cliff edge, the wind rippling his pelt and the waves crashing on rocks far below, he faced out to sea and made obeisance to the Olympians who lived on the round mountain, there on the island that rose from the horizon—the Olympians, who never had to migrate in search of new hunting ground, and who watched from the boulder that floated like a cloud in the wind—who watched but took no part in the things they witnessed.

And he wondered, even as he made obeisance to them, why they kept themselves aloof, and what was the source of their powers, and whether his people, too, could achieve those powers—to become the equals of those strange and enigmatic beings.

And he wondered, too, would they teach him? Would they teach him if he went to that mountain—out there in the ocean? Would they permit him to learn the secret of their powers?

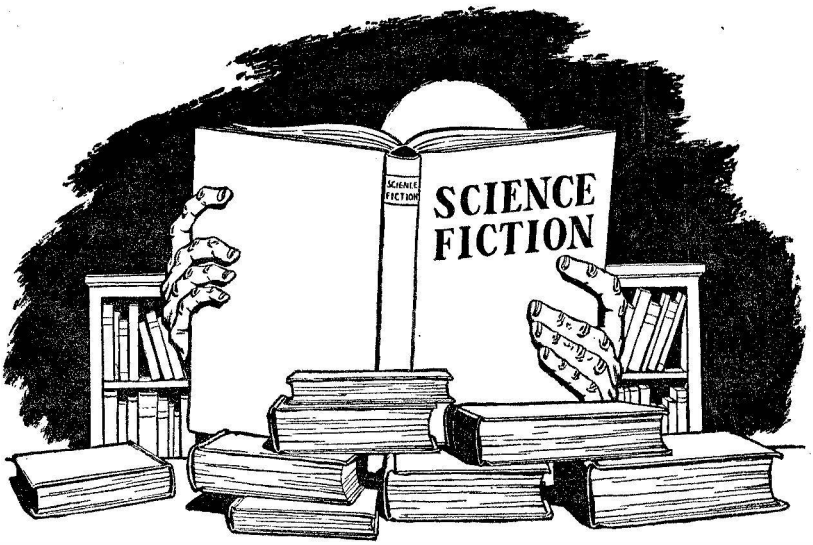
He wondered how to cross those tattered waves—how to climb that shore and ascend to the crest of that mountain.

Thinking thus, Shokk-elorrisch knew what his path would be. And the path of his people.

Toward greatness. Toward the mastery of Nature.

Toward glory.

THE END



THE REFERENCE LIBRARY

By P. SCHUYLER MILLER

JACKPOT

WHEN I have left some valuable archaeological books in a restaurant . . . had to give up most of my 1959 vacation . . . and six other calamities, all within a few weeks, I begin to study Robert A. Heinlein's "The Year of the Jackpot" as closely as Archbishop Ussher ever conned the Bible. Do you suppose that 1960 *is* Heinlein's "Year" when all the cycles will crest at the same time, and not even Finagle's Law can save us from the final blowup?

I trust not, but year's transit has brought us a veritable jackpot of Heinlein books. Not only did the end of 1959 offer his "Starship Troopers," which is both praised and damned but never faintly, but somewhere in that hazy realm around Christmas and New Year's—when, apparently, at least two other SF books went to the neighbors instead of me, or were taken home by the mailman—Gnome

Press brought out two collections of Heinlein short stories and novelettes, almost if not quite simultaneously. They carry 1959 copyrights, and I got 'em in February of 1960, so you bibliophiles worry about the "real" publication date, or ask Marty Greenberg.

Of late, while Heinlein has been concentrating on novels, many of us have almost forgotten that some of his most memorable stories were short ones. The two books at hand bring together fourteen stories as old as 1940 and as new as 1959. The title story of the book called "The Unpleasant Profession of Jonathan Hoag" passed as a novel when it was published in *Unknown Worlds* for October 1942 as the work of "John Riverside," and most but not all of the stories in this book are fantasies. The companion volume, this time mainly science fiction, is "The Menace From Earth," named for a novelette that I suspect the author hoped to plant in the productive soil of the *Saturday Evening Post.* Both books give you about 256 pages for $3.50 . . . though I suspect they are on the "Pick-a-Book" bargain list by now, if you buy them directly from the publisher.

This deluge of Heinlein illustrates the author's tremendous versatility as well as anything could. It includes the delightful fantasy of "Our Fair City," featuring Kitten, the intelligent whirlwind, the two outrageous exploitations of the time-travel paradoxes in "By His Bootstraps" and the new and even more flabbergasting "All You Zombies—," and the slick but beautifully realized "Menace From Earth." But we're going to get hopelessly confused as to what is in which book—in case you're of an either/or mind about fantasy and science fiction—unless I take the books one at a time.

"The Menace From Earth" is the science fictive volume. It opens with the eight-year-old "Year of the Jackpot," in which Heinlein uses the study of cycles and pyramids all kinds of unconnected events into one tremendous peak of mishappenstance. Who else could weave so many unrelated elements together so smoothly, to drive at an inevitable climax?

Then comes his classic "By His Bootstraps," published here back in 1941 and as good as it ever was. In this one Heinlein tackles the time-travel paradox of the man who meets himself, and instead of weaseling around the edges of the problem, he meets it head on, with a burst of fireworks. Bob Wilson not only meets himself—he harries himself unmercifully, in an effort to remake the future. You'd think, after this, that Heinlein had left nowhere else to go, but he's done it within the past year, in "All You Zombies—," in the "Jonathan Hoag" volume. I can't even suggest the way that tangle is worked out, if you happen not to have read it.

Just a year later, Astounding published "Goldfish Bowl." From a distance, it is one of Heinlein's lesser stories, but while you're in it the problem is real enough. Two gigantic col-

umns of water are rising from the Pacific to the clouds: one carrying things up, one returning them. So, to find out who or what is causing the spouts, two men let themselves be drawn into the updraft—or, rather, plan to be drawn into it, since one is snatched away first by ball lightning. Finally, they find themselves in a kind of informationless cell in which they must reason out the nature of the mess they're in, and find a way of warning Earth.

These early stories were gimmick yarns, but three of the eight stories in this first book are "people" stories. This is perhaps most true of "Water Is For Washing," which is a "straight" short story about a man with a dread of being drowned, who redeems himself when the crisis comes. It's pretty obvious in all but detail. It is next most true of "Columbus Was a Dope," a short-short in which a few men in a bar agree there's no future in space. And it is true of "The Menace From Earth," which is, however, a prime example of the author's skill at constructing realistic backgrounds in the most minute detail. Here the problem is not one of mad scientists or BEMs from outer space; the story's heroine is a teen-ager living on the Moon, who finds her boy friend dazzled by a glamorous tourist. It's *Saturday Evening Post* stuff in everything but the beautifully realized lunar society.

The remaining two stories hammer at your emotions. "Sky Lift" is the corny old serum-to-Nome story—in this case, a blood bank to Pluto—with a hero who has to do just a little more than he can. Like "Goldfish Bowl," it's real while you're in it. "Project Nightmare" is a different matter and a far better story. A battery of psi-gifted people have to find nuclear bombs hidden in most of the larger American cities, and mentally prevent them from going off until they are disarmed. Here, as he doesn't often bother to do, Heinlein has created some genuine characters through their action and reaction under the mounting stress of the problem.

"Jonathan Hoag" takes up more than half of the fantasy volume, and Heinlein was right to use a pen name for it. It was a pot-boiler for *Unknown*—reasonably intricate in plot, reasonably puzzling, but a fantasy to the extent that the hectored hero could never be expected to figure out what was happening to him. This is the one about the "Sons of the Bird," who can travel through mirrors and who have their own reasons for wanting detective Ed Randall to stop trying to discover Mr. Hoag's profession.

But the rest of the book is worth having to stick out—or skip—"Jonathan." You get "All You Zombies." You get that 1940 classic from this magazine, "And He Built a Crooked House," about the four-dimensional house that was shaken into instability by an earthquake. If there were such things, this would make a wonderful short movie, with slapstick comedy, paradox, and abstract sets all goulash-

ed together. Maybe for "Twilight Zone?" You get "Our Fair City," another chuckler—Heinlein had more humor in him in those days—in which a reporter and a whirlwind outwit a crooked city administration. You get "They," from a 1941 *Unknown,* which has aged a bit, since it's no longer novel to write a story whose main gimmick is that the impossible is true. And you get "The Man Who Traveled in Elephants," from a source I can't identify—a quiet, folksy, sentimental fantasy that might have been done by Bradbury.

Looking these two books over, you'll see that Robert A. Heinlein started out, like everyone else in the early 1940s, with gimmick stories. He did them—"By His Bootstraps," "And He Built a Crooked House," "Fair City"—wondrously well, and he can still do them just as well if he wants to, as "Zombies" shows. But, like almost every other writer in the field, he soon saw that gimmicks and gadgets were legitimate only when you turned your attention away from them to the society or the situation in which they were the causative factor or a logical consequence of other, more subtle forces and relationships. Even in "Jonathan Hoag" your interest switches from Hoag's mysterious profession—the initial gimmick—to the fantastic world on the other side of the mirrors, and you resent the second gimmick that solves the Hoag mystery and everything else to boot.

Such worlds Heinlein builds better than anyone. It may be as intricately simple a world as the lunar city of "Menace From Earth,' logically constructed without ever seeming artificial, or as intricate as the galactic military civilization of "Starship Troopers," where more is suggested than is ever spelled out. Other writers show us people more fully, but Kitten, the whirlwind, has a definite personality and so has Grandma Wilkins of "Project Nightmare," however little we see of her.

Other writers tell better stories. Other writers give us more solid characterization. Other writers may entrap your emotions more skillfully, or drive an abstract idea home more powerfully. But there is no other science fiction writer who creates worlds better than Robert A. Heinlein.

THE SEA PEOPLE, by Adam Lukens. Avalon Books, New York. 1959. 221 pp. $2.95

Here is an unabashed interstellar adventure yarn that is considerably better than the recent run from Avalon.

Bitter, arrogant, crippled Dick MacCaishe, invalided out of the Space Service, abuses the hospitality of the relatives who have taken him in, when he tries to turn their telepathic daughter over to the ruthless experimenters of the Science Service. He is exiled to the water-world, Skywash, and there makes friends with its strange amphibian race. With their help he not only modifies some of his ingrained views about the importance of the Space Service, and himself in

particular, but makes a flying trip to Earth to rescue the caged girl.

The detail is nicely handled, the hero is an insufferable character who slowly turns human, and the plot moves right along. No awards, but it's readable.

THE SECRET OF THE NINTH PLANET, by Donald Wollheim. John C. Winston Co., Philadelphia. 1959. 203 pp. $2.50

Winston's series of science-fiction books for teen-age readers is not dead, as this and 1959's companion volume by a new author prove. "Secret of the Ninth Planet" is Donald Wollheim's third for Winston, and about par for the series—sound, but not exceptional, and with one scientific howler that this experienced author/editor just shouldn't have let by, especially in a juvenile which gives a more or less realistic picture of the several planets.

The story starts when it is discovered that mechanisms on the several planets and their satellites are somehow "milking" the Sun of energy, diverting it from the worlds that need it and building up stresses that will cause the Sun to explode in a nova. Burl Denning, who has been in on the destruction of the first Sun-tap station in the Andes and has been somehow energized so that he can shut the things off, sets off in an anti-gravity ship to find and disarm the stations. The voyage takes them to the Moon, Mercury, Venus, Mars, Callisto, and eventually to the mysterious ninth planet, Pluto.

Conditions on the various planets are realistically described, and there are some fascinating life forms, with a grand finale in a Plutonian zoo-museum. The one blooper is one that many magazines and newspapers have made when describing the doings at Cape Canaveral; they describe liquid oxygen as being terrifically flammable, whereas it is what burns other substances. If such a point weren't made of turning a jet of oxygen into a blast of flame, I'd be less annoyed, but this is just the thing schools seize on to condemn the whole series.

THE STAR CONQUERORS, by Ben Bova. John C. Winston Co., Philadelphia. 1959. 216 pp. $2.50

This second of Winston's 1959 juvenile s-f novels is a notch or two above the average for the series, and introduces a new writer—a neighbor of Isaac Asimov's—with a nice hand at interstellar war. I hope he'll try his hand at some adult fare.

Narrator is a young humanoid observer with Earth's Star Watch, in the war against the mysterious Masters for domination of one segment of the galaxy. The Masters never appear; their forces are the reptilian Saurians, by whom Alan Bakerman—properly Ahgh'loun B'khrom'mnin—was brought up, and a variety of other humanoid mercenaries. Some of the Star Watch, quite naturally, are a bit suspicious of Alan's own real loyalties.

In lively action that shuttles from the stars back to Earth, then to the stars again, and at last corners the

Masters, we get a vivid impression of the immenseness of the galaxy. The characters are nicely complicated, and there is a Pyrrhic twist to the final victory. While never pretending to be more than a fast-moving adventure yarn, the book manages to be more adult than all but the very best of these Winston teen-age science-fiction novels.

PLANET IN PERIL, by John Christopher. Avon Books, New York. No. T-371. 159 pp. 35¢

The smoothly proficient English writer who shook up the *Saturday Evening Post* with "No Blade of Grass" has a less memorable but no less professionally competent yarn of underground adventure here. "Underground," I must add quickly, is intended in the van Vogtian sense—not the speleological, which this author has also used in non-s-f.

We're shown a twenty-first century in which an almost world-wide social order has been constructed around a group of industrial or managerial empires: Atomics, Steel, Mining, Agriculture, Telecom, and the hero's United Chemicals. The status hierarchy is rigidly fixed by each industrial bloc: you are practically born into your social level, be it executive, research, or labor. Maverick outside this whole structure, which Western Society rebuilt after the next World War, is the little capitalist monarchy of Siraq, a kind of descendant of the present Arab Republic.

The hero, Charles Grayner, is transferred to a research job from which his predecessor has vanished—supposedly drowned off the California coast. He has a lovely Siraqui assistant, with whom he falls in love—and soon she, too, disappears. Soon Grayner is involved in a tangle of plot and counterplot that has him shuttling, with and without his consent, from one managerial faction to another, all the time wondering why he should be so important. His secret, incidentally, is the least convincing part of the whole business. Apart from that, it's smooth entertainment.

THE OUTWARD URGE, by John Wyndham and Lucas Parkes. Ballantine Books, N. Y. No. 341-K. 143 pp. 35¢

Who Lucas Parkes is, and how he got into the act, I can't tell you. He wasn't apparent when "The Troons of Space" were in *Fantastic,* or—as far as I can recall—in the original English version either.

The four parts of the book originally appeared as four novelettes, following the fortunes of the Space-minded Troon family through a hundred and fifty years, impelled all the time by the "outward urge" that seems to be deep and hot in their blood. In 1994, when we meet the family, "Ticker" Troon is helping to build the first space station. In 2044 his son, Commander Michael Troon, watches the United States and Russia destroy the world from England's tiny base on the Moon. In 2094 an-

other generation—now nominally Brazilian—takes over as Capitao Geoffrey Trunho copes with misfortune and madness on Mars. And in the final episode, in 2144, the Australian and Brazilian sectors of the Troons meet and clash in the conquest of Venus.

This is competent and routine—and by no means the John Wyndham of "Out of the Deeps" or "The Midwich Cuckoos."

THE PIRATES OF ZAN, by Murray Leinster
THE MUTANT WEAPON, by Murray Leinster. Ace Books, N. Y. No. D-403. 163+93 pp. 35¢

The new part of this Ace Double was "Pirates of Ersatz" when it was serialized here last year, and a rare old piece of Leinsterian adventure yarning it was, too. You may recall how Bron Hoddan, electronics engineer, set up a program of interstellar piracy in order to unravel a tangled economic impasse in a far corner of the galaxy.

The shorter chunk was called "Med Service" when it was here in 1957, and was reprinted a few months ago in Mary Kornbluth's "Science Fiction Showcase." You'll remember it as the first of Leinster's series about the interstellar medical service, which functions in the future world of the landing grids, that this author is building up about as painstakingly as Robert Heinlein did his "Future History."

Swell stories, both, from science fiction's truest professional.

FIRST TO THE STARS, by Rex Gordon. Ace Books, N. Y. No. D-405. 190 pp. 35¢

This Ace original novel is by no means the book that the author's "First to Mars" was—but what is? "First to Mars" created and peopled a planet, plausibly and originally; this new book owes more to conventional science fictive gambits. The basic premise—that a couple sent off on a spaceship should heartily despise each other—is unreasonable and unnecessary. The miscalculations that divert the ship from Mars and send it to the stars are as old as Verne. The rather confused relativistic "explanation" doesn't hold much water. And the love-affair-from-propinquity is never made real.

These preliminary quibbles out of the way, Rex Gordon has done a nice, if routine, job of creating far planets and a society of insect-like creatures, in which David Spencer's child is brought up. In the end he is forced to lead them back to Earth, where Time is out of joint and Mankind has moved far ahead.

I miss Mars.

WE WHO SURVIVED, by Sterling Noel. Avon Books, New York. No. T-360. 160 pp. 35¢

A writer who until now has concentrated on mystery and suspense stories tries his hand at an old science-

fiction theme—the coming of another Ice Age that wipes out all but a handful of survivors. The mechanism he uses is also old, but respectable: passage of the Solar System through a cloud of cosmic dust, that shuts out the light of the sun for years on end. The story, of course, is in the experiences of one small group of survivors, who first hole up in a Kansas farm and then—when the glacial cap begins to move and scour the earth under it—set out across the ice for the Atlantic coast, and a ship that will take them to the unfrozen equatorial belt.

The description of the Fifth Ice Age is convincing enough to provide a reasonable setting for the personal melodrama of the Harrow Group. I suspect meteorologists and glaciologists could knock holes in it, but the narrator, Vic Savage, is a retired Air Force colonel rather than a scientist. The time—2203 A.D.—is far enough ahead so that people might conceivably have survived under the ice, as these do. The "scientific" jargon of the future is no better or worse than most. But for the life of me, I can't see why these people headed east from Kansas City, over the mountains to the Virginia coast, when the Gulf coast was hundreds of miles closer and the climate presumably a little better.

A TREASURY OF GREAT SCIENCE FICTION, edited by Anthony Boucher. Doubleday & Co., Garden City, N. Y. 1959. 2 vols. 1049 pp. $5.95

There can be only one immediate reaction to this colossus of science-fiction anthologies, and that is: "Wow!"

Its only rival is the great and good Healy-McComas "Adventures in Time and Space" of fourteen years ago, which gave you nine hundred ninety-seven pages for $2.95—and still did, as a Modern Library Giant, until the prices of Modern Library books went up. A fifty-cent movie of 1946 costs $1.50 now, so why shouldn't a $3.00 book have doubled in price?

I doubt that Anthony Boucher selected the title for the anthology, for he makes quite clear in his short introduction that he has *not* tried to assemble "great" stories, but "to get together a great deal of good reading in modern s.f. which had been overlooked by earlier anthologists." Nine of the stories in the two fat volumes have never been between hard covers; only one has been in an anthology, and that has been out of print for ten years.

So what do you get? Let's look at it.

Four complete novels—five if you include Robert Heinlein's short "Waldo"; John Wyndham's "Re-Birth" and A. E. van Vogt's "The Weapon Shops of Isher" in Volume I; Poul Anderson's "Brain Wave" and Alfred Bester's "The Stars My Destination" in Volume II. Heinlein's "Man Who Sold the Moon," which appeared only in the collection of the same name, can be considered a sixth novel; it's only four pages shorter than "Waldo."

Nine novelettes, ranging in length

from the twenty pages of Joel Townsley Rogers' "Beyond Space and Time" and George O. Smith's "Lost Art" to the sixty-three of Theodore Sturgeon's "The (Widgett) the (Wadgett) and Boff." Others, in order of their appearance, are Ray Bradbury's "Pillar of Fire"—which I had missed; "The Children's Hour" by Henry Kuttner and C. L. Moore —here in 1944 as the work of "Lawrence O'Donnell"; C. M. Kornbluth's memorable "Gomez"; Oscar Lewis' "The Lost Years"—a "sleeper" of the kind that Boucher continually turns up; Judith Merril's "Dead Center"; Kuttner again, with "Piggy Bank" by "Lewis Padgett"; and Nelson Bond's "Magic City."

Sleepers? I've mentioned Lewis' story about what happened to a Lincoln who didn't die. Have you read George P. Elliott's "Sandra," or the Rogers story from a 1938 *Argosy*—I assume, though it's not in Day's "Index on the Weird and Fantastica in Magazines"? Or E. B. White's "The Morning of the Day They Did It," from *The New Yorker?*

Short stories, finally. The White and Elliott stories fit into this category. They have for company "The Shape of Things That Came," by Richard Deming; "The Father-Thing," by Philip K. Dick; a future-detective yarn to rival Asimov's in Poul Anderson's "The Martian Crown Jewels"; Malcolm Jameson's "Bullard Reflects"; the six vignettes of the space-station builders in Arthur C. Clarke's "The Other Side of the Sky"; and Mildred Clingerman's "Letters From Laura."

Box score for Astounding, in its pre-Analog days? Three of the novels and near-novels; three of the novelettes; one short story; for three hundred forty-six pages, or more than a third of the total. Not bad.

THE GLORY THAT WAS, by L. Sprague de Camp. Avalon Books, New York. 1960. 223 pp. $2.95

Since Sprague de Camp is now taking his history straight, in a series of historical novels on the neglected Hellenistic period—"An Elephant for Aristotle" and the new "Bronze God of Rhodes," which I haven't seen yet —whatever science fiction appears under his name is a resurrection. This was a one-shot from *Startling* of 1952; Sprague says he has done no rewriting, and doesn't know whether the publisher has, though the picture of sexual customs in Periclean Athens may have been toned down from the original manuscript, if not from the magazine version.

If you remember "Lest Darkness Fall," still my favorite of all the author's books and one of the best time-travel stories of all time, you may consider it pure perversity that he didn't play this one straight. As it is, he gets extra fun and games out of tossing two men from the Twenty-seventh Century into what is either the Athens of Pericles' time, or a masterful mock-up of same. Actually, the beans are spilled early enough in the book so that I betray no confi-

dence when I report that the mock-up is the answer.

One of our protagonists is Wiyem Flin, a Classical scholar whose wife has disappeared behind the force wall with which World Emperor Vasil IX has surrounded Greece and its environs. His companion is an adventurously inclined editor of Spanish descent, Knut Bulnes. They make it through the barrier, only to be run down by a trireme, attacked by thugs jabbering a low grade of Classical Greek, and rescued by a Scythian cop. Soon they are posing as a pair of Tartessans, alias Philon and Bouleus, and getting into deeper and hotter water with every hour, as they try to earn a living as wandering philosophers, hunt for Philon's lost Thalia —who turns up as Euripides' wife— and try alternately to monkey with the course of what may be history, or to find out why the Golden Age of Greece is being recreated thirty-two centuries after its proper time.

The action is unrestrained, the comedy is broad, the picture of ancient Athens is de Campishly faithful to both history and scholarship, and the result is fun for all and one of the best of Avalon's science-fiction books.

THE ARMCHAIR SCIENCE READER, edited by Isabel S. Gordon and Sophie Sorkin. Simon and Schuster, New York. 1959. 832 pp. $7.95

This weighty anthology, which might be considered a companion to Clifton Fadiman's "Fantasia Mathematica," is of much more interest as a sampling of writings connected with all aspects of science than for the several science-fiction stories it contains. The publisher tells us nothing about the editors' backgrounds, and their foreword suggests that they have a layman's interest in science and are eager to see others enjoy its gems as they have. I think someone with a broader knowledge of the science-fiction field might have suggested even better and equally significant or illustrative stories.

The book opens with Howard Koch's script of "The War of the Worlds" for the famous Orson Welles-Mercury Theater broadcast in 1938. It is followed by two charming but thoroughly unscientific interplanetary bits, a sample from C. S. Lewis' "Out of the Silent Planet," and Lord Dunsany's "Our Distant Cousins," a Jorkens yarn and—I think—his first Martian tale. These three items represent "Man Among the Stars." They are followed, in "Man Upon the Seas," by an excerpt from Verne's "Twenty Thousand Leagues Under the Seas" and by Poe's "A Descent into the Maelstrom," two period pieces that would be meaningful with the kind of editorial comment that would fit them into the science and literature of their time.

"Man and His Earth," third of the fictional sections, is a little more fruitful. It opens with John Leimert's "John Thomas' Cube," a lovely little psi opus from *Atlantic Monthly*, and goes on to Wilmar Shiras' "In Hiding," which needs no introduction here. Then there's a snatch on creative

evolution from the preface to George Bernard Shaw's "Back to Methuselah," and two "straight" stories in which ordinary people come to grips with science and scientists. In Jesse Stuart's "Split Cherry Tree" we have the warm comedy of a mountaineer father encountering the fringes of science education; in Nigel Balchin's "Cabinet Decision,' bureaucrats meet a scientist head on, and are helped to understand why we are not on the Moon and might never be but for Russian rivalry.

The tally continues with Bertrand Russell's "Dr. Southport Vulpes' Nightmare" from his "Nightmares of Eminent Persons"; it is a burlesque of automation. Finally there are two classic short stories in which gifted "main-line" authors look into the future: Walter Van Tilburg Clark's "The Portable Phonograph" and Stephen Vincent Benet's "By the Waters of Babylon." Read them and compare them with the ham-handed way the same themes have been handled over and over again by "our" writers.

This opening section is the only solidly fictional part of the anthology, but other bits are scattered through the book. Benet, in "The Blood of the Martyrs," brings a great scientist and a presumably great dictator face to face; we meet Dr. Max Gottlieb in a fragment of Sinclair Lewis' "Arrowsmith"; there is Sidney Howard's play about the conquest of yellow fever, "Yellow Jack." There is a bit from George R. Stewart's novel, "Storm," an excerpt from Francis Bacon's "The New Atlantis," in which he describes Solomon's House, his ideal institution for research, another from Swift's "Gulliver's Travels," mocking his Laputan savants and through them those of his own time, and a solid chunk from Bellamy's "Looking Backward."

The book ends as it began, fictionally, with a little from Aldous Huxley's "Brave New World"—his vision of education as it may be—with E. M. Forster's "The Machine Stops," and with E. B. White's "The Morning of the Day They Did It"—"it" being the destruction of the Earth.

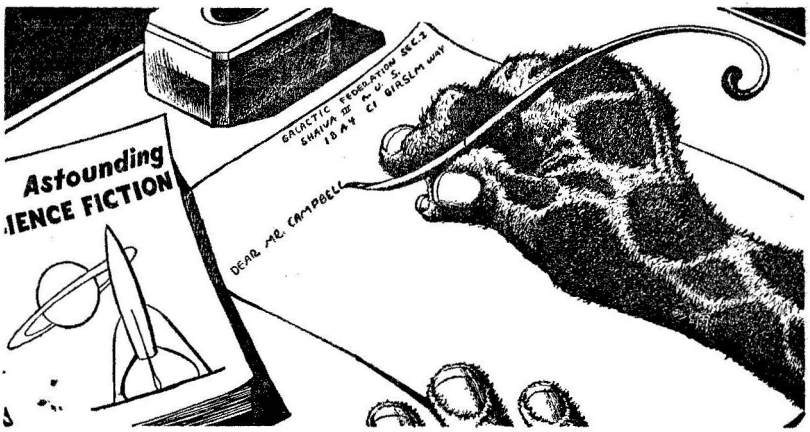
Distinguished company — literary company—and in it one remembered story from this magazine, "In Hiding."

But don't stop there: read what Leeuwenhoek and Darwin and Einstein and Eve Curie and Alfred North Whitehead and Thomas Huxley and Hippocrates and Aristotle and Roger Bacon and I. I. Rabi have written. Read John Campbell's account of the first reaction to the atomic bomb. Listen to Shakespeare and Chaucer and Keats and Shelley and Kit Marlowe and John Donne and William Blake and T. S. Elliot and Tennyson and Whitman and Frost and Ogden Nash, as they sing Man in the Universe.

Dip . . . sample . . . pick it up for a while . . . let it lie until the mood is on you. I think you'll find it rewarding.

THE END

BRASS TACKS



Dear Mr. Campbell:

Much of your recent writing has been on the subject of conformity. While it is certainly true that there is a great deal of conformity around, I am not sure that this is a very valuable term to use. After all, to a Martian, all Earthmen are pretty much alike. What we could do is to discriminate between the natural similarities and those that are fostered by cultural influences, and then to subdivide the latter into desired and undesired by an estimation of their consequences.

Let me illustrate this by an example. One of the conformal attitudes of contemporary America is the belief that none of the great events that occur throughout history are the results of direct, purposeful actions on the part of individuals or small groups. There are two levels to this belief; a societal level and an individual one.

Since 1945, the Western powers have been on the retreat in the number of allied countries, in technological progress, and in relative economic growth rates. A prime cause of this decline has been the conscious, purposeful activities of a relatively small number of men in the Communist countries. But we say that China fell, not that Mao Tse Tung defeated Chiang Kai Shek. Hungary revolted and Russia quelled the revolt, not that a group of people tried to win their own freedom and their masters defeated them. And so on.

Now this is an efficient way of describing the actions and feelings of

large groups of people. But most of the people that I have met have internalized this procedure to an extent that renders them incapable of seeing certain contemporary events clearly. If a nuclear war comes, it will come because some man (or group of men) gave an order that sent the first bomb on its way. The Spirit of Camp David will not stop that bomb. There is only one way to prevent a nuclear war and that is to make it impossible for the bomb to be used successfully. So we find people saying that we should all disarm. Now general disarmament will not repeal the laws of physics. If everyone disarms then the one man who successfully builds a bomb and conceals himself until he is finished, will be king of the heap. There is only one way to neutralize the bomb and that is to find a perfect defense or a better bomb. No weapon that I know of has ever been voluntarily given up by all men; the only way that a weapon gets put in a museum is by building a better weapon. And this better weapon or perfect defense will not build itself. Someone will build it. If we don't, we've had it.

Now this does not mean that such a belief is always undesirable. The feeling "There will always be an England" has served both England and the average Englishman well. Similarly, the belief in the eventual victory of their system has served the Communists well. We may be dealing with an elemental phsychological desire here. Yet effectual action in a real world does depend upon the ability to be bound only by the results of experience, and to leave the psychological desires in the psyche for comfort and solace when things look bad.

So much for the social level. On the individual level, if anyone suggests that some things happen to people because someone planned it that way, he is promptly labeled a crackpot or a paranoid depending upon the social circle that he moves in. Internalization occurs on this level too. If a man is fired by his employer, it is evident that the capitalist system is illiberal—even though he could go to another employer. However, the people who believe in governmental planning—and this includes practically everyone—do not get disturbed by the possibility of the starvation of a rebellious citizen. For them the government is—or will be—a totally beneficient entity, not a collection of men who are prone to indigestion.

I believe you once said that freedom is the ability to look at the world and to decide which of the alternative courses of action is best. Now if people deliberately narrow the alternatives before them, are they not voluntarily relinquishing some of their freedom? As David Hume said: "It is seldom that Liberty of any kind is lost all at once."—Gerald S. Wasserman

The great and eternally perplexing problem is that Liberty is rightly sacrificed for some other values. The free-living amoeba sacrificed some freedom to be part of a living organism.

But what Liberties are rightly sold for what rewards?

Dear Mr. Campbell:

Thanks for taking the time to personally answer my letter of comment on your treatment of Land's color theory and its possible auditory parallel. I am now writing to find if you have discovered a further clarification of color perception, implied in an article in the *Journal of the Optical Society of America.* (No. '59, p. 1041, "The Greenish-Yellow Blotch")

This research presents clear proof of the means by which the eye obtains two distinct color records, a long and a short. The author, William A. Shurcliff, of the Polaroid Corporation itself is apparently unaware of the connection with Land's theory and offers a rather valueless mechanistic hypothesis to account for his observed phenomena.

The effect is this, in brief: The eye is exposed to *only* long wave lengths of high illuminance in narrow ranges of the spectrum other than those of standard or natural lighting—such as Corning filter 3482. After five seconds a reddish-blue pattern appears on the parts of the retina exposed to the greatest intensity, in sudden irregular clusters—conforming to the pattern of rod distribution in the retina. Removal of the filter alters the colors of the pattern instantly to those *within* a narrower range in the same spectrum — greenish-yellow. After two to three seconds this pattern disappears, each segment individually and instantly.

For myself, this experiment is clear proof that the so-called rods and cones provide the short and long color records through neural impulses for comparison in the brain. It has been known that the rods are many times more sensitive than the cones to radiant energy. It may likewise be assumed that they are also *more quickly responsive* to changes in the pattern of incoming radiant energy; that the scotopic, and to a degree the photopic, peak of sensitivity is not static at a single point of maximum chemical sensitivity. But that subtypes of chemically composed sensors of both rod and cone nature provide a flexible means of shifting the curve of peak sensitivity for either rods or cones along the spectrum, according to the range of wave lengths in the spectrum to be viewed. The mechanism for shifting the peak of the more sensitive rod sensors is more rapid than for the less sensitive cones. In other words, in addition to the Purkinje Shift, which is only an *apparent* shift in the eye's sensitivity to illuminance—a mathematical reapportionment of vision from the cones to the rods at twilight—there is also a *real* shift in the sensitivity curve of each of these types of sensors toward the shorter wave lengths—colored shadows—until the cones can no longer sense the lowering level of illumination—gray-scale night vision.

By setting up an abnormal spectrum of very strong yellow wave

lengths and *no* short wave lengths, we can present a strong impetus for the rods to search for a new and more efficient curve of sensitivity much farther into the long spectrum than normally. Feedback instructs the rods that there is absolutely no radiant energy at their usual peak wave length; that the short half of their available spectrum is gone. The peak point moves quickly into the longer waves. The comparable point for the cones, already in these longer waves, remains essentially the same during this time. First, because the range of the "new" filtered spectrum is not too different from that which the cones normally sense. And secondly, because the cones are less sensitive and move slower. On those parts of the retina where illuminance is great enough, the peak of rod sensitivity is actually pushed *past* the slowly shifting cone peak—the rods are sensing more of their radiant energy from the longer wave lengths than are the cones of theirs. At this instant, the roles of the rods and cones in the brain are *reversed;* the rods suddenly become the long record and the cones become the short record. But the new short record is now moving *toward* the shorter waves slightly from its *normal*—cone—peak. The brain, accustomed to interpreting the normal short record peak as blue, perceives the short record as moving to an even deeper blue. The new long record is now moving into the wave lengths substantially longer than the *normal* rod peak. It may actually be only into the yellows, but the brain, accustomed to interpreting the normal long record peak as yellow, perceives this added long-wave fleeing from the normal as red. Thus, the eye suddenly sees bluish-red where perception was in normal colors an instant before. The faster the shifting motion, the farther along the spectrum from the normal color is the perception of it. Upon removal of the filter, the direction of shift is reversed, and the perception of colors is altered from those on one side of each sensor's normal peak on the spectrum to those on the other side of that peak—again in proportion to the velocity of shifting. When the sensing mechanisms are at rest; i.e., when feedback on the viewed spectrum's average agrees with actual peak positions, then the normal colors of the image are perceived. Complimentary afterglow is this same shift adjustment minus the interpreting confusion of reversed long and short sensor characteristics.

The details of Shurcliff's results are explained by this hypothesis. I am writing him predicting further effects not described in his article, which I believe will check out, though I have not tried the experiment myself yet deliberately. Shurcliff never makes mention of either Land's experiments nor of rod and cone vision and yet the ratio of long and short radiant energy for the phenomena and the optimum bands of sensitivity conform to known rod and cone ratios and sensitivity data.

It would appear that both rods and cones are essential to color perception. Sub-types of each are propor-

tionately energized to indicate the average peak point of distribution of the spectrum sensed by each main type of sensor, and these two averages are compared by the brain to deduce the single perceived color at that point on the retina.—Rod E. Packer

Obviously a lot of new approaches to theory of color vision are going to be showing up.

Dear Sir:

Your March Editorial is causing me great distress. I feel that you have overlooked the primary quality of "The Key Fact" and in so doing lost the punch the Editorial was to convey.

The issue is this: The Report Writer has a correct idea, used in a wrong sense; you have taken the wrong sense for editorial expansion.

The Key Fact definition is set forth as the last bit of information necessary to make an invention. Suppose we work from this.

Technological development offers two possible cases. First; an invention is needed but there is insufficient data to produce it. The problem can be solved by a computer as soon as The Key Fact is fed in. Certainly the computer cannot derive The Key Fact by logic, otherwise The Key Fact was not missing at all. Therefore logical deduction must be ruled out as a means of securing The Key Fact. Second; information is available but the invention is undefined. The Key Fact here is the definition, which if supplied by logic, could not have been missing. Thus logical deduction must be ruled out again.

From the foregoing it is seen that every invention has two prerequisites; something to invent and a way to do so. The Key Fact can involve either but is unattainable through logic. In order to have a problem, The Key Fact must be missing, i.e., it is in the realm of the unknown.

Extracting The Key Fact from the unknown can't be done by logic, and random selection is helpless merely because there is nothing from which to select randomly. Fortunately, there is one illogical method that can treat of such a situation. Imagination! And this is the crux of the whole matter: THE KEY FACT IS ALWAYS SUBJECTIVE.—Jack W. Glover, 527 John M., Clawson, Michigan.

Your discussion does not fully recognize the nature of the pure-intuitive invention. 1. It may be that no "problem" has ever been recognized, and only after the invention is produced is there the "Why didn't I think of that?" reaction. 2. An invention may not have ANY logical-thought derivation from ANY previously known facts. A mutation in living form isn't logically derived from its antecedents; a cosmic ray may have exploded a gene structure in a totally random fashion. So it is, in fact, possible for "random selection" to achieve invention.

THE END

(*Continued from page* 7)

ters" might turn out to be very distressing to the gorilla population. In those "Earth's fairest daughter" bits, I've noticed, nothing whatever is said about the intellectual capabilities of the "fairest"; a charming young gorilla maiden would pass the only test proposed . . . if your eye for looks were slightly different. And obviously these interstellar harem-agents aren't interested in offspring anyway; there couldn't possibly be any.

This leaves one other imaginable reason for aliens invading Earth—one of the old, stock motivations. For slaves.

Little by little, over the last few centuries, Earth has been growing up a little. Slave raids used to be very common—practically a standard commercial operation. Slaves were a major item of the world's commerce. Like it or not, idealists can plead, brotherly-love addicts preach, and bigots rave, but nothing much gets done, on anything more than a local in time-and-space basis, unless Economics agrees. If Economics says X, and the idealists say Y . . . X gets done.

The slave trade wasn't stopped by preachments, ideals, or any moral force. It wasn't stopped by Man's increasing kindliness to his fellow man on an idealistic basis, either. Horse-stealing wasn't stopped by laws, executions, or any other method tried during the last six thousand recorded years of history; it stopped only when it became more profitable to steal automobiles.

The great difficulty with the problem of slavery is that the definitions given for "slavery" are completely useless, and totally non-objective. There's no use looking up the definition in a dictionary, or a law book; the definitions don't correspond with the reality of human experience. "Slavery," so far as I have been able to work it out, in several years of consciously directed research, is almost purely an emotional, not a legal-objective, situation. An inherent part of the necessary definition of "slavery" must, then, be "an emotionally painful situation." If it isn't emotionally painful, no matter what the situation may be objectively, it isn't slavery—it's something else. And this means "emotionally painful in actual fact, to the individual involved"; if the situation would be emotionally painful to you, then you, in that situation, would be a slave—but if it is not emotionally painful to the actual subject, then it isn't slavery.

Keeping a fish under water isn't cruelty; for a dog or a man in the same spot, it is cruel. Throwing a catbird off the top of a tall building isn't cruelty; throwing a cat off would be.

One of the great confusers in the problem of slavery is serfdom; serfdom looks, to most modern men, so much like slavery that the two are almost hopelessly confused.

The essential difference is this: in a serfdom, the serfs are fish being assured of being kept under water—they're men guaranteed security in the way of life they choose.

A perfect example of serfdom in nature is the ant and bee society; the workers are serfs, protected by soldiers. There's perfect division of labor; soldiers don't work, and workers don't have to fight, while the queen does nothing but reproduce.

In noble-and-serf societies, the noble has the sworn duty of protecting, defending, and maintaining the established way of life, defending it against all comers, either invaders from without or saboteurs from within. Typically, the noble of European tradition was not allowed to work; the soldier ant isn't either.

The serf likes serfdom; it is not unpleasant to him—and it is not, therefore, slavery. That *you* wouldn't like it has no bearing on the matter whatsoever.

Serfdom, however, is inherently an "evil" thing—"evil" has to be in quotes, of course, but I can define what I mean. It's an effort to duck out from under one of the fundamental laws of the Universe; the Law of Change. The sworn duty of the noble is to *maintain what is;* they defend against change. The ant and bee societies have achieved a highly successful serfdom; they haven't changed in hundreds of megayears. In achieving perfect security and stability, they have settled down in a dead-end alley of evolution. An ant worker is *not* a slave; it is a serf, and can't imagine living otherwise. If it is forced to live otherwise, it dies shortly, and in misery.

Serfdom is always pleasant to the serfs; therefore it is not slavery. And it is invariably destructive, because it is a violation of the fundamental force of Evolution and Change.

All right; slavery is invariably "an emotionally painful situation," while serfdom is not. But the best definition of slavery I've been able to find so far is this: Slavery is a system in which one group of individuals, the slaves, are forced by another group, the masters, *to learn something they do not want to learn.*

The essence of slavery is the exact inverse of serfdom; slavery is imposed, undesired change.

The consequence is that slavery is not inherently, automatically destructive or injurious; it is automatically and inherently painful. But "hurt" and "injure" are not by any means synonymous; they just feel that way at the time. Dental work commonly hurts; it has been used as a means of torture. But that doesn't mean that painful dental work is injurious!

Dental work isn't always painful, of course; education is not always painful, either. I am not implying that all education is slavery—but I am suggesting that all slavery is educational!

A child in a modern home is a true slave; he is forced to labor at tasks he does not choose, under threat of physical, mental, and/or emotional punishment. If he seeks to escape, the legal mechanisms of the society capture him and force him to return. He is forced to work without remuneration, for a period of time not under his control. The fact that he does not choose to learn arithmetic makes no

difference; it is imposed on him willy-nilly.

The most unpleasant thing about this definition of slavery is, of course, that it makes it perfectly clear that slavery can be a highly beneficial experience.

And that, of course, causes an immediate sense of outrage and protest; slavery is invariably an emotionally painful situation, and what could be more obnoxious than the idea that something emotionally painful can be beneficial!

The distinction between good and evil slavery is simple in principle, but anything but simple in practice. "By their fruits ye shall know them." An imposed lesson which forces a desirable, productive growth is beneficial, however painful. If the imposed lesson decreases the stature of the individual, he is a victim of evil slavery. The fact of emotional pain in the situation is not relevant; it is not true that a man becomes "a slave to morphine"—he becomes "a serf to morphine," because the experience is peaceful, pleasant, and comfortable.

I assume that you have read George Orwell's "1984"; you're not a proper member of the group Science-fictioneer if you haven't. In that story, the proles are serfs; Winston is a slave. In every human serfdom, there is an inner slavery system; the occasional peasant-born man who wants to change, grow, and change the static culture around him is necessarily a slave. Because the nobles in the system are sworn to defend the Way of Life against all comers, invader or saboteur alike. Every would-be tradition-changer is an enemy of the Society. The nobles must, under their assignment of duty, stop his efforts.

First, they will seek to persuade the rebel to appreciate the beauty and warm comfort of the Sacred Traditions. If he yields at this stage, he does not become a slave; he learns the lesson of serfdom without reaching the painful stage.

If he persists, he will be punished. He must be taught the lesson he does not choose to learn; at this point he is a true slave.

If he cannot be taught, he must be destroyed for the safety of the Society. Both noble and serf will agree on that—and they will agree on it whether the rebel is a peasant's son, or the son of a high noble. For the nobles are serfs, too; they, too, are bound to the stasis-effort.

Winston Smith, in "1984," is a slave; the effort of the masters is to force him to learn the lesson of accepting the validity of their ideas. Now a slave has two levels of defense—which Orwell brings out clearly. The first, of course, is the effort at physical escape; to escape doing what his masters impose. If he is forced to acknowledge that physical escape is impossible, his second line of defense is, essentially, "You can make me do what you want, but you can't make me like it!"

The shockingly repugnant ending Orwell achieved was the final, and utter destruction of Winston's will; he discovered that he *loved* Big

Brother. He was a broken slave; he loved the hand that had whipped him into submission.

The concept is violently repugnant, isn't it?

That's fine; we're in agreement. Only . . . now tell me, why is Shakespeare's "The Taming of the Shrew" a delightful comedy? Katherine, the shrew, is, in the course of the play, subjected to physical, mental, and emotional punishments that finally force her to give up not only her rebellion, and her hope of rebellion, but even her will to rebel. She winds up loving her master.

Just like Winston in "1984," isn't it?

We both know it's different; I'm simply inviting you to clarify your strong feeling of the difference so that you can express to someone else the "unimaginable reasons" that make Katherine's painful emotional situation rate as comedy.

True serfdom is always pleasant for the serfs—and always evil; it's a drug habit. True slavery is always painful —and not always evil.

The reason the world has given up "slavery" in the last few centuries is fairly simple; the old system was not slavery, but serfdom, in practically all cases. Serfdom is economically usable; the serf works contentedly, and is a trustworthy and satisfied worker.

A true slave is undergoing an emotionally painful experience; he can be used only for the coarsest type of work because he will, of course, seek to sabotage his masters wherever he can. Typically, agricultural workers can be true slaves, since armed overseers can force them to work. Obviously, they cannot be used as domestic servants, clerical workers, or industrial workers. One does not leave a baby in the charge of a slave who hates his master.

Today, the rate of change of technology makes serfdom nonexistent, or at least economically impossible. You can't use slaves in delicate technological work.

So when we have a still higher, and wider-ranging technology, and are free to voyage among the stars, free to seek out a thousand more primitive worlds full of slaves to be had for the taking—their defensive weapons would be futile against ours!—we're going to be frustrated again.

When we can do it . . . we will no longer be able to want to do it. What is the use? It would cost so much more to teach those stubbornly resistant captives! Robots are cheaper, and a darned sight more dependable than a slave.

Sure there must be Others out there with vastly greater powers than we now have. They could take us any time they wanted.

But if they want to at all, it must be for unimaginable reasons. And from the fact that they haven't, we can vaguely guess that there must be unimaginable-unimaginable reasons that offset the unimaginable reasons!

THE EDITOR.

THE END

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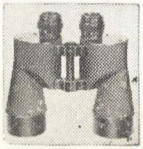

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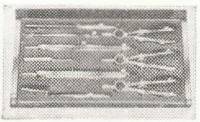

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