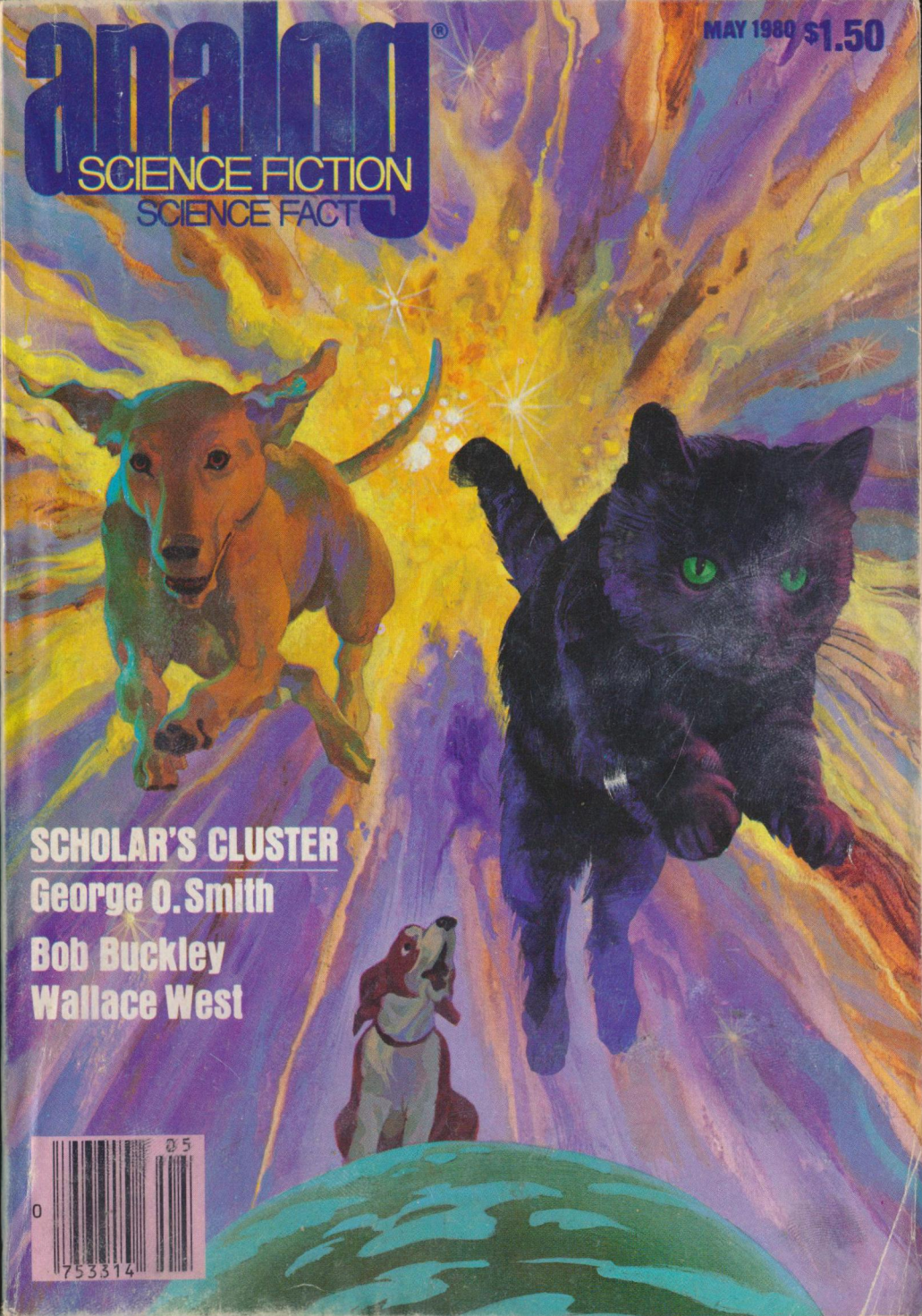
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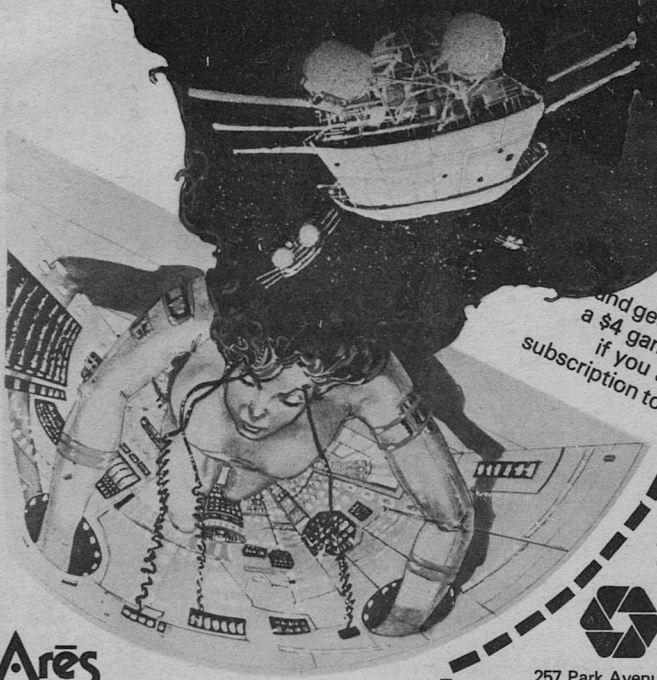

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$1.50 per copy

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Vol. C No. 5
MAY 1980

SCIENCE FICTION
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SCIENCE FACT

Analog Science Fiction/Science Fact ISSN0161–2328 is published monthly by The Condé Nast Publications Inc.: Condé Nast Building, 350 Madison Avenue, New York, New York 10017. S.I. Newhouse, Jr., Chairman, Robert J. Lapham, President, Fred C. Thormann, Secretary-Treasurer.
Controlled circulation postage paid at New York, N.Y., and at Concord, New Hampshire. Subscriptions in U.S. and possessions, $10.00 for one year, $18.00 for two years, $25.00 for three years. In Canada, $12.00 for one year, $22.00 for two years, $31.00 for three years. Elsewhere $13.00 per year, payable in advance.
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POSTMASTER: SEND FORM 3579 to ANALOG SCIENCE FICTION/SCIENCE FACT, BOX 5205, BOULDER, COLORADO 80323.

Editorial and Advertising offices: Condé Nast Building 350 Madison Avenue New York, New York 10017

Subscriptions: Analog Science Fiction/Science Fact, Box 5205 Boulder, Colorado 80323

The High Cost of Safety

Guest Editorial

Nuclear Energy—The Edsel of The Future! Guaranteed 100% Safe and Ineffective!

This rather poorly mixed metaphor should be adopted as the battle cry of the antinuclear movement. The incessant harping on the dangers of nuclear power plants is beginning to irritate many people and, in any case, is no longer so convincing as it once was.

The opponents of nuclear power claim that the incident at Three Mile Island is just another in a long series of disasters that prove nuclear power plants aren't safe. But there is another way of looking at this "disaster." In spite of more than 30 errors in judgment by the plant personnel, there was no disaster; the safety equipment worked even when it was improperly utilized. Maybe nuclear power plants are safe after all.

JOHN AHRENS

The issue of safety aside, however, one thing is clear. The propaganda of the utility companies notwithstanding, nuclear power plants are among the most expensive methods we have for generating electricity.

The utilities' claim that nuclear energy is cheap rests on a comparison of the costs of nuclear fuel and coal, which is the cheapest of the so-called "conventional" fuels. And it is true that nuclear fuel is cheaper than coal. (Or, at least, this was true. The price of nuclear fuel is increasing, and the quality declining, at a much faster rate than that of coal.[1]) But fuel is only one of the costs associated with the operation of power plants, and is far from being the most significant.

The construction costs of nuclear plants are increasing so rapidly that it is impossible to predict with any accuracy what they will be even in the near future. A study conducted at MIT in 1976 indicates the extent of the problem: the average cost overrun of a nuclear plant in the U.S. was found to be 100%.[2] By 1976, construction costs for nuclear plants were as high as $645/kilowatt (KW) of capacity, a considerably higher figure than the $137/KW predicted by the AEC in 1967. And the end is nowhere in sight.

Nor can these increases be attributed to inflation or to increases in the cost of labor and materials. The

cost of coal-fired plants has also increased drastically, but only half as fast as that of nuclear plants.[3] Much of this increase must be attributed to the complex technology required to meet the safety and environmental standards imposed by the various regulatory agencies. And while utility officials are quick to complain about these requirements and to blame environmentalists for the increased costs, we must remember that it is just this complex technology that makes nuclear power plants safe.

Another fact that is generally ignored by the proponents of nuclear power is that nuclear plants are simply not reliable. A 1976 survey by the Council on Economic Priorities (CEP) indicates that the average capacity factor of nuclear plants (i.e., the amount of power actually produced by a plant expressed as a percentage of the amount of power it would produce if it ran continuously at full capacity) was only 59%. The same study found the capacity of coal-fired plants to be 75%. And the problem is getting worse. CEP also found that the newer and larger reactors are less reliable than earlier models.[4]

Thus, the consumer of electricity, having already paid the high capital costs of a nuclear power plant, must also absorb the costs of the replacement power and back-up capacity necessary to insure a steady supply of electricity when nuclear plants are "down." And this list of the costs associated with the operation of a nuclear plant is far from exhaustive. These combine with the costs of decommissioning, waste disposal, and so forth, to make nuclear power plants the most expensive source of cheap energy ever devised.

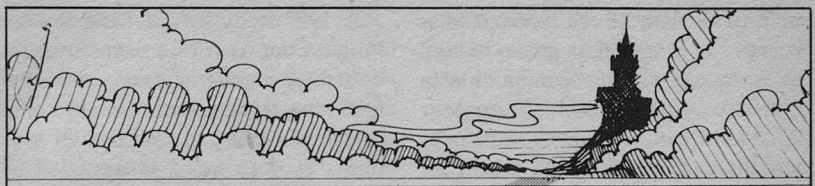
But what is the alternative? Coal-fired plants, although they are cheaper and more reliable than nuclear plants and are likely to remain so, are also responsible for a great deal of pollution. And even though the most up-to-date pollution control equipment can often reduce harmful emissions by as much as 90%, what remains has a significant impact on the environment.

Fortunately, there is a third alternative—solar power. Unfortunately, the antisolar propaganda of the utility companies has been quite successful. The following passage from a recent column by Jerry Pournelle is typical of responses to the suggestion that solar power is a viable alternative to nuclear plants:

> Will we . . . face the fact that at the moment it takes from fifteen to thirty times as much energy to build a solar power system as the system annually can produce? That ground-based solar energy systems are *big* (tens of square miles) and probably require pumped-storage systems to support them.[5]

Thus, Pournelle would have us believe that solar energy is uneconomical, requires large amounts of valuable land, and cannot function apart from conventional energy systems.

This passage exhibits the error com-



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mon to virtually all criticisms of solar energy. It is true that ground-based solar energy systems comparable in size to conventional or nuclear systems are outrageously expensive and highly inefficient. But this is *not* the kind of technology advocated by most proponents of solar energy. They advocate the use of small-scale, decentralized technology, and use the term "solar energy" to refer not only to the use of the sun's heat to produce electricity, but also to conservation, wind energy, hydro-power, biomass conversion, and so forth. These technologies pose none of the problems that so distress Pournelle.

Consider, for example, the economics of conservation. And let me hasten to point out that I do *not* mean by "conservation" a reduction in economic growth or standard of living. Conservation is not doing without. Rather, it is using energy more efficiently so as to derive the same or greater benefits while using less energy. Reliable cost figures for conservation are hard to come by. One reason for this is that conservation is such a loaded issue; both sides of the controversy tend to exaggerate their case. But a more important reason is that the cost varies geographically. The first problem can be overcome by seeking figures from an unbiased source, insofar as this is possible. The second can be overcome by looking at figures for a relatively small area, and one that is not especially suited to the implementation of conservation technology.

A 1977 study by the Iowa Energy Policy Council (EPC) seems to meet both these requirements and yields the following information.[6] In 1977, the cost of electricity to a residential consumer in Iowa was 3.5¢ per kilowatt hour (kwh). A comprehensive residential conservation program would result in annual savings of 1.1 trillion BTU of electricity by 1980 at a cost of approximately 2.2¢/kwh. And if we consider the energy-value of the primary fuel used to fire power plants, the cost of conserving electricity is reduced to only .5¢/kwh.

Indeed, the few utility companies that have invested in conservation have found it to be profitable. Two Washington utilities,[7] for example, have undertaken to finance the conservation efforts of their customers by offering *no-interest* loans, with no payments due for a period of *ten years*. They have found that this program results in substantial increases in profits by allowing them to avoid the massive expenditures required to expand generating capacity. Clearly, it is cheaper to save electricity than it is to generate it.

Of course, conservation does not actually produce any electricity. Thus, it might be argued that nuclear energy is the only or most viable method for generating whatever electricity is required after conservation measures have been taken. Electricity currently meets approximately 13% of all end-use needs in the U.S. and, if current policies remain in effect, this figure could increase to 20-40% by the year

2000.[8] It is unlikely that conservation could reduce this figure to zero, since some of this electricity is used to operate lights, smelters, and other electronic equipment.

But notice, electricity is a very high quality kind of energy and is often used even when a much lower quality of energy would suffice. This 13% figure could probably be reduced to 8% by replacing electricity with other forms of energy where technically and economically feasible, e.g., for space heating and cooling. This figure could be further reduced to 5% by applying "technical fixes," i.e., by utilizing *existing* technology to increase the efficiency with which we use electricity. And this reduced need could probably be met by existing U.S. hydroelectric capacity in conjunction with the cogeneration capacity that could be made available in a few years.[9]

Conservation, then, is not just cheap. It is a viable alternative to the massive expenditures required to expand generating capacity.

Why, if nuclear power plants were such an economic joke, do the utilities continue to tout their virtues? There is, of course, no simple answer to this question. One reason, I think, is America's fascination with "big technology" and the belief that it will create a world in which material want is eliminated. Another is simple greed on the part of the utilities. Continued reliance on centralized generating facilities will allow them to retain their monopoly on the production of energy and the economic influence that accompanies this monopoly.

But more important by far is the fact that government has encouraged the utilities to invest heavily in nuclear energy and acted to hide the true cost of this investment from the consumer. The Energy Research and Development Administration (ERDA) estimated that by 1977 the government had invested at least $9 billion in nuclear technology. Had these R&D costs been absorbed by the utilities, the cost of electricity generated by nuclear plants would be increased by 50%![10] And just prior to its demise, ERDA proposed a program that will involve expenditures of between $48 billion and $120 billion over the next 20 years for the development of new technology for electric utilities.[11] No

doubt much of this will be spent on technologies which utilize coal as their primary fuel. But if present trends continue, a sizable portion will be spent on nuclear technology.

Indeed, a survey of recent reports of government research indicates that there is no longer much interest in the economics of nuclear power. Rather, the federal government is seeking ways to expand nuclear technology and the demand for electricity, and to finance the nuclear industry, despite the problems discussed above. And in view of the current emphasis on "energy independence," this trend is likely to continue.

The government also encourages the development of nuclear energy through its regulation of utility rates. The government grants each utility a monopoly within a certain geographical area and then determines the price at which the utility may sell its product. The price is simply whatever is necessary to cover the utility's operating expenses, tax liability, and a guaranteed profit. The profit is figured as a percentage (usually 8-10%) of the company's capital investment. In addition to removing all incentives to avoid inefficiency, this method of determining rates encourages investment in capital-intensive rather than labor-intensive technologies. And, as I pointed out above, nuclear power plants are highly capital-intensive.

Moreover, the government's tax regulations provide a strong incentive for capital expansion. Utilities in most states have convinced the regulatory agencies to allow them to keep two sets of books, one for the purpose of determining tax liability and another for the purpose of determining rates. This dual bookkeeping system is too complex to admit of a brief explanation, but its result is quite simple: the utilities collect from their customers approximately one billion dollars in taxes each year that they do not pass on to the IRS. Proponents of this arrangement argue that these taxes will eventually be paid. But the fact is that as long as the utilities continue to expand, they will never have to pay these taxes. Thus, government encourages and subsidizes heavy investment in nuclear and other capital-intensive technologies. And much of this investment is financed by tax revenues rather than by utility revenues, thereby hiding the true cost from the consumer.

What to do? Many opponents of nuclear energy demand that the government impose an outright ban on nuclear plants and divert funds to the development of alternative energy sources. This strikes me as wrongheaded for two reasons.

First, a ban would prevent us from determining whether or not nuclear power plants can be made both safe and economical. Second, the government's track record in regulating business is far from encouraging. It almost invariably distorts market indicators, thereby making it impossible for businesses and consumers to make rational decisions. (Even the nuclear

industry might not be in such sad shape had not government encouraged its development before the technical and economic problems were well understood.) I see no reason to suppose that government involvement in the development of alternative energy technologies would be any more beneficial.

Rather, government should withdraw entirely from the energy industry. All direct and indirect subsidies should cease and protective legislation (such as the Price-Anderson Act) should be rescinded as quickly as is possible without causing severe economic dislocation. If nuclear power plants can be made both safe and economical, the market will provide plenty of incentives to do so. The demand for energy is certainly there. If they cannot, funds will be diverted to alternative energy technologies.

I do not believe that nuclear technology will survive as a means for producing a significant fraction of the energy consumed in the U.S. But if it does, it should be because it is the safest and most economical means available to us. It should not be because the government bleeds the taxpayers white and stifles technological development to support an industry that cannot support itself. ■

ABOUT THE AUTHOR

John Ahrens is an Assistant Professor of Philosophy in Bowling Green State University in Bowling Green, Ohio. He also teaches in the Environmental Studies Program and is pursuing research into the effects of governmental regulation of the economy.

OUR APOLOGIES . . . *For failure to give proper credit at the proper time, and for any confusion resulting from two unfortunate errors in our March issue, both in connection with Rick Gauger's story, "Detour." First, the author's name is indeed Gauger, not "Gaugel" (as appeared in our Table of Contents). Secondly, the illustration was by the author himself, Rick Gauger, and not Jack Gaughan. We apologize to both gentlemen for the confusion, and hope that all readers will take note of the true state of affairs. It's not often that we have an author illustrating his own work, and when it happens, he deserves recognition.*

NOTES

1. Richard Morgan, *Nuclear Power: The Bargain We Can't Afford,* Environmental Action Foundation (1977), pp. 26-27.
2. I.C. Bupp, Jr., and R. Treitel, "The Economics of Nuclear Power: De Omnibus Dubitandum," MIT Center for Policy Alternatives: Cambridge, MA (1976), p. 1.
3. Morgan, *op. cit.,* p. 12.
4. Charles Komanoff, *Power Plant Performance,* Council on Economic Priorities: New York (1976), pp 1, 4.
5. Jerry Pournelle, "The Alternate View," Analog, vol. 99 (Aug. 1979), p.163.
6. *The Iowa Energy Conservation Plan: 1977-1980,* Iowa Energy Policy Council, March 28, 1977. Although this study was done in order to qualify for federal energy funds, I do not think this results in significant bias. All that was required to obtain the funds was that a study be made; recipients were not required to propose or implement an effective energy conservation plan.
7. Washington Water Power Company, Spokane, WA, and Puget Sound Power and Lighting Company, Bellevue, WA.
8. Amory Lovins, *Soft Energy Paths,* Harper and Row: New York (1977), p.39.
9. *Ibid.*, pp. 39-40. Lovins gives a detailed defense of these figures in Chapter 4 of *Soft Energy Paths.*
10. Morgan, *op. cit.*, p. 36.
11. *Comparing New Technologies for the Electric Utilities,* ERDA, 12/9/76, ERDA 76-141 (Discussion Draft).

Scholar's Cluster

It's possible to get too much of a good thing—and not always easy to judge whether that's happening.

GEORGE O. SMITH

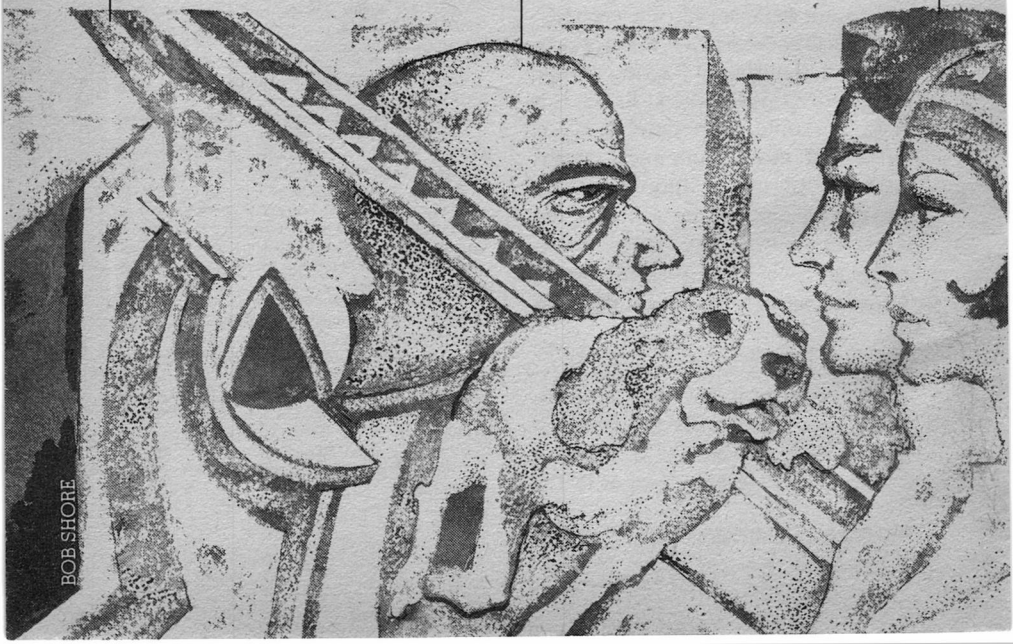
His name was MacDougall, and he was the chief of the Extra Terrestrial Service. He looked sympathetically at the younger man in the chair before the desk. "I know it's tough, Peter, but it's something that field operatives must go through three times in their lives if they're lucky."

Peter Hawley spread his hands out, palms up. "Rules are rules," he said, "and that's the name of the game. But there's nothing in the rules that says that I've got to feel happy about parting with my dog."

"We all feel that way," said the Chief. "Sure, Beauregarde is still full of that good old 'Go, Beau!' but he's slowing down just enough to make life touchy. Especially in Xanabar, where all the guys in the black hats, and half of the guys in the white hats, would like to see Peter Hawley and Beauregarde clobbered."

"I suppose so, but—"

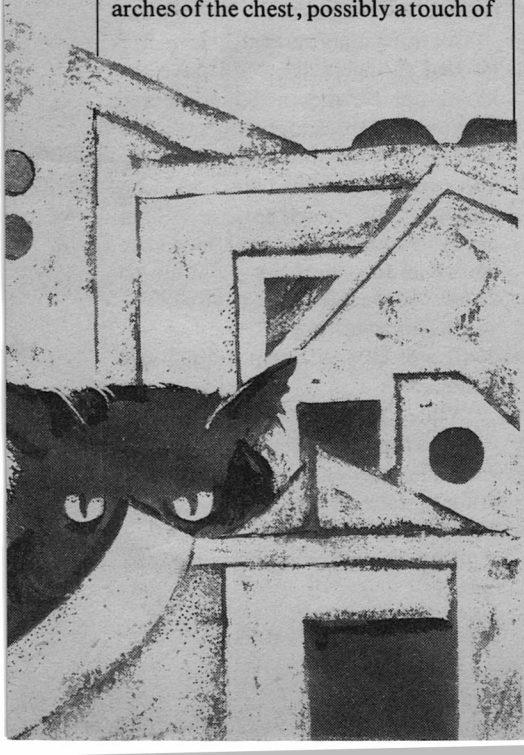
"But me no buts. Seven years of field operation is minimum, but if we said that Beauregarde was good enough for another year, we'd have some operative suggesting that we ought to try nine. The slowing-down process isn't a step-function. It's a long term tapering off, and so we put a



stop to the active life well before the dog's snap misses and Extra Terrestrial loses both man and dog. We're not going to exterminate one of the finest dogs in the Service. This is retirement."

"Yeah," drawled Peter Hawley, "well, that is a step-function. In one fell swoop, Beauregarde stops chasing villians in Xanabar and takes up sitting on his haunches in a scientifically kept kennel, eating a carefully balanced diet, and getting exercise on a treadmill."

"It comes to all of us." MacDougall looked down at the pile of papers. "It will come to you, too. This is your third dog, Peter, and in seven years he'll be the third retired dog that worked with Peter Hawley. And in seven years, Peter Hawley will be forty-five, have a slight case of falling arches of the chest, possibly a touch of gray at the temples, and find himself following, and not leading, into a brouhaha."



"So rules are rules, and so let's change the subject. There's one thing that's been bothering me, Chief."

"Go ahead."

"It's this maximum stay in the Cluster. The way the Service lays it out, our operatives gear their training and education in seven-year lots."

"Sure, gearing with the dogs. That's sensible."

"Sensible? I wonder. Look, Chief, I graduated from the Academy at twenty, then spent three years in Scholar's Cluster, with the last six months training Edgerton. Then I went on active duty even though I had a full year left before the time limit was up. In other words, since training and education are logarithmic, seventy-five percent of the full time means that I went out with less than sixty percent of my possible maximum. In blunt words, I went out for my first seven years just a bit more than half trained and educated."

"And—?"

"I don't like coming in second!"

MacDougall smiled. "I know. You have the feeling that everyone on the street is far above you; that you're the fellow with the high school education trying to make his way through a universe of college graduates. I had that feeling until I found out better.

"You see, Peter, it costs a wad to send someone to Scholar's Cluster, and as a consequence, those who go must pass a fairly stiff examination. Ergo, two things take place. First, the streets are not teeming with near-

geniuses, but loaded with ordinary characters who couldn't stand a chance of going to the Cluster. Second, those whose minds border on the criminal seldom attain their bachelor's degree and usually lack the discipline to save until they have the necessary cash.

"Now, then, one more interesting item. The Extra Terrestrial Operative, on his first assignment has received all the training and education that makes for a first-rate, active service. You did and you were. And after the first seven years, you went with Beauregarde to train the dog, and there you received training and education that would—if you didn't enjoy plowing in—permit you to supervise. This will be your third visit to Scholar's Cluster, and when you return, you will have the makings of a real operations manager. Oh, I'd hate to send you out after the underworld of Xanabar without managing experience, but one of these days *you'll* have had *your* fill of hell fighting and *you'll* be sending younger operatives with their dogs to Xanabar. It just takes time to wear the likes of you down to an office desk. Okay?"

Three men sat casually in a comfortable office on the top floor of a building in Manhattan, the center of the metropolis that covered the eastern coast of North America. They smoked expensive cigars, utterly ignoring the concept that smoking was sheer pollution. They drank Napoleon Brandy, created a few centuries after Waterloo.

"So you're taking your usual hideout, Lou?"

"You just bet I am."

"Sensible," said the third man. "I doubt that the Senator bothers to read stuff that isn't recommended to him, but that was a pretty harsh exposé, and the Holograph News will comment. That will be sufficient recommendation, and then the Senator will be after you."

Lou Phillips smiled. "Senator Claghorn may be after you two, you know, for printing my book."

The man behind the desk shook his head. "If the Senator comes a-roaring in here, dander flying, I'll agree with him, while pointing out that I don't direct policy except at the top level. But I'll see that those that accepted the manuscript will get the axe."

The third man nodded. "In fact," he said thoughtfully, "I'll have the Holograph News do a special, slanted to show how 'Freedom of Speech' can be turned into downright libel by unscrupulous writers such as Lou Phillips." He turned to Lou. "That ought to run the sales up a bit. Since you're hiding out, uh—I want to know, hopefully, that you'll be writing another exposé."

"It will be a different kind," said Phillips.

"What kind?"

"I've thought for years that this maximum stay at Scholar's Cluster is just a gimmick cooked up by the top dogs to stabilize their positions."

"Do go on! Just how do you figure?"

"Look at it this way," said Phillips. "You," and he pointed to the man behind the desk, "are John Sullivan, president of the board of directors for Boswash Media. And *you* are Edwin Crossley, director of Holograph News. Me? I'm just Lou Phillips, a fellow clever with words and with an unscrupulous mind. On the social and business ladder, Sullivan stands on top, with Crossley next down, and me at the bottom. We attained our present positions by attending Scholar's Cluster and, presumably, reached our full mental competency.

"But now, hypothecate; John Sullivan rules that I may not return to Scholar's Cluster since I spent my full four years there and will come unglued if I stay any longer. In other words, Sullivan stays on top by ruling that his underlings may not improve their lot. Okay?"

"Think you can do this?"

"In either way, I win," said Lou. "If what I think is so then I will expose the whole works and there will be hell to pay. We three will be on the deep inside and will promptly put everything we've got into spacecraft and space travel stock—which we'll promptly use to stay on top. And if I am wrong, then I'll write a tearjerker, describing the mental decline and final fall of some wiseacre who violates the maximum stay."

John Sillivan nodded. "I'm going to break up this meeting," he said. "I've got another appointment. But this afternoon, I'll have Maurice draw up an option contract for your next book and holoscript."

The Empire of Xanabar sprawls across the spiral arm about halfway from the center of the galaxy to the outer edge.

In Xanabar, the cities glow with shops and palaces and sophisticated amusements, and the jewels of the spiral arm: diamonds, rubies, saphire and the crystals of standard chemistry —and if one has the price, one can purchase the fabulous oyster pearl of Sol Three—Earth, which is traditionally known only to glow when it touches the throat of a woman in love.

And among this glitter and glow, there is the underworld. Theft, prostitution, woman-slavery, kidnapping (especially of the girl-approaching-womanhood) and other crimes that go with the underworld: bribery, torture, and murder.

Near the uncertain center of Xanabar lies the planet Syrtyr; and the capital city, Citadel.

In Citadel, as it is with any city, the glittering upperworld and the sordid underworld blend in a dirty gray area. From 'Ser' in the upper class, to 'Bad' in the under class, passes the money of Xanabar and for enough crystal cut, Bad will get Ser anything.

"Ser Zal Lobrand, I have outside some information that may—or may not—be of interest to you. It is for you to decide. However, I follow your orders to—"

"To bring information to me about Sol Three—Earth, that does not have to do with their internal politics."

"Yes, Ser Lobrand. It appears that the Terrestrial Operative known as Peter Hawley did not leave Xanabar for good."

"Oh, most brilliant! This is information? Bah!"

"Please permit me to finish, Ser Lobrand. Peter Hawley returned to Sol Three—Earth, to obtain a new Terrestrial Canine. He will soon be on his way to Scholar's Cluster to train this canine for duty and to bring the canine to Understanding."

"Interesting—at least the reason for Peter Hawley's return is. I gather from this that the active life of the Terrestrial Canine is substantially shorter than the Terrestrial. That Hawley will work with the canine is obvious. Go, now, Bad Farben. You know what I've wanted for quite some time. I don't care how it is done, but do it."

"One more thing, Ser Lobrand. Bad Tar Yawl reported from Sol Three—Earth, that someone in authority has authorized the study of using the Terrestrial Feline in covert operations. The information is scant; they keep their secrets well, especially when they suspect espionage."

"And they do. In fact, I am of the opinion that they permit Bad Tar Yawl to stay on Earth because they can feed him the information they want us to know. Er, what is this feline?"

"It is smaller than the canine, furred, and with claws that retract, like the Syrtyrian Zerax. The feline is quite supple and according to the story—which may be discounted because all Terrestrials are arrant liars—it is capable of crawling silently through interstices smaller than its own cranium.

"I am also told that the canine and the feline are enemies by nature, which means that if they forget their natural emnity, a mixed pair can be dangerous. Again, this is unsupported rumor: but traditionally, Terrestrial Female is linked with Terrestrial Feline as the male links with the canine."

"A double mixed pair! Complicated, quite. Well, Bad Farben, we must break this matter into bits."

MacDougall sat with his heels on his desk, chuckling. "How's things, Joel?"

"Couldn't be better."

"And what's Marthea's attitude?"

"Marthea believes that it was her influence and her money—and her affection for the cat—that got their okay."

"It was both. Marthea's ultra-great grandfather donated a grant to the Animal Genetics Lab; the family's kept it going, and Marthea put her feet down and demanded that great grandfather's affection for the cat family be recognized by sending Eight Ball to the Cluster to get Understanding. And this, too, goes both ways. The cat with Understanding might well be useful to the Service and this gimmick of having her meet Peter on Fanvor will come as a complete coincidence."

"Fine. And Peter won't suspect a thing since he is quite aware that *any*

Terrestrial travelling with a dog would be suspect in Xanabar. So it doesn't bother him to be travelling on the edge of the spiral arm where the alliances to Xanabar are rather thin.

"And, using some petty cash, I managed to juggle the reservations so they'll be held over in Fanvor, where there will be some sort of religious ceremony in which no one leaves until the ceremony is polished off with great gusto. Knowing Peter and Marthea and their attitude toward exotic, pagan, religious ceremonies, I'll predict a to-do at first, but Fanvor isn't about to change their ways for a single Terrestrial couple. Then, being Terrestrians, socked in by a religious ceremony, my guess is that they will take to their Terrestrial ways of meeting, dining, wining, and dancing and—since there is no competition—making the best of it."

"Meaning making out. And Peter's pooch?"

"Old Doc Koch is doing his part. He's imprinted a pup and as he says, it's the dog that picks the master."

"What kind of cat has Marthea?"

"A very large hunk of cat. Heavy, strong, adapted from the Maine Coon branch, a fairly bright branch of the cat family from the beginning. Now after fifty generations of high powered genetics, the frontal lobes have developed and a stay in Scholar's Cluster will develop Understanding. Its name is Eight Ball; completely black except for a white circle on the forehead, might be more than just a come-on pitch for Marthea and Peter."

MacDougall laughed. "We can't lose. If the pooch snaps at Eight Ball, and Eight Ball takes a one-two left-right at the dog's nose, Marthea and Peter will separate them and then agree over cocktails that dog and cat squabbles should not break up a budding friendship—and if dog and cat curl up together, it will be a fine example to do likewise."

"Quite! All of the training can't be kept in the Cluster. Hawley will go on raising hell until some dame convinces him that coming home to soft hands and a loving mouth is far better than rescuing some love-starved Scholarette from what they've planned for her in Xanabar."

"Marthea has a job on her hands. Peter Hawley's way is to set fire to the villian, secure the maiden, and after dark, board Old Starwar with cutlasses and take off through the Dark Nebula and cut 'em off at the Pleiades."

With considerably more money than he'd expected, Lou Phillips found that a mild swatch of it could get him routed out and away from the centers of Xanabar, where legal curiosity might be embarrassing considering his mission. For one of Xanabar's gimmicks of increasing the Empire Income was to inspect, so carefully, any spacecraft not registered under Xanabar for safety, passenger comfort, air purity, this, that, and so forth, which required the ship to remain on the landing pad for three or four days with every passenger booked into a fancy hotel quite close

to one of the tourist traps of Xanabar—of which there are many.

But while it is customary to say, "Xanabar lies across the spiral arm," out along the edges of the arm, where the stars begin to sparce out, Xanabarian loyalty is low or non-existent.

Lou Phillips, using a mixture of cash and the old Blarney Stone, was making a zigzag run of it along the side of the spiral arm. He acted as if he had no aim. His story was about as honest as anything he ever said or wrote. He was a novelist in search of pleasant, describable scenery, and to fill it, a plot.

Takeoff completed and the ship at ease in transphoton travel, Lou Phillips entered the bar of the spacecraft.

"Ah!" he exclaimed most pleasantly. "Ah! We, er, seem to be alone. That is, unless you accept the barkeeps as chaperones."

"Are they?"

Lou laughed; it was a controlled laugh, low and cheerful, and extremely socially polite. "In general, no. But this ship is registered by a planetary combine known as Tallahas—ah, you are Terrestrial, aren't you?"

"Yes."

He nodded, politely, as if he had asked a personal question and was happy to receive an answer instead of the back of her hand.

"Well, now, Tallahas has a fantastic sense of religion. It goes right in with their social mores. It bothers them all that we have not been properly introduced by some elderly person who happens to know us both, and that I spoke first and that you replied. This isn't improper to them; it is downright blasphemous. They permit us to continue this meeting without alarums and excursions, but only because we're from the outside. But we must go no further. We may continue to talk, but I must buy my own drinks and you must buy yours. I may not make a gesture toward you. I may not touch your hand. Nor—if you smoke—may I light your cigarette. To us, these are social graces. To Tallahassa, we should be strangers until we've been properly introduced, and any polite social grace from me would be tantamount to my unbuttoning your blouse and kissing you between the breasts.

"On the other side of this coin, it would be considered quite impolite, at dinnertime, if I did not invite you to be my guest. Quietly; with gestures. When dinner is announced, I shall offer you my arm. If you take it, you accept. If you refuse, we shall be expected to pass in the hallway as if we couldn't see one another."

She smiled, quizzically. "And what do I say to you when you offer me your arm? 'Hello, arm!' Is name swapping verboten?"

"If you take my arm, I must introduce myself by name. Comes from a pagan belief that someone who knows your name has some power over you. And if you reply by giving me your name, that tells the rest that you trust me. That is—aher, I assume you are alone? The gods of Tallahas would disrupt the continuum of space

if we continued without your companion present."

"Oh, I am alone," she replied. "Except for my pet. I have a cat in the animal quarters."

"Ah-ha! Our formal introduction. In their pagan days, they believed that the gods used small animals as their messengers. So at present, if we meet or go to visit your cat and the small beastie doesn't kick, scream, and try to claw me to bits or chew my throat out, they'll eyeball the procedure as if we'd been united by a messenger from the gods."

"Eight Ball can get rough," she said, "if she's treated rough. But treat her with simulated purrs and scratch her behind the ears, and she becomes a lap-cat."

Lou Phillips looked at her with inner thought. Openly, he asked, "Am I out of line if I ask how come you're travelling on a space journey with a member of the feline society? Considering the kilograms per light-year cost—?"

"Oh, we're going to Scholar's Cluster. Some higher-ups think that the Terrestrial Feline may be excellent for covert work for the Extra Terrestrial Service. I'm an Exteeserv."

"Well, now! Er—while the male may not make obvious passes at the female in Tallahassa, if you were to clutch my arm and insist that I come with you to visit the animal quarters, we'd be solid with our environment. Under the rose bush, m'lady, I'm Lou Phillips."

"The author?"

He chuckled with self-deprecation. "Shakespeare, and Dickens, who still remain alive in their writing, are 'Authors.' Scribblers like me, whose books go out of print before I spent the cash I made on them, are merely 'Writers.' But yes, I'm the hatchet man who did the job on Senator Loudmouth. That's why I'm here, on my way back to Scholar's Cluster. Took it the hard way. I didn't want the critics or my publishers to know that I really didn't finish my stay at the Cluster on my first trip. But my job on Senator Blabbermouth brought me a fortune and a nice advance on my next book, as yet untitled.

"Ah, now, m'lady, since we're both heading for the Cluster, and since we've got to make it look good for the gods of Tallahassa, let's revise our reservations so we can travel together."

"I'd like—er—but—?"

"Oh m'lady, I didn't suggest that we ride in the same cabin. In the same spacecraft, yes. I'll gladly accept the accusation that having you in the same spacecraft provides me with greater probability of enticing you into my cabin, and you will admit that having you in another spacecraft absolutely prevents our meeting again over a cocktail. Right?"

Marthea looked around. There were, by now, several in the bar. Couples, singles, a few with four or six in the large tables. They were, without a doubt, Tallahassans, heading for their capital, Fanvor, for the religious celebration. In simpleminded Ter-

restrial, Marthea and Lou Phillips were in a strange land, surrounded by foreigners. She took his arm, and said, eagerly, "Let's visit my cat. Let's go see Eight Ball!"

At once, the Tallahassan semi-frown became a wide, knowing smile.

Marthea Campbell was, by no means, a hardened space traveller. She was, in rank, approximately equivalent to Peter Hawley. But Marthea Campbell had been given lighter duties, where the stay was fairly long. The Service presented her with official tickets and the travel schedule and she was not about to wonder how come she'd been ticketed to Fanvor where, it appeared, she'd be held over for several days if not a week.

While Marthea was meandering on her gimmicked trip, Peter Hawley was quite busy.

First, he recognized the necessity of passing near the edge of the spiral arm to avoid close contact with the center of Xanabar, so those who arranged his schedule arranged it so that he would turn up in Fanvor during the religious ceremonies, booked in the same hotel and on the same floor as Marthea Campbell.

Second, he was to meet his new canine companion. This new dog would, as usual, be of an age where late puppy was mingled with early dog, and naturally without Understanding.

On the other hand, the dogs in the Extra Terrestrial Service would have caused tears to a twentieth century dog fancier. They were bred for intelligence, not to resemble as closely as possible the rigid specifications spelled out by the Universal Kennel Club, where the Dalmation is graded on the number of spots and where they are. The Service dogs were as mixed-bred as the humans they served, and had but one single common characteristic: the skull had changed over the decades of breeding dogs for intelligence, and the forehead above the eyes rose to give room to the frontal lobes.

So, even without Understanding, any dog picked by Peter Hawley at the Service Kennel was going to be several steps ahead of the ordinary canine.

"Well, now, Doc, let's pick me a pooch."

"You've been through this before, Peter. Take a walk through the kennels and pick your dog."

"Huh! Pick my dog? What if I point to one who doesn't think I'm the biggest and the greatest?"

"All right, so we'll take a walk through the kennel and let the dog pick his master. C'mon."

On their way to the kennels, Doc said, "I'm not showing you the whole works. Peter Hawley has reached the point where Peter Hawley is no longer expendable, and sooner or later Peter Hawley is going to be sending the expendables out to be expended if necessary. So I've collected a special pack. For the guy who may wear the hat with "Chief" on the scrambled eggs, what we want is a dog marked with master sergeant's rockers on the shoulders."

The *Canis sapiens* without Understanding sniffs, wags the tail, and addresses visitors with cheerful whimpers and happy barks.

By some doglike communication, the special pack picked by Doc seemed to know that when the human with the veterinarian left, he would leave with one of them, and they seemed to know which one. They hung back; not much, but just enough so that a dog-puppy of the nondescript brown color that mixed breeding brings could make its point. Doc opened the door and the dogs circled Peter sniffing and making friends, but leaving enough space for the brown dog to come forward, stand on the hind legs, and put the front paws on Peter's knee.

Doc smiled. "Looks like Number K-9-853 has picked his master."

"Seems so. So I'm picked. Now, the picked human is going to pick a name; I'll be double damned if I'm going to call out something that sounds like a license plate number."

"We use the numbers for identification, and so some name won't be memorized. Puts a zigzag in the dog's memory channel. Your first was Edgerton, and the second was Beauregarde. As usual, I'll register a veto on an ordinary name. Name the dog 'Joe' and you'll have a hundred pooches following you if you call his name."

Peter smiled. "I'm a bit of a nut on those extra-ancient prehology shows," he said. "A couple of weeks ago, they had a real ringer-dinger out of a community on the western part of Europe. They wore swashy hats, ruffled shirts, and fought with swords. For reasons that mystify my simple mathematics, it was called 'The Three Musketeers' while the tale really wove about the fourth: D'Artagnan."

D'Artagnan dropped to all fours and walked around to Peter Hawley's right heel.

"Let's go!" said Peter. "The Musketeers swung a mean sword in those olden days. So D'Artagnan, let's swing a mean load."

Marthea's reservation had been made for her by the Service for a room at the Hostel LaDanne, a high priced joint that was very convenient for the stay-over since it was on the spaceport property. By the same logic, Lou Phillips had made reservations at the same place. He was quite pleased that he and Marthea were to stay under the same roof. Not only that, but—

The word of their companionship, blessed by the small animal carried by the gentleman, passed from one to the other with the wink of the eye and the Fanvorial smile. The registrar, observing that the Terrestrial Female was to have Room 1523, while her companion was reserved for 1101—and that Room 1524 was reserved for another Terrestrial, who hadn't arrived yet, took action. How long does it take a room clerk to juggle things? Very briefly.

—So Lou Phillips was also quite pleased that the lady of his immediate desire should be rooming next door. In which, he quickly discovered, there was an adjoining door that could be

opened to make the two rooms a suite.

Lou and Marthea had come down in the early rush. They were established, with Lou suggesting that the door be opened so that Eight Ball could get exercise by having enough room to run, long before the ship that brought Peter Hawley to Fanvor arrived—to find that spaceport landing pads were jammed and the late arrivals were put into parking orbits while the bureaucrats tried to play spaceport chess with the spacecraft.

Peter Hawley was still in orbit when Lou Phillips carried Eight Ball to the animal quarters and, in his absence, Marthea closed the adjoining door—and locked it on her side.

So, with religion fancying the introduction by a small animal and greed fancying the possibility of a large tip, one unimportant desk clerk gummed up the plans of important higher-ups in the Extra Terrestrial Service. So by the time the spaceport authorities convinced the religious leaders that *taking off* implied leaving the premises with passengers and cargo, whereas putting an empty spacecraft in parking orbit implied letting a clutch of pilgrims onto Fanvor (where their contributions would be helpful), as well as a small group of deep space aliens (whose payments for services would help the economy), Lou Phillips was saying unpleasant things about closed doors, Marthea Campbell was sound asleep, Eight Ball was curled up in the animal quarters, and Peter Hawley and D'Artagnan were entering the lobby of Hostel LaDanne.

"Your room, Ser. Eleven-Oh-One. But the Terrestrial Canine must be taken to the animal quarters, below."

"Like hell!"

"But it is our law, Ser."

"Look, my Bad room clerk, this Hostel LaDanne is on legally interstellar ground, in which my law is as good as yours. In my world, we do as we please. He stays with me. In fact, since he's just a puppy, if I abandon him overnight, he'll be miserable and probably whine all night."

"Yes, but—"

"But nothing. He's going to the Cluster with me to obtain Understanding and—er—Understanding—may this help our Understanding?" at which point Peter held out a bill.

The desk clerk, expecting a tip from this Lou Phillips for juggling the rooms, now faced with a tip from this Lieutenant Major of the Extra Terrestrial Service (when he expected an argument since the lady and the lieutenant had been reserved side by side from the Service) said, quietly, "Some laws are made to be overlooked, Lieutenant."

Man and dog went into Room 1101.

"Eros" MacDougall had missed his mark.

And so as Peter Hawley and D'Artagnan were shown into Room 1101, four floors below the bedroom chamber of Chief MacDougall's plan for Peter Hawley's bride, the Chief ordered the first of the three-martini lunch, and said, "I'll bet the next drink that if they haven't met by now,

Eight Ball and D'Artagnan are sniffing under the door."

"I'm not going to bet. It'll be six months before we find out, and that's a long time between drinks, guv'nur."

"Shucks, two drinks in six months is hardly excessive."

"Um, at four a year, the only thing excessive is being without."

"Yeah, like calling the Sahara Desert a swimming pool. Mac, how come we just didn't introduce your pair of lovers right here. You know—mutual members of the Service, both going to Scholar's Cluster to train their small animals into Understanding, and so on and so forth, and et cetera?"

MacDougall thought for a moment and then went on: "I don't know about Marthea's attitude, but her experience in the Service has been uncomplicated and unviolent. Conversely, Peter Hawley has spent his active missions in Citadel, on Syrtyr, where if someone says, 'Good morning,' the proper response is, 'What does he mean by that?'' In other words, Marthea might swallow the introduction, but Peter would eyeball the situation and the timing while he eyeballs his travelling companion, and he'd quickly come to the conclusion that the garden path he's been invited to walk along leads to an altar."

"And he's against it?"

"And he will be until he discovers that one-night stands may be fun, but love is better with experience."

"And how about Marthea?"

"Well, now," chuckled MacDougall, "we both know all about women, don't we? She's thirty. Never been married, but I won't add, 'or anything!' Just a guess, but my opinion is that a woman of thirty who has yet to indulge in her first love affair is one of the Chinese Twins: *Too Dumb To* and *No Yen To*. Next, Joel, there has been no evidence that Marthea has any intention of making the Service her life's work. She's excellent, but she lacks that extra drive that would make her a devoted executive.

"So the operation was to put them side by side, stuck in a very strange environment, where the pair of them have a lot in common, and have them meet as if by accident. And have them isolated side by side until they get used to the Noah's Ark Principle."

"You mean they'll Understand one another?"

"Man and woman Understand one another? Oh, hell no! But they'll begin to Understand how come you can't live with 'em and you can't live without 'em."

By comparison, it would be equivalent to two o'clock in the morning.

In Room 1101 of the Hostel LaDanne, on Fanvor, the absolute nighttime silence is barely broken by the deep sleep breathing of Peter Hawley and the slightly higher pitched breath of the dog, D'Artagnan. Hawley is a-sprawl, mostly on his side, with his legs in a comfortable figure four position. D'Artagnan is on his back in the inner part of the figure four, paws curled gently, his head tilted upward at about forty-five degrees altitude.

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Hawley may be dreaming, but whether it is about the blonde on Sol Three—Earth, or foiling the villains of Xanabar, is anybody's guess. D'Artagnan is not chasing a dream-rabbit, for his feet are not running, and the dog is too near the late-puppy stage to be dreaming girl-dogs.

The rap on the door was discreet. Just loud enough so that no one could complain that they'd entered without rapping, and just quiet enough so that it wouldn't awaken an insomniac next door.

Peter, well trained as an active operator for the Extra Terrestrial Service, came awake instantly. He grabbed his robe and slipped it on as left hand rubbed the left eye and the right hand rubbed the right eye. The rap came again as Peter dug in the pocket for the sidearm he always had handy. They opened the door with a master key and snapped on the lights. There were five of them in echelon.

"Wha' goes on here?" asked Peter, mumbling only the first word.

"Lieutenant Major Peter Hawley of the Extra Terrestrial Service?"

"Why the hell bother to ask?" snapped Peter. "Xanabar's so-called Peacekeepers wouldn't be here unless they knew I was here, would they, Bad Farben?"

Farben scowled. In Xanabar he knew his place; he politely addressed his superiors with the title *Ser* and his inferiors with *Bad* and as he rose in rank, *Ser* became *Bad* as he rose above his fellows. But to have this outlander, this Terrestrial, this foreign free agent, to address him as an inferior, was nearly the end. He controlled himself to go on with the ritual: "You are breaking the peace of Xan—er, Fanvor."

"Come on, now. I am not drunk and disorderly. I haven't had time to case the city and open the bank. I didn't drive on the wrong side of the street; and since I was brought here, I didn't run any stoplights. So just what have I done that requires a mid-morning walk-in by the Peacekeepers of Xanabar? Aren't you out of your precinct?"

"In Fanvor," said Farben, "during their religious ceremonies, there is no crime and their keepers of the peace join with the religious celebrants. By treaty, the Peacekeepers of Xanabar come to keep the peace in Fanvor."

"Now ain't that nice and peachy. So I plead guilty of loitering in the parking orbit waiting for spaceport clearance."

"Sarcasm will get you nowhere. We find it unpleasant when we come to ask polite questions and find you holding an Alden Twenty Four."

"Now listen, Bad Farben, when someone raps on my door at two o'clock in the morning, there is the possibility that it might be a love starved lady who wants attention—but it's unlikely. Then when someone uses a master key to open the door, it is quite easy to come to the conclusion that there's dirty work a-foot. This," he said, dropping the sidearm back in the pocket, "was to keep and maintain the peace of Fanvor. You may not

like it, but you are forced to accept the fact that an officer of the law is never off duty and required by Galactic Treaty to observe and protect the laws of far distant planets."

"That's quite a speech," snapped Farben. "But we did not come here because you are carrying a hand weapon."

"No, no," drawled Peter. "You came to ask polite questions—at two o'clock in the morning. So, tell me, what's the pitch?"

"First, are you aware of the sanitary laws of Fanvor?"

"Such as?"

"In the legal language of Fanvor, their laws state that the quartering of the lower animals in the premises of humans is prohibited."

"Uh huh," grunted Peter. "Written back when soap was not known, and when they were just beginning to realize that animals often carry fleas, and that fleas will bite, and that a person bitten by fleas may kick off in a screaming fit and a fever of God-Knows-What since I don't understand their temperature scales. Isn't that about it?"

"It remains their law."

"Where I come from we use soap on humans and animals, and it is the custom to have animals in the house and home. And by Galactic Law, when I rent a hotel room, enter and lock my door, that room becomes a part of my home. You'd like to try this in court? I mean a legal court, not the kangaroo variety."

"I grant that the argument may be sticky on either side," said Farben. "But that's just the beginning."

"So what's new?"

"Suspicion of sodomy."

"*Sodomy*?" yelled Peter. "Goddammit, if there were another person in this room, I might be charged with fornication because this is my year for women. *Sodomy*!"

"Sodomy, Terrestrial, includes sexual intercourse with animals."

"You mean D'Artagnan?"

"If that would be the name of the offended."

"*Offended*?"

"Offended. An inspection of the purser's log says that you are travelling with a male Tellurian Canine Puppy, which means not only sodomy, but intercourse with an animal under the age of consent."

"Good God on a Raft! Now it's statutory rape?"

"The hotel register says that you are Peter Hawley, with the Canine D'Artagnan, in a single room."

"Sure, what was I supposed to do? Get a special room for the pooch?"

"You have broken the peace of Fanvor. Do you admit you registered with this Terrestrial Canine?"

"He's here," snapped Peter. He waved a hand at the bed. D'Artagnan was far enough out of the puppy stage to realize that something was quite wrong, but lacking Understanding he couldn't know what. And he was not yet enough of a dog to stand to defend his master. He did know that what the trouble was could not be resolved by his master by force because it was one

against five, nor by argument because, it seemed, the argument was going to go on until someone changed argument into force. Frightened, he had backed in between the pillows so that all one could see of him was a small puppy face.

"Observe," said Farben to his buddies, "the evidence is as claimed. This Terrestrial Canine occupies the bed of Peter Hawley of the Extra Terrestrial Service. You," he snapped at Peter, "will come with us!"

"The hell you tell! We're here legally. And I am not about to leave D'Artagnan here."

"As you registered, you stated that this immature Canine was in your custody. You claimed him to be a minor citizen of Sol Three—Earth. As a minor, he is considered incapable of making major decisions that require judgment and experience. It is therefore the intention of the Peacekeepers of Xanabar, working in treaty with the planet Fanvor, that this Canine shall be offered the finest in food and shelter—I observe that he requires no clothing although the law provides it if necessary—until the Canine can be returned to Sol Three—Earth, or else placed in the custody of a Terrestrial whose record shows no taint."

"I'll suggest that you leave one of your Peacekeepers here with D'Artagnan until I can get this lumped up mess squared away. I trust I am permitted the customary telephone call?"

"By treaty, you are so permitted. But the call must be made from Headquarters."

"Oh, fine!" snapped Peter. "Do I come as I am, or may I put on some street clothes?"

"Dress. But be quick about it!"

"Quick? I should be quick when you are about to drive three kilometers per hour to give more time before I settle this screw-up?"

"We do not know what three kilometers is, but sarcasm—"

"Three kilometers," said Peter evenly, "is about the length of the tail of the rat that cooked up this gimmick of the rap on the door at two ayem and the charge of sodomy."

Peter swung out of his robe and tossed it on the bed. As it landed, the sidearm slipped out of the pocket and lay exposed. Farben said: "Please observe. As a so-called officer in the Extra Terrestrial Service, he is entitled to carry that weapon. *But to bed?* We can assume that Peter Hawley was aware that he might be apprehended. We may find out whether an officer of the law is on duty when sound asleep."

The remainder of this scenario is simple—but effective. Peter made his telephone call to the ambassadorial suite that handled things for the Terrestrial Alliance. A representative arrived at nine o'clock, and by noon, it was decided that the Peacekeepers of Xanabar had been overzealous in their program of obeying the treaty between Fanvor and Xanabar. The tone was that the Peacekeepers had overdone a good job and, so long as this does not lead to a *Galactic Incident,* it was better to overdo a good job than

to let it lapse from duty.

Accept our sincere apologies.

D'Artagnan? "Ah, Ser Ambassador, in our efforts to provide the best for this immature Canine, we placed him in the care of one of our officials who had only the preliminary semester in Scholar's Cluster. Thus the Canine D'Artagnan will become properly trained."

MacDougall said, "Something got fouled up, Joel."

"How come? I thought we had it fine perfect."

"The best laid plans, y'know. I don't know what went on, it came through double scrambled which not only cuts the permissible text, but also lowers the bandwidth. Peter doesn't mention meeting a woman with a cat. All he says is that Xanabar was playing games in which D'Artagnan was cleverly stolen from him and he wants reinforcements. He signed the message 'Send best regards.' Now, Joel, why should Peter waste bandwidth and time by such an overworded signature?"

"You said the message was double scrambled?"

"Yes."

"That signature is the third scramble. It's been a couple of centuries since the Terrestrials got their separate languages combined into a common tongue. But 'Beauregarde' was a French name or word, meaning something like 'Beautiful Looking' which gets revised to 'Send Beau-Regarde.' Okay?"

"Well, I think Beauregarde can stand one more caper with Hawley. If Peter goes into Scholar's Cluster to find D'Artagnan, he'll need all the help he can get, and Beauregarde is best, right now, for Hawley."

It takes time to fly from Earth to Fanvor, even with MacDougall's police cruiser. Peter groused; he wanted D'Artagnan, and to get D'Artagnan, he had to have Beauregarde. Peter, the man of action, was lousy company during the wait.

It would have been ideal to MacDougall's romantic plan if Lou Phillips hadn't turned up, for Peter and Marthea would have swapped stories and come to a man-woman Understanding with their mutual background, currently blocked by the enemy: the Peacekeepers of Xanabar. But by Fanvorian social custom, Marthea and Lou Phillips were allied, and Peter Hawley could not so much as speak to her alone, and when the three of them were together, Lou Phillips monopolized the conversation and Peter groused in silence.

But everything comes to a close. MacDougall's police cruiser, using diplomatic immunity, landed Beauregarde and politely took off, leaving the dog to be picked up by his master, Peter Hawley and no other.

"Hell!" said the dog. "I'm being handled like registered mail! They put me in the animal quarters."

"Well, now, you just ain't human, y'know."

"All right, so we get onto that argu-

ment? Forget it. What I want is a bath. Can do?"

"I think so. Let's get back to the hotel."

"Any idea where D'Artagnan is?"

"Somewhere in Scholar's Cluster."

"Needle in a haystack," said the dog.

"That's assuming that one searches the haystack without a magnet," chuckled Peter. "Terrestrial Canine, out here, is about as obvious as an outhouse in a snowstorm. Make an official noise loud enough, and we'll hear word."

"And get some action?"

"Hope so. This time I'm not just doing it because it's my job. This time I have a score to even up."

The desk clerk at LaDanne gave Peter the same look as man and dog entered. This time it was quite a bit different. Beauregarde was a full grown dog, with an air that made it obvious that he was *Canis sapiens,* with experience. This was no late puppy. But the clerk said, "He will have to remain in the animal quarters."

"No thanks," replied Beauregarde, displaying a fine set of teeth, as he stood on his hind feet and glared hotly at the clerk.

"But you are an animal."

"Join me, then. So are you. Or are you a robot?"

This clerk's only knowledge of the Terrestrial Canine was when Peter turned up with D'Artagnan. It came as a shock to find that the full grown dog was robustly large, quite sure of himself, and not only had a tongue, but an insulting one at that.

He said, "We have laws—"

"Phooey on your laws. That's how Peter lost D'Artagnan. Any clutch of Peacekeepers who breaks and enters at two o'clock in the ack emma had better be careful."

Beauregarde landed on all fours and looked up at Peter. "Animal quarters like hell! I don't just *hate* prepared dog food; I *abhor* it! I am here, Peter, take me to your larder."

Beauregarde eyed Eight Ball with amusement. "Very large and handsome cat," he said to Marthea. "It is pussy or thomas?"

"She's a pussycat."

Beauregarde rose and walked slowly forward. Eight Ball rose on three and held the fourth at about half-level. Very slowly, Beauregarde gave a gentle sniff at the cat's nose, as near as he could come to what cat fanciers call a "cat kiss." Then he licked Eight Ball behind the ear with a length of wet tongue; the raised forefoot came down but remained poised ready to raise again. Beauregarde folded his forepaws under him and dropped belly flat on the floor, his lower jaw over the back of the cat's neck. He said, gently, "Until you get Understanding, pussycat, we're going to make it the hard way. Then you'll Understand that out here along the spiral arm, we don't have time for civil war. On top of that, it's only by false tradition that dogs and cats fight like dogs and cats. Relax."

Peter said quietly to Lou Phillips,

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"There'll be a howling hell if we try to take them into the dining room. So this is on me—well, that is, on my expense account." He turned to Marthea. "What does Eight Ball prefer? Fish or meat?"

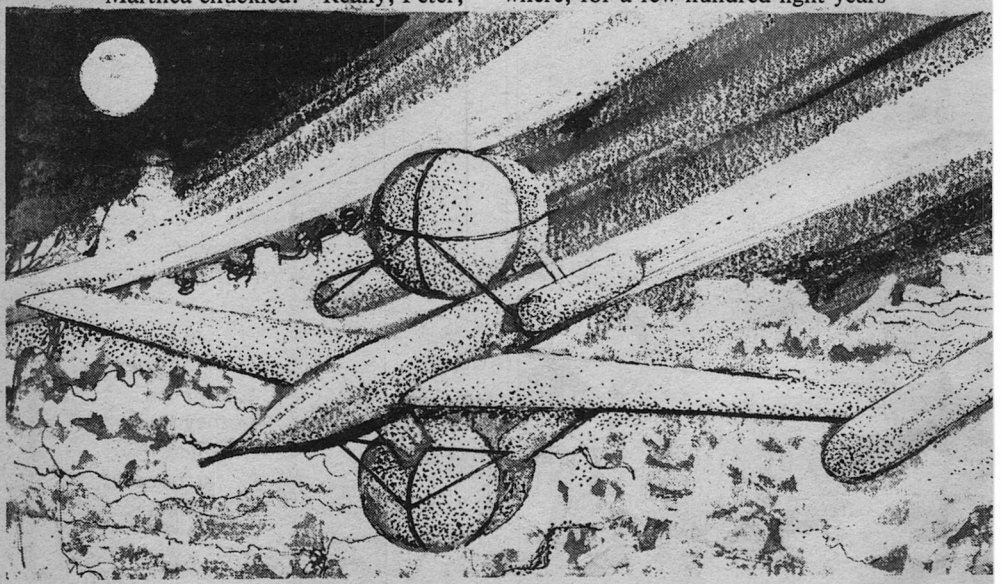
"Meat. For both of us."

Peter picked up the telephone and dialled room service. "Room Eleven-Oh-One," he announced. "Three steak dinners, rare, with the works, including what Fanvor likes best for dessert. Next, two more steaks, raw, just warmed enough so they don't have ice crystals in the middle." (Pause, with the telephone making voice sounds, unintelligible beyond Peter's ear.) "Oh, we are three humans for the dinners, and we have two Terrestrial Carnivores as guests."

Marthea chuckled. "Really, Peter, you made 'Carnivore' sound as if we had two *Tyrannosaurus rexes* as guests."

"Sure," Peter replied, cheerfully. "That's what I had in mind."

Scholar's Cluster cannot be seen from the outer parts of the spiral arm because of murky gas clouds along the arm. But once the clouds have been traversed, the Cluster is a blazing beauty. It is roughly spherical; and as clusters go, the deeper one enters, the closer the stars go. No one has ever been to the center of Scholar's Cluster because the astrophysicists theorize that the radiation that acts as catalyst to the thinking mind is generated where the stars are so close together that their Roche Limits intermingle—where, for a few hundred light-years



in diameter, the individual stars are just intolerantly brilliant radiation centers in a radiant plasma of incandescent nuclear particles in random motion from any sun-center to any other. Since radiation diminishes as the inverse square law, the theorists have concluded that any attempt to approach this center would diminish the safety limit of stay to the point where the crew would become burned out before the ship arrived.

The planet Almada, sufficiently outside the Cluster to receive radiation so small that it could be filtered to protect the individual's mind, was the central point of entry on the side looking outward toward Xanabar, and thence the outside of the spiral arm. From Almada, the visitors were registered, and transported by scholars in their last quarter of their stay as space pilots, to planets picked for their resemblance to the visitor's home.

Scholar's Cluster

Within the Cluster is Neo-Syrtyr, where Farben had taken D'Artagnan for his training, since Farben intended to use D'Artagnan on Syrtyr for his own Canine Operative as Peter had used Beauregarde.

Once arrived, D'Artagnan found his life changed. He did not care for animal quarters, Peter had never put him in one. He did not like exercising in a squirrel cage geared to odometer and angular velocity. He did not like to have people around him that acted as if they were afraid, as if the Terrestrial Canine was a vicious beast with sharp teeth and short temper.

But now, once established, he was given exercise in a yard with rough grass, bushes, and a sidewalk that led to a large wooden door set in a high masonry wall that surrounded the grounds. At night, he slept in a tiny room on a pallet; the place would have been called a 'broom closet' by Peter Hawley. He was there because the whole installation was a training headquarters for the Peacekeepers of Xanabar and designed in that architecture—and since the Peacekeepers had no dogs, they had no animal quarters.

Here it must be pointed out that the 'no dogs' did not mean they had no small animals on Syrtyr; there were small animals a-plenty, but none of the size, intelligence, and trainability of the Terrestrial Canine.

And as time passed on Neo-Syrtyr,

D'Artagnan began to Understand what was wanted of him, although many things bothered him.

For example, his new master, Farben, taught him to walk beside the heel, and at unexpected times, someone else would leap out of the bushes and pretend to attack. The whole business puzzled D'Artagnan until he concluded that this was just a game for his exercise.

It must be a game. The so-called attacker did not exude the smell of anger or violence, but more of the aroma of fear. And while the attacker was dressed in the mufti of the Terrestrial, he was olfactorily Xanabarian and D'Artagnan couldn't be fooled. Second, of course, Farben smelled like Farben, but his smell did not change when the attack began. Farben was not afraid of the attack, nor did he exude violence when he ordered, "Attack!" Nor was Farben mildly surprised when the attack started with the abrupt emergence of the enemy from the bushes.

So it must be a game, and if that's what they wanted until his true master came to collect him, D'Artagnan was willing to play it. And to improve it. He received praise when he first leapt upon the enemy, and more praise when he leapt for the stun gun in the enemy's hand. And still more praise when he learned how to swing his body around the enemy's right hand as fulcrum to hit full weight against the man's chest, overturning him.

D'Artagnan learned how to make whimpers that did not sound as if he were being beaten, and growls that did not mean anger; he was going well into the beginning of that strange process called "Understanding."

Farben and D'Artagnan had been taken from Fanvor by a cruiser of the Peacekeepers of Xanabar who, by treaty, kept the peace on Fanvor during the religious ceremony; just as later Beauregarde was delivered by a cruiser belonging to MacDougall of the Extra Terrestrial Service. But since transporting Peter Hawley, Marthea Campbell, Lou Phillips, Beauregarde, and Eight Ball was hardly police business and since three civilians, one pilot, and two animals would have made life resemble commuting public transportation during the rush hour, they went by passenger spacecraft to Almada in the Cluster.

And when the ceremonies were over and transportation began to resume its habits, Peter Hawley and Lou Phillips were at the ticket desk. Peter to wave his Lieutenant Major's identification if things got sticky, and Lou Phillips to remove stickiness by the addition of oil from his credit balance.

In the double room, opened to a suite during the day, Marthea was watching a holodrama while Beauregarde and Eight Ball were relaxing in the other room. The holodrama ended and a nonstop speaker started to deliver a long-winded essay on Fanvor's religious ceremony. In the silence that followed the click of the on-off switch, Marthea caught on. She stepped to the adjoining door and

asked, "Beauregarde, are you teaching Eight Ball *Understanding*?"

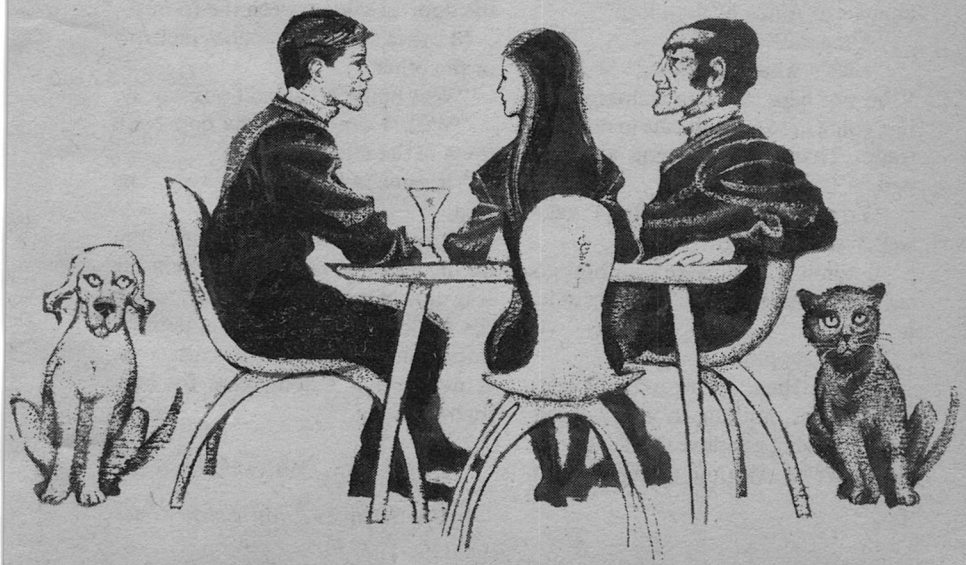
"The beginning."

"But I thought it had to be in the Cluster."

"Just the beginning. Eight Ball has quite a capacity within that small skull, and she's more than eager to communicate as you and Peter communicate with me. You see, Marthea, the dog whimpers, barks, and growls, and the cat hisses, meows, and purrs. The main point is to convert these voices into something that a human with Understanding can translate. It begins with a vocabulary, which is made easier for me since the dog and cat have vocal systems much closer to each other than to the human. Once we can communicate in dog-cat language, we'll go to work on dog-cat-human and have Eight Ball to a fine start when we get to Scholar's Cluster.

"Now," he went on, "I have Understanding full and complete, and therefore I can grasp about half of what the cat is trying to say. Conversely, with Understanding, I can put it so Eight Ball gets the idea. Uh—say that we half communicate. I am teaching the pussycat how to manipulate the tongue, throat, and lips to produce brilliant statements such as: 'I am a Terrestrial Feline. I am a cat. I have a furry hide. I have teeth. I have claws. If you step on my tail, I'll use both of them on your ankle.' These are no more than vocal exercises. We're not trying Shakespeare, whoever he is, nor watching the Decline and Fall of the Roman Empire, although I haven't the foggiest notion where along the spiral arm it was."

Marthea laughed. "The Roman Empire declined and fell on Terra about thirty-five hundred years ago, not in space." She looked down at Eight Ball. "And how is my cat?"



Eight Ball said, "Pur-r-r Pur-r-r Pur-r-r Pur-r-r . . ."

Beauregarde said. "Communication, without Understanding. This is a statement of the cat's comfort, pleasure, and self-satisfaction that a six year old child could Understand."

Beauregarde rubbed his chin across the cat's forehead. "She's got a lot to learn—and there's no better way of it than talking to her and letting her talk back. Human babies learn that way."

Lou Phillips and Peter Hawley came in. "We're off," said Peter, "on the first ship out of here when the clambake is over."

"How did you do that?"

Peter chuckled. "I waved my I-D Card and insisted that the travel agent read my travel orders from the Service. And Lou said, 'I'll bet you a hundred flat Terrestrial or its equivalent in Xanabarian crystal cut, that you can't get tickets for three and two animals to Almada.' Lou lost."

"Almada?"

"That's where we part," he said. "I'm not here for deep training. I'm just going in to self-educate in my own trade. That is, to become a better writer."

"You seem to have done very well," said Marthea.

"I admit it. But there's nothing to say that I mustn't try to be better at it, is there?"

"No, I suppose not."

"Okay, then, we're off. Tickets, reservations, nothing to worry about except waving goodbye to Fanvor. So while we're waiting alongside the launch pad, let's have a nightcap."

"Why not!" said Marthea.

"We'll leave our zoo to take care of things," said Peter. "Take that pair into the bar, and we'd be sued for scaring the customers into sobriety."

Beauregarde said to Eight Ball, "A 'nightcap' means at least one each around. We'll continue our lessons until they return." To Peter, Beauregarde said, "And I'll stay here tonight so you won't be rushing up and down to fetch me to your room."

It was about midnight on Fanvor when Peter left the elevator on the eleventh and Lou Phillips and Marthea went to the twin double. By courtesy, Marthea's room was 'her bedroom' and off limits without an invitation, while Lou's room was considered the 'living room' where they gathered. As they entered, Beauregarde and Eight Ball were sprawled on the door-saddle between the rooms.

Marthea said, "Now, zoo, pick one or the other."

"Why bother?" asked Lou casually.

"Well, I can't close the door with them in the middle of it."

"It's our last night on Fanvor," he said.

"Lou," she said, facing him, "I'm hardly a prude; my virginity went the way of all virginity as it usually does in the freshman year at college, but that doesn't mean that I'm promiscuous. It means that I don't care for one-night stands."

"But—"

"Please, Lou. You've been a pleas-

ant companion, and I can say that I'm proud to know Lou Phillips. If we were back home, where the affair could continue until it either became firm or fell apart, I might invite you in. But this has been a shipboard romance, destined to end with the trip's end. Let's leave it that way, please?"

"Auf wiedersehn—?"

"Meaning?"

"Look it up, Marthea. And, damn it all, good night."

Marthea went in to her room. Eight Ball followed her, and Beauregarde came after and closed the adjoining door with his nose. By the time Marthea was between the sheets, Beauregarde was in a curl between the two doors with Eight Ball comfortably curled between the dog's feet. Marthea chuckled gently. With that pair on guard, no one of the billions of men or near-men along the spiral arm could walk through either door without leaving in a bloody mess. No one? Well, not quite.

She wriggled sensuously between the sheets and then decided to object to herself that the one man who would be thrice welcomed was just four floors below and he of all the billions simply wouldn't think of it.

D'Artagnan took his training with a grain of salt; he knew there was no animosity between Farben and the assailant. The whole process was to bring him to Understanding. What he hadn't realized was that Understanding might possibly include knowing what went on if the attacker pulled the trigger of the stun gun he held. D'Artagnan was shook up when the assailant fired a burst of coned pale light and the tiny whine that went with it. The blast missed, and D'Artagnan accepted it as part of the game. He must attack the 'miscreant' despite the stun gun and win with speed and teeth. He zigged. And then zagged as a second blast came. The firing became more rapid as distance decreased, and the dog finally raced around the 'Terrestrial' in a decreasing spiral, moving just too fast for the 'miscreant' to follow and aim.

"Now try this!" the dog yelped, and made an inward move. But this time he did not aim for the weapon, he aimed for the man's wrist; caught, and only the heavy gloves prevented a nasty wound. D'Artagnan caught the man's sleeve, glove, and wrist where it bent into the hand; the rest of his body swung sidewise in an arc, and hit the other smack across the belly at full speed. Then as the man backed and tried to keep from going over on his spine, D'Artagnan snapped his head back and forward again, snapping the weapon out of the hard held hand. They hit the ground with the dog on top with all four feet in gear and the man with his breath knocked out.

When the smoke cleared away, D'Artagnan was belly down on the man's chest, showing a large set of teeth one tooth-length from the man's bare throat. Dogs whimper, bark, and growl—and they also snarl and snarling is a communication of its very

own. It was not to be mistaken, and especially from one who has complete Understanding.

"Take him off me!" the man cried.

D'Artagnan snarled, "Stay where you are or I'll finish this job!"

Someone took a step. D'Artagnan nipped the throat with the sharp incisors. The man screamed—and fainted. For which we must permit him because it was the first Terrestrial Dog he had ever seen, and that nip on the throat above the Adam's apple felt as if the dog had taken the whole bite.

"Are we finished?" asked D'Artagnan. "Or shall I finish him?"

The Peacekeeper in the Peacekeeper's uniform did not tell his friends to be careful because this was a dangerous animal. He *knew* that the dog was being properly trained to take the word and the order from a Peacekeeper in full uniform to attack a man in the civilian dress of Sol Three—Earth.

Almada.

Just outside the boundary where the Cluster's radiation had fallen below the threshold of catalytic action, Lou Phillips said goodbye but withheld his disappointment.

Lou Phillips was far, far from celibate, but single women seldom travel space and those that do seldom travel space for romance. So by the time he met Marthea Campbell, Lou Phillips was getting pretty horny. But, he had to admit that, from her woman's point of view, she was right. His concern was that now they were no longer a threesome, Marthea and Peter might well make it a twosome, and that might make it difficult to bed her when they met on the way home. Then he shrugged. Marthea was by no means the only girl in the Galaxy; she was just the only one as far as the telescope could see. Like street cars, another would come along in time—and writing is a lonesome business.

Lou found a small, furnished apartment hotel on the outskirts of downtown where eating, drinking, and amusements were within walk. He swung a deal with the manager; he was going to stay for six months to do some writing inside Scholar's Cluster and for a break in the rent, he would right now, pay the whole works.

His half-truths—or perhaps half-lies—convinced everybody that he was what he was: a professional writer who had finally accumulated enough financial background to finish off his last six months allotted to him in the Cluster, and that he was not signed up for training courses since writing is itself on-the-job training.

He even allowed with a smile that he was going to start from scratch with an untouched ream of typewriter paper that he intended to convert into nonfiction—and that when finished, he would grade his own improvement from start to finish.

He set up in the small living room of his apartment and went to work as he always had; that is, rise early in the morning, build coffee and breakfast on a slice of toast or a roll, and hit the keys solid until lunch except for those

moments when natural requirements interfered with his thought processes.

Since Marthea Campbell and Peter Hawley were both members of the Extra Terrestrial Service, it came as no astonishment to find that they were both assigned to the same area on a planet called "Neo-Terra" for obvious reasons. Given the size of Scholar's Cluster, the surveyors could, and did, find planets as close to their home planet as to make the difference immaterial.

The main problem is that Marthea had Eight Ball to train and bring to Understanding, Peter Hawley had Beauregarde, already trained and well experienced in handling his Understanding. The fact that Beauregarde was about his limit in the Cluster did not greatly concern the authorities since the dog had been taken out of retirement for a special reason. Overstaying would not kill him, nor completely ruin his intellect; it would, of course, slow him down to Understanding and instantly catching on as to what was about to go on, but, as he, himself, said, one doesn't have to know the mathematics of ballistics to catch a miscreant by the wrist.

Peter was more than just worried about D'Artagnan, but in a moment of relaxation after a long day with Eight Ball, Marthea pointed out what she thought.

"My guess is," she said, "that someone in Xanabar wanted a Terrestrial Canine for their own, or that someone in authority wanted one to study and possibly develop their own competition in the field operations."

"I suppose," he agreed, sourly. "Thing that bothers me is that they may train D'Artagnan improperly."

"What can they do?" she asked.

"Couldn't they train him to obey the Peacekeepers of Xanabar and order him to attack outlanders?"

"I wonder," she said. "That's the worst case, Peter. The other side might be to train him to obey some big wig with a lot of crystal cut to spend for an exotic pet. But in either case, and the possible cases between, they'll have to bring him to Understanding first. That means two things. First, you brought him here to bring him to Understanding yourself, so that's what they're doing instead of you. Second, with Understanding, D'Artagnan will grasp a lot of what goes on and might very well make up his own mind who he is to have as master."

"I hope you're right."

Their relationship remained sixty-forty platonic. With the customs of Fanvor favoring Marthea and Lou Phillips as a couple and Peter the outsider, Marthea had to face the fact that Lou Phillips was interesting, well informed, generous, travelled, and as a writer he could talk on a large variety of subjects with the tone of authority. On the other hand, she could not discuss anything with Peter Hawley in a twosome, and if the subject of their mutual backgrounds in the Service came up, it would be a two-way conversation with Lou Phillips listening to a conversation in which he had no

interest, and nothing to say.

But when the writer left them at Almada, and they were free of Fanvor's customs when the spacecraft took off, Marthea turned to Peter as a close friend. With an almost invisible invitation that she might consider him as a possible lover if their interests were compatible. If Peter had mirrored her interest in him, MacDougall's Plan would have gained a fine start.

But Peter was concerned about D'Artagnan in the first place, and not about to tackle two operations at once, especially when he placed Marthea in the second of his categories. In Peter's mind, he placed the available, attractive women either as those out for a good time and a roll in the downy and the goodbye-lover kiss when parting time arrives; and the kind of woman that Peter would not date until some day in the distant future when he came to the conclusion that it was time to make it permanent.

So their relationship was sixty-forty instead of the sixty-sixty that is necessary for a hundred percent romance.

Marthea was willing to wait it out, since she was up-to-here busy with Eight Ball. She knew that Peter would find D'Artagnan, and once that was done and gone as a concern, there would be time for better things for him to think about.

At their age and rank, they were eligible for visiting privileges. Marthea saw to it—on the grounds that Beauregarde was a great help in bringing Eight Ball to Understanding—to visit when Peter was not off on one of his hunting trips.

Hunting a dog in a stellar cluster is not as impossible as it sounds except for this circumstance. Generally, passengers and their small animals are carefully logged and one need only ask the computer to determine where they are from takeoff to landing. The problem is that D'Artagnan had not been a passenger on a public spacecraft, but taken in a cruiser with the logo of the Peacekeepers of Xanabar on its license and left Fanvor without logging a flight plan.

Second, the police cruiser did not stop at Almada, but went directly to Neo-Syrtyr, dropped D'Artagnan and Farben off and departed quickly.

Far, far from Scholar's Cluster, MacDougall was realizing part of his success in his latest exercise. It started as soon as he read the doubly-encrypted message from Peter about the separation of D'Artagnan. MacDougall said things not fit to print and then concluded that proper vengeance was to snatch the dog from the dognappers with the whole damned clutch of Peacekeepers watching a trained operative retrieving the animal.

So his first act was to send out an all points bulletin to the Extra Terrestrial Service telling his agents that a slip of crystal cut might bring information as to the whereabouts of one Terrestrial Canine in the hands of Peacekeepers in Scholar's Cluster. (He wanted to

pin Farben's name on it, but thought that pinning the big dome's name might scare the lightweights.)

This, of course, brought in a lot of information, most of it sheer rumor, much of it completely phoney, and some of it carefully contrived to lead the possible searchers off the path.

But then the computer chucked up three pieces that tied together. From three far-separated planets of the Empire came three reports that a Terrestrial Canine had been sighted upon a planet that revolved about a sun; the three reports coincided with the celestial coordinates of the Scholar's Cluster system.

MacDougall punched a button. A secretary came in with a crypto machine and MacDougall dictated one of the most cheerful messages in his recent life to Peter Hawley:

D'Artagnan on Neo-Syrtyr. Meet me Neo-Terra. Police cruiser yours for mission.—McDougall.

"Um," Peter Hawley said to Marthea. "That's going to take some time."

"But it makes sense, doesn't it?"

"Sure. But it takes time, and I want it now!"

"Wait. Now that we know, using a Service cruiser means that you won't be tied to these pick-ups."

"Yeah. So I'm going in there quick and I'm coming out quick, and the cruiser is the quickest way there is."

Lou Phillips was quite pleased with himself. He'd been a couple of months at his writing and he'd completed about three hundred pages of manuscript, taking it slow by writing in the morning and thinking out tomorrow's stint in the afternoon, and relaxing completely on the weekends. (He didn't give a hoot for the local calendar or the time. His watch, like all interstellar timepieces, could be set to divide the diurnal period of the planet into twenty-four hours, seven of which clocked one week.)

This was Monday by his watch, and he did not arise to write, but to review his work. Yes, he was quite pleased with himself.

He discovered that the earlier part of the three hundred was not as clear and concise as the later parts, which were crystal clear and precisely put in strong sentences with an arrow at each period aimed at the enemy he was about to destroy by damning wordage. Pleased. He poured himself a drink and declared himself a holiday.

He considered the work. If this had been the standard Lou Phillips book, he'd have rewritten the earlier parts to bring the whole book to the better standards. But it was not the standard Lou Phillips book.

Instead, it was prima facie evidence that overstaying his Cluster period did not downgrade him, but put him high above his earlier self. Therefore instead of rewriting, he was going to let it stay untouched, with footnotes giving date and time to show how his improvement increased on a slope from his first arrival.

He wrote a note to Sullivan and Crossley explaining what was going

on and his plans, put the carbon copy in an envelope with the note, and shipped it back to Sol Three—Earth.

"The problem," said Peter, "is tactics. It's going to take some slippery work completely surrounded by a bulwark of lies to get Beauregarde and Peter Hawley *onto* Neo-Syrtyr, let alone allowing this well-known secret operative enough freedom to penetrate the planet long enough to find out where their training headquarters is located."

"And then," added Marthea, "you've got to break and enter one of their strongholds, locate D'Artagnan, and get out whole."

"Yup! But we do have a few things on our side. The Terrestrial Canine sees with his nose. That puts me on the leading edge. The good old Doc impressed the pooch in my favor; all I have to do is to smell like Peter Hawley, speak like Peter Hawley, and act like Peter Hawley, and the Peacekeepers of Xanabar will have two dogs to fight."

"Makes sense. So what have you in mind?"

"First, the Peacekeepers of Xanabar are given special memory training to identify the Extra Terrestrial Service operatives, and I've been quite busy on Syrtyr. Put me in disguise, and the first Peacekeeper I ran into would ask, 'Peter Hawley, why are you in disguise?' So I can't travel publicly. On the other hand, it's been difficult to locate D'Artagnan because they transported him via one of their official cruisers."

"I think,'" said Marthea, "you can use some company."

"Now, see here—"

"Peter, don't be medieval! I'm not going to carry a sword, nor try to crack the line. I'll tackle combat if it's forced upon me; I've been well trained by the Service. What I mean is that Eight Ball might come in very handy if we put a bit of makeup on her."

"Makeup?"

"Sure. Black out that big white spot and my pussycat can go prowling on any dark night."

"Um. Come to think of it, you are more than right. An unseen Terrestrial Feline with a lot of curiosity should be in fine shape. And what I said a bit ago about Peter Hawley being conspicuous in Xanabar also goes for the Terrestrial Canine—and Beauregarde can, and will, go in with me when the action starts, but prowling the joint for information would give the show away. They are by no means stupid. If one of them so much as sees a dog on the street, the word will go out that the secret has been dropped, and they'll haul D'Artagnan out of there so fast it'll make your head spin. And then we'll be right back where we were on square one."

Peter had been impatient all the time he'd been searching for D'Artagnan without success. Now that he knew where to look, he became itchy. He wanted to get going, raise hell, slam some Peacekeepers flat, and collect D'Artagnan in full view in broad

daylight and roar out into freedom with the cannons roaring and the Singing Sword carving a swath through the unrighteous.

On the distaff side, Marthea took the waiting in stride. The end was in sight. There would be some excitement, but now was the time to prepare for the calm after the storm. She baited her trap wisely; knowing that Peter at the present state of his excitement and his inability to do anything useful until MacDougall's police cruiser arrives, would view the unbuttoned top two on her tunic as relief from the summer on Neo-Terra, that the swinging hoops of her earrings were relief from the sterility of official uniform, and that the moist lips were a matter of health instead of being target for tonight.

But it takes weeks to fly a cruiser from Earth to Neo-Terra. And Marthea knew the law of diminishing returns. As the days grew on into weeks, she became just a bit more provocative each evening than the day before; but just enough so that only a daily tally by a professional boulevardier could note the change.

And no one, not even the overeager Peter Hawley, can maintain a sense of utter-urgence on the top plane without change. He observed the casual dress at visiting period, he enjoyed her vivaciousness. He petted the dog and tickled the cat, and Marthea saw to it that while they hadn't split a no-wed ring, the other singles had damned well keep their hands off.

Beauregarde was playing with Eight Ball by putting out a foot and seeing if he could retract the paw before the cat could catch it in a sudden swing.

Marthea was not showing the white of her upper breasts through the unbuttoned top of her tunic—she was displaying the upper roundness of her endowment and the cleavage, slightly emphasized with makeup, and the inexpensive but interesting frauland of Celira that glowed gently with its own color in the darkness of the cleavage. Her skirt was slitted precisely enough to display the contour at the top of her stockings. The cut of her dress emphasized the slender waist and the rounded hip, and as she leaned forward to put Peter's glass on the tabletop, only a blind man would not make a quick peek or a dazed stare.

Except Peter, who only growled, "Damn it, the Chief was supposed to come in his official cruiser, and I know the Chief. He's picked Lieutenant Haynes, who'd never let an asteroid grow between his tailfins, and I'll bet the Chief told Haynes to waste no time. The Chief should have been here three weeks ago, damn it!"

"He isn't, Peter. Until he is, you'd better relax and try to enjoy it because there's nothing else you can do."

Beauregarde woofed slightly as Eight Ball caught his paw.

"Ease up, Peter," said the dog after he licked the slight scratch with a long tongue. "We'll have action sooner or later."

Eight Ball put out front paws and stretched. "Can't stand that gunch you humans drink," said the cat, "so

I won't join you but I'll make the toast: To Action!"

"Yeah," said Beauregarde, "To Action!"

Marthea touched the rim of her glass to Peter's. "To Action!"

"When and if it comes," growled Peter. He tossed off half of his drink, and said, slightly throatily, "Woosh! Who are you trying to embalm, anyway?"

"You," laughed Marthea. "To get you out of that mood, Peter."

"Okay." He tossed off the other half. His *Woosh!* was less throaty. "Y'know, Marthea, it was that first one that took the lining. Now that the lining is gone, it doesn't hurt. Er—try me again?"

"Sure," she said. "Why not."

Peter tried his second with less haste. "It also tastes better when you toss it down slowly. Hey! We forgot the toast.

"All right. Now we'll have one for MacDougall," grumbled Peter. "And if he beats on this door tonight, you tell him it's all his fault. S'warm in here."

"Take off your jacket," she told him. "No sense being all bundled up in a uniform jacket."

"Okay. Mind if I open my shirt?"

"Why not?"

"Okay. Now, this one's for Beauregarde."

"Then one for D'Artagnan."

"Yep," said Peter in a slightly soggy voice. "And then one for the lovely lady who is trying to poison me. Lady Lucretia."

Beauregarde looked up. "Marthea, Peter can handle his liquor fairly well, but you've hit him hard with that stuff. Take it easy, will you?"

"Shushhh, Beau-garde. I'm all right."

"Yeah," replied the dog. "I'm big enough to haul you to your quarters, Peter, but it would look strange to have Lieutenant Major Peter Hawley taken home on hands and knees by a sober Beauregarde."

"Oh," said Marthea, "if it gets that bad, I'll roll him up on the sofa. You and Eight Ball can play chaperone."

A half an hour later, Marthea said to the dog: "It didn't occur to me, Beau, but I don't think Peter will fit that sofa."

"Not until he's folded up."

"Okay. So I'll fold him on the bed and roll up on the sofa myself. Come on, Peter, I think you might better lie down for a moment."

"Oah, I'mm a'right."

"Come on, for a moment. Until that last ounce wears off."

Peter staggered slightly, but made it to the bedroom without breaking furniture. Marthea led him by one arm.

She did not return.

Beauregarde looked at Eight Ball. "Pussycat, can you go 'Woof!' in a ladylike fashion?"

"No. Can you sit on the fence and catcall?"

"No. So you take that end of the sofa and I'll take this."

It was the equivalent of Terrestrial four o'clock in the morning when the

cruiser came down on flaming jets, its tachyon drive off and stowed. Spaceyard hands took over and MacDougall entered the official land cruiser awaiting him. At the dormitory, he asked, "Peter Hawley?"

"Um—sir—em—ah—sir. Er, Lieutenant Major Peter Hawley entered the ladies quarters at visiting time, but—er—hasn't come out yet. I should have—that is— sir—?"

MacDougall chuckled. "I'm the guy who gave the order, sentry. It may be out of order, but it's best for the Service."

"This is the first time."

"Good Lord! Well, now. Give 'em plenty of time. And if—or when, Peter Hawley starts to crawl out of that door trying to make it look as if no one saw him, you and your next shift look anywhere else. Got it?"

Peter woke up, and knew in this late middle of the night that he was not in his own room in his own officer's apartment. It was just before breaking dawn; just enough skylight to outline Marthea, asleep close beside him. He got an elbow under him and lifted, then looked down as his movement disturbed her. She looked up at him. And smiled.

"Good God!" he said in a whisper. "It's nearly dawn."

"So what?"

"So how the hell am I going to slip out of here without being seen?"

"I doubt you can," she giggled.

"But goddam it, I can't hide here until nightfall!"

"No, you can't."

"But what am I going to do?"

"Relax," she said, "and enjoy it. So Peter Hawley, an officer and a gentleman, spent the night with Marthea Campbell, an officer and a lady, in Women's Officer Quarters. You'll get six gigs officially and a handfull of raised eyebrows from those who wished they had your nerve—"

"Booze, you fed me."

"And it will remain six gigs if you sneak out now or wait until sensible folks get up and start the day. Once more before my beauty slumber," she said heavily. She put an arm about his neck and pulled him down.

Against her lips, he said, "I'll see if I can make arrangements in the Coupled Officers' Quarters."

Against his lips, she mumbled, "Six gigs, raised eyebrows, and an official order to remove to COQ—or else!"

"Damn MacDougall."

"Damn?" she chuckled. "Peter, I hoped I was good enough in bed to change it from 'Damn' to 'Dear bless his heart, the conniving bastard.'"

"You think we've been connived?"

"I don't honestly know, but I wouldn't put it past MacDougall. And whether this is connived or natural, let's make the best of it until we have to go out and explain to a very suspicious sentry that this is all in youthful innocence."

"Wearing red faces?"

"Wearing very red, happily-had faces."

His name and his rank are not

recorded, but one fine day he will rise to a high rank for his ability to handle an awkward situation. He did not stare at the cloud on his upper left, nor at his right toe. He saluted. "Good morning, sir and madame. For your personal information, Chief MacDougall arrived late last night and asked for you, Lieutenant Major Hawley. The sentry on duty could hardly give a plausible explanation without lying outrageously. He simply reported to the Chief that you, sir, visited Ms. Campbell properly during visiting hours, but did not return." The sentry's eyes twinkled but his face remained straight. "The sentry went on to explain that this was your first offense, and the Chief said tell them: 'When they become aware that the Galaxy awaits them outside their bedroom door, they are both to meet me in Suite Nine-Zero-Three.' That is all, sir and madame."

"Thank you," said Peter, and to Marthea, he went on as they walked toward Headquarters: "We've been connived!"

"How come we didn't do some earlier conniving ourselves?"

"I thought you were Lou Phillips's girl."

"The Tallahassans thought I was and did their best to get us into the hay together. But Lou Phillips is going to spend the rest of his life in one-night stands as he always has, and I'm at the age when I prefer to talk about another subject over breakfast."

"I was afraid of that."

"You object to a bit of permanence, Peter?"

"Not really. But I did have the idea it would come later."

"Men," she chuckled, "have that idea until some woman finds one she wants and puts man-traps along the garden path. Now, let's not disappoint the Chief. Let's act as though we were the first humans to discover sex and that we're going to keep it a secret because it's too damned good for the common folks."

"All right. Have my arm and hold it as if this union had been doubly blessed by the Tallahassan's religion. Close by, Beau; Blackie."

Chief MacDougall looked up from the report on his desk, and examined them from left to right. Beauregarde close by Marthea's calf, Eight Ball rubbing her ribs on Peter's ankle. "Um," said the Chief cheerfully. "And how are the newly-unweds this morning? I'm sorry about breaking in on your unwed honeymoon, but you can have extra time when you've collected D'Artagnan and I've reached Lou Phillips."

"Phillips?"

"It's a long story. Xanabar ran the traveller's log through the I-D computer and discovered that Phillips is an overstay. The word came back to me and I contacted Sullivan, the publisher, who admitted that Phillips was going to write the exposé of Scholar's Cluster on the spot."

"Is Phillips right?"

"That overstay is a gimmick to keep some ambitious character from becoming a Galactic Alexander who is

looking for another spiral arm to conquer? I don't know. All I know is that when Earth discovered the Tachyon drive and headed for interstellar space, Scholar's Cluster was long established and the time allotment rule had been developed by empirical observations some few Terrestrial centuries ago."

"And—Lou Phillips?"

"If his idea is wrong, we'll take back a slob. If his idea is right, it's likely to be 'Giddy-yap Napoleon, it looks like rain!' And it may be in the middle, with Lou Phillips, having reached his intellectual plateau and staying right where he was, and is." MacDougall fished in his pocket and brought out a felt-covered box as he went on. "We'll find out about Phillips. But now one more little ceremony." MacDougall flipped the lid. Inside was the customary pair of unwed rings, the single heart cut intricately in two to fit precisely together, with P-H on her ring and M-C on his.

"We've been connived," said Marthea as he slipped her ring on her left-hand third.

"We've been shotgunned," said Peter, receiving his.

"Traditionally, you should kiss," chuckled MacDougall.

"Traditionally, I find this boring," said Beauregarde.

"Traditionally," said Eight Ball, "I find the cat-wail of the thomas much more musical than the twang of the bed spring."

"Traditionally," said Peter, "I'm about to leave these traditions stand by and wait until, traditionally, the night and the moon, and the environment are—"

"Peter, shut up!"

"Yes, m'dear. Now," he said to the Chief, "what goes next?"

"You and your sapient zoo collect D'Artagnan, and I'll take a standard flight back to Almada for you. Then I'll take Beauregarde back to Earth for his retirement and you, Marthea, Eight Ball, and D'Artagnan will take up your assignments on Syrtyr."

They hit a large lake without incident and dropped beneath the surface. Once stable, Peter said, "Well, let's get going."

"Just how do we get ashore?" inquired Eight Ball. "I'm a black cat and black cats don't like water."

"If we bleach you?" asked Peter, fishing among the stores of the small spacer.

"Then I'll be a white cat, and white cats don't like water either."

"I'm told cats can swim," said Peter, pulling out a government crate that had DINGY, INFLATABLE, CAPACITY 2.

"Cats can swim," said Eight Ball, "but only when we're faced with the grim alternative."

"So I'll make the supreme sacrifice since I'm the one who can do it. I'm going to lift the port above water and launch you three. Then I'm going to set her down on the bottom and use the escape port."

Peter peeled down to his shorts and put his clothes in the dingy—with a

beach towel, aside. He added the two bags already packed.

"Once more for a read through," said Peter. "We are going to register as unweds, lovers from Xanabar, here to complete our final training together since it will give us greater Understanding of one another. You two will hide by day and prowl the streets by night, finding the spoor of Terrestrial Canine, of which there was only one until Beau arrived—and if you wanted to, you couldn't help leaving the spoor of Terrestrial Canine and Feline which, happily, only D'Artagnan, on Neo-Syrtyr will detect."

NeoCitadel was like Citadel; a city. But not like Citadel if one means that the two were laid out the same map-to-map by any means. Unlike Citadel, this city had been planned for what it was: the city where the Syrtyrian went for training.

Therefore the on-the-job training for the upcoming Peacekeepers of Xanabar is to police Neo-Syrtyr.

And so Eight Ball prowled the back streets with nose and ears alert, frequently pacing walls and wires with feline balance. Beauregarde paced below or beside the cat.

In service in Syrtyr, Beauregarde did not have his nails trimmed although pacing the pavement kept them from outgrowing. The idea was that Peter and Beauregarde were about as secret operatives as their appearance could give them: Zilch! In other words, is the advertised police force advertised to warn the criminal that there is a police force; or is the unmarked police force there to apprehend the criminal after the offense? The question has no final answer.

Then upon one of their prowls, Eight Ball said in a low-voiced hiss, "Got it, Beau?"

"Sure," said the dog. "I kept telling you that dogs don't prowl on high fences. I'm right down here where someone—uh, huh, believe me, managed to make the mistake of walking in dogshit."

"So what now?"

"We follow the trail."

The trail ended going under a large wooden ornate door set in a high brick wall. Eight Ball said, "I can get to the top of that—but should I?"

"Let's case the outside all around," said Beauregarde. "Then we'll go back for the troops."

The wall was a large rectangular enclosure. The ornate door was obviously the main entrance: the back of the enclosure was a building several stories tall and the windows on the street side were lightly barred, and in the center of the building's backside was another door, obviously for deliveries, trash removal, and the like—and sentry's post-shelter beside.

"Let's go," said Beauregarde, and the two of them then returned to Peter and Marthea.

"Do we go in?" asked Beauregarde.

"Not tonight," said Peter. "We'll wait until that silly moon and the glow of Scholar's Cluster are lined up on

the other side of Neo-Syrtyr when it's midnight here. Less light the better."

Sullivan and Crossley smiled affably at the younger man between them. "You've got the pitch?" asked the publisher.

"Yes, Mr. Sullivan, I've got the pitch, all right, but I don't know why." He pointed at the manuscript. "Just what was Mr. Phillips hoping to do? Oh, yes, I know; but he isn't going to do it this way. He starts out as he always has, with sharp, declarative sentences, with the literary dagger at the end of each line aimed at whatever he was exposing. Then as it reads on, Phillips's wit runs down, he gets sloppy, he begins to lose his punch—but as this becomes evident to the average, intelligent reader, he inserts a footnote pointing out that his overstay in Scholar's Cluster has increased his writing perception to the point that he now considers the earlier stuff unclear, difficult to understand, complex in composition, and so on. And that if it weren't for his purpose to display what really goes on in an overstay, he'd feel forced to rewrite it completely for the benefit of the reader. You see, sir, I don't understand how come he feels that the later stuff is superior to the older stuff, when in fact it is on its way to hell."

"Johnny, if you were on an escalator going down, the step you were standing on will be going down with you. And as you look up the steps, you'll realize that some moments past, you were at a higher level than you are now. In other words, Lou Phillips's writing decays as his intelligence decayed, which is quite logical since one rules the other. But now he cannot understand what he did last month, but he condemns it for being too complicated, mushy, et cetera instead of realizing that he is in the process of change from a brilliant linguist to someone who can't put a sentence together."

"I get it. But look, sir. By halfway, the book is unreadable. And you want me to annotate it? Surely, you're not going to publish it, are you?"

"I am," smiled Sullivan, "which is why I am the publisher. Phillips went to Scholar's Cluster to write an exposé of the Cluster, intending to reveal what really goes on in an overstay. Well, now, there are two ways of solving the insolvable. One way is to find a way to solve it, and the other way is to find a proof that it cannot be solved. Either case is valuable. They're still trying to untangle Fermat's Last Problem, but no one so far has either solved it, nor has anyone come up with a proof that there can be no solution. So you annotate this as we've discussed, and it will be printed as concrete evidence of what an overstay does to the human mind."

He turned to Crossley. "It'll sell enough to send someone out to bring Phillips back despite his wishes. But we'll have to do it as an advance against royalties, like right now, because as he overstays and overstays, he'll become more and more degraded until he's incontinent."

"And what would happen then?"

"Frankly, I don't know, but I can guess, having read the book as evidence of his downfall. He'll consider it quite acceptable that a man in his position dirties his bed every night because he's too busy planning his next book to bother getting up in the middle of the night to go to the john."

Astronomically, the glow of Scholar's Cluster, and the pint-sized moon of Neo-Syrtyr were aligned on the far side, and it was midnight in the city.

"Tonight," Peter Hawley said. "Foot, horse, and marines."

"Just a darned moment," said Marthea. "I'm going to be properly dressed for the occasion."

He checked his Alden Twenty Four and said, "I'm properly dressed."

"Good Lord, Peter, you're dressed for a wild evening on the town."

"Look, Doll, I could put on the largest false moustache in the spiral arm, and the first Peacekeeper who met me face to face would say, 'Why, Lieutenant Major Hawley, what *are* you doing here on Neo-Syrtyr?' I'm going to make a fuss and I might as well make it a big one."

"So I'll be the sly one," said Marthea, heading for the bedroom. She returned minutes later in a skin-tight body suit of nonreflecting black, suede soled slippers, black gloves, and a black skull cap that covered her hair. In one hand she carried a small make-up box and in the other hand—

"What the hell is that?"

"A belt of throwing knives," she said, putting down the box and slipping into the belt.

"Ah, the delicate, loving, gentlewoman who loves peace and quiet so much that she keeps everything peaceful and quiet-ful by slipping the enemy a sticker in the ribs."

"In the belly, Peter, where there aren't any ribs to deflect the knife."

Silently, they slipped down the fire escape and went along the alleys through the city, arriving at the Peacekeeper's Training Headquarters at the back door. There was no whispering; each of them knew what had to be done, and one of the first things to be done was silence until things started to crack.

Peter and Beauregarde retreated a block, turned into the street, and made their way along the sidewalk as if they had every right to be walking along the sidewalk at approximately one o'clock in the morning.

It was not the front sentry's job to accost everyone on the street in the middle of the night, but he had been most thoroughly warned that a tall, slender but muscular male accompanied by a four-footed animal, prowling the streets at night near Headquarters most likely meant trouble. On the other hand, normal, ordinary citizens who are minding their own legal business take a very dim view of being stopped and asked questions over-flavored with suspicion. It might gloss over any possible trouble if he kept his mouth shut.

He was wrong. Peter walked to the sentry, stopped a foot from his face,

and said, with authority, "Open up!"

"Who wishes to enter the Training Headquarters of the Peacekeepers of Xanabar?"

Peter said, "That voice will sound better later in life."

"He's past puberty," said Beauregarde. "I think that high pitch is effeminacy."

"You may not insult—"

"Oh, shut the hell up and open that door."

"And what is your pleasure?"

"We have come to recover some very valuable stolen property."

"There is no stolen property on Neo-Syrtyr."

"Malarkey," said Beauregarde. "My nose tells me that a Terrestrial Canine, named D'Artagnan, has walked along this path recently."

"If this be true, it is—"

"—Prima facie evidence that the Peacekeepers of Xanabar are not above breaking their own law for their own benefit. D'Artagnan was dognapped from me on Fanvor by Bad Farben—"

"Ser Farben may not be impugned!"

"He may be Ser to you, but he's Bad to me. I'm not impugning him, I'm flatly accusing him. And I'll break his goddam neck when I catch him."

"Peacekeeper," said Beauregarde, "your hand looks nervous. It is trying to decide whether to grab for that stunner on your hip or the buzzer on your belt-squawker. You mustn't be nervous, or you'll end up in the emergency ward with a puzzled medico reading books on how to treat the hand slashed by the angry Terrestrial Canine."

"Let him reach, Beau. We've got him outnumbered and my sense of justice tells me that one shouldn't go shooting mice with battlecraft killers." Peter eyed the young Peacekeeper. "Go on," he said, "reach for the buzzer. If you reach for that stunner, make your draw, because I'll have enough time to freeze your arm after you've made your pitch."

"You may not threaten—"

"You sound loud and clear, but as a Terrestrial Playwright once said, 'It is full of sound and fury, signifying nothing.' You've a lot to learn, kiddo!"

The Peacekeeper's hand moved forward and Beauregarde growled. The hand stopped, then moved backward. Beauregarde visibly relaxed. The hand moved toward the belt-talkie until the finger touched the button coded for a call for reinforcements.

Beauregarde said, "A couple of years ago, you'd have swiped one of their Peacekeeper's Runabouts, and gone up that sidewalk, up the stairs, into the door window and let them worry about the flying glass."

"Yeah, Beau, and you'd have mangled his arm into shreds at the first reach. 'Wisdom,' someone said, 'is just applied caution.'"

"Or old age."

In the back of the building, Eight Ball felt the twitch of Marthea's hand

as the alarm bell in the sentry's box tinkled gently. With no hesitation, the sentry took off at a gallop toward the front gate. He was out of sight around the corner, but the noise of his passage still went on as Marthea took the tiny sheath of little picks and went to work on the lock. This was no genius-killer. On the other hand, it would be hyperbole to suggest that the lock was picked as quickly as it could have been opened with the key.

Nor would it have been logical to suggest that the door would be without an alarm.

It rang in two places. One, where it should, but where the master of the guard was sound asleep because the master of the guard knew that it rang second, in the apartment on the top floor of the Headquarters Building where Farben had his temporary quarters. Now, Farben may be the villain of *this* account, but to the Peacekeepers of Xanabar, he was only second in command to their hero, Lobrand.

Farben had had trouble enough with Peter Hawley and Beauregarde, and he was concerned about the woman operative, Marthea Campbell, and her feline Eight Ball, who, by misguided myth, could slink through a hole smaller than the cat's skull.

And so when the tinkle of the tiny auxiliary alarm bell rang next to Farben's bed, his awakening and his analysis of what was going on came simultaneously.

Farben robed, found his stunner, and looked out over the courtyard, down from high above onto the wooden door. He opened the double doors over the balcony and heard Ser Hawley, whom he'd been hoping to make it Bad Hawley for a decade, say, bluntly, "Now we're even-steven, Peter Hawley and Beauregarde, facing two frightened Peacekeepers."

"Student Peacekeepers, you mean," said Beauregarde.

"You may not—"

"Oh, shut the hell up," snapped Peter. "Must you mouth that gibberish when your life and your limbs are in danger? We're going in there, and Beauregarde's nose will lead us to D'Artagnan, and then we're coming out. All of us."

The elder of the two said, "You have broken the peace of Xanabar, and you have unjustly accused us of felony. It would be far more proper if you were to bring these charges into the Courts of Xanabar and have them investigated properly."

"Big deal," said Peter sourly. "And by morning, you'd have D'Artagnan halfway across the Cluster. Better idea than yours, let us in, watch Beauregarde nose out D'Artagnan, and let us out—and you can return to your unguarded post in the rear."

"Hardly unguarded," replied the more recent arrival. He swung a key on a chain. "With this I can come and go as I find it necessary; without it, no one touches a door in the Headquarters Building without ringing an alarm in the guards' quarters."

On the balcony, Farben hesitated. He was quite aware that Peter Hawley and Beauregarde were much more

than a match for two student Peacekeepers, but a major part of their training was to face odds such as this. They'd lose this encounter but in losing they'd realize the strength of their enemies. Then from the balcony, Farben could ambush the victorious man and dog with a single sweep of the weapon, even though the charge of the battery cartridge would drop to zero-zero in the matter of milliseconds. Farben knew that it had to be a single blast; he could not eject the spent battery cartridge and lever a fresh one from the magazine in the time it would take Peter Hawley to take action.

In other words, Peter Hawley's plan was working nicely. Create a fuss at the big front door to attract attention while Marthea and Eight Ball were quietly picking their way in through the back. And the very fact that Farben heard the voice of his enemy at the front door forced the Xanabarian Peacekeeper to ignore or diminish the warning caused by the little alarm bell. That was Farben's second mistake. His first mistake was to conclude that Hawley and Beauregarde were going it alone.

In the downstairs hallway, Eight Ball said, "Now what?"

"Locate D'Artagnan, you've got the nose and the ears for it, and they've always said that cats can see in the dark. I'm going to see what Peter and Beau are up to. You locate D'Artagnan but don't take any action until we all meet here."

Farben, on the balcony, did not hear the tiny alarm beside his bed when Marthea slowly and cautiously opened the front door to let herself out. In her skin-tight black body suit, she was unseen as well as she slunk along in the darkness. But as she reached the big wooden door, Marthea made her own mistake.

She forgot that wood, of the kind the door was made of, is light, and there was just enough illumination in the courtyard for Farben to detect her silhouette on the lighter background. And Farben instantly placed the silhouette as a woman and promptly identified her as Marthea Campbell.

With two of the Extra Terrestrial Service on the premises, plus Beauregarde who was a dangerous menace, and most likely Eight Ball whose prowess in unarmed combat was not known but considered dangerous, there existed the possibility that they'd locate D'Artagnan. That would give the enemy two Terrestrial Canines (although Farben believed that his training of D'Artagnan in the Cluster might well diminish the dog's loyalties to the Extra Terrestrial Service).

The time for action had come, and Farben was going to start it, for once. He pulled the stunner from his robe pocket and brought it to bear. But Farben had been desk bound for some time and he made the common error of triggering the stunner before it came to dead aim. It made its brief, high-pitched hiss, and the aiming flare cast a long, long conical shadow as the weapon swept upward.

It caught Marthea from the shoes

and upward to the waistline before the cartridge was discharged. She fell in a slump; everything below the waist was tingling with that well-known feeling of 'being asleep' plus the agony of unbearable cramps in all of the muscles below the waist. What the stun gun did not do, pain and agony did. Marthea passed out, cold.

And as the stun gun flared in the upward part of its sweep, the ray passed through the wooden door to catch the two Peacekeepers in the feet and upward into the thighs; they'd been standing with their backs against the door because their training told them that as the Terrestrial argued, the Canine would meander behind them to attack from the rear. They went down, unable to stand erect with everything below the hips gone dead.

From Farben's balcony, looking down, there was a substantial angle at the door. Peter and Beauregarde stood back from the two Peacekeepers by enough so that the beam of the stun gun passed through Marthea at the waist, hit the Peacekeepers below the hip, and struck the ground at Peter's feet. It did hit Beauregarde on the forepaws and the end of the nose.

"Someone's playing rough," said Peter.

"If I could only walk on my hind feet," said Beauregarde, with some difficulty because the end of the dog's nose was numb, "I'd show someone how to play rough. Do we go in?"

"Yes, but wait a minute, Beau. Something's up."

"What, for instance?"

"That stun ray wasn't meant for us. Oh, we were heard, all right, but not seen. It came down from an angle high in the building since it hit these Peacekeepers below the hip and you on the forepaws; that marks the edge of the beam. My guess is that it was aimed at someone on the other side of that door, and it is also my educated guess that the target was Marthea."

"Well?"

"Nothing would please the Peacekeepers of Xanabar more than to apprehend an operative of the Extra Terrestrial Service prowling around their Training Headquarters. That means that someone will be coming out to investigate the situation."

"And we'll take 'em?"

"Only if the investigator pokes his head out of that door."

"But look, Peter—"

"We came for D'Artagnan," said Peter quietly. "And we'll leave with him. And Marthea. But if she's stunned, she's a problem in transportation instead of being an asset in recovering a dognapped pooch."

"How long do you think?"

"Marthea is hardly the slip of a girl," said Peter. "She's a substantial, healthy woman that measures up in height and weight according to the standards for the Service. That means two things, both favorable. First, the effect of a stunner depends on the size of the victim, and second, being sound, healthy, and quite able to handle Service exercises, she'll come out of it sooner. Say half an hour to three-quarters."

"And so we wait?" Beauregarde sniffed. "My nose is coming back," he reported.

"How's the feet?"

"I think I could hobble along, but don't make me run."

"Let me rub 'em a bit," said Peter.

Unfortunately for Xanabar, Varne Farben had been guiding a large desk too long, and fortunately for Sol Three—Earth, he was out of hand with the stunner, and he'd been too long without parlor games such as geometry and trigonometry. So when he fired the stunner and saw Marthea drop leaden in her tracks, and he heard the argument outside the door stop abruptly, he assumed the beam had passed through the wooden door, stunning those on the outside.

Farben now raced to complete the first third of his personal mission, to display Peter Hawley, Marthea Campbell, and Beauregarde, in stun, in trespass on Xanabarian soil, and in his sole custody without aid.

Not only would this bring a promotion, but it might very well put him in the social position where he could address Zal Lobrand without the "Ser" that admitted his inferiority.

He made his way along the walk keeping a sharp eye upon the woman, and quite ready to let her have another battery full of stun ray if she made a move. He was in a hurry; he wanted to do this without aid, and to waste time might have someone coming to help, at which point he'd be faced with sharing the credit.

Outside the gate, Beauregarde put his nose to Peter's ear, and mumbled with partly paralyzed lips, "Steps!"

Peter drew his Alden Twenty Four, checked the chamber and the magazine, and set the intensity to medium. "You gentlemen are about to have a nice snooze because we don't want you a-howling. I'd suggest that you lie in comfortable positions as I apply the anaesthesia."

Both Peacekeepers opened their mouths and drew in deep breaths. Peter triggered the Alden and swept it sidewise, hitting both Peacemakers across the top of the chest, the throat, and the face, silencing them for quite the time being. Peter then ejected the spent cartridge, mumbled, "She's a twenty-three—" and levered a new charge into the chamber.

Marthea, was still slumped unconscious. Farben came close quietly and cautiously, touched her and found her helpless, and assumed that he had done a good job in stunning her completely. He had, he assumed, plenty of time if he made each move fast, and it took several moves because Farben was not about to carry more than one load each trip. This was the first.

He wasted no time. He slung Marthea over his shoulder in the fireman's carry and grunted at her weight. He made it to the building and into the elevator, plugged the button, and cursed the lack of any place to set the unconscious woman down. In his apartment, he heaved tired shoulders and Marthea went backward, as limp as a rag doll, onto his bed. She laid as

she had landed, legs and arms askew. Farben, relieved of her weight, sat on the edge of the bed to get his breath—it had been many the year since Farben could carry his light of love into the bedroom and have enough energy left to complete the seduction. He was quite winded.

Eight Ball, invisible as the black cat in the coal mine, watched the return of Farben with Marthea over his shoulder, and she watched the tell-tale climb to the top floor.

Marthea had warned, "Take no action—" But this was the time to ignore such warnings and play the game by ear. The cat knew Peter and Beauregarde were outside somewhere, but this was no time to sit and wait.

Still as invisible as the black cat in the coal mine, Eight Ball went up the stairway to the second floor and down the hall to the door of D'Artagnan's room where she scratched the panel of the door with both sets of foreclaws.

The noise awakened D'Artagnan, who caught the sniff of the Terrestrial Feline under the door. And the education he had received while coming into Understanding told him that no small domesticated animal of Sol Three—Earth would be this far from home without good reason. D'Artagnan said, under the door, "Hello, Cat, what are you doing so far from home?"

"Looking for you, D'Artagnan. I'm Eight Ball."

"Glad to meet you, Eight Ball. Now tell me, is it really true that the Terrestrial Feline can squeeze through a hole smaller than the cat's head?"

"If you're thinking of that crack under the door, forget it."

"Is Peter Hawley about?"

"Somewhere outside. Beauregarde is with him."

"Marthea Campbell?"

"She took a stunning and one of them carried her upstairs to the top floor, as cold as a turkey."

"So how do I get out of here?"

"Can you reach the door handle?"

"Yes, by stretching full, but then I have no leverage to pull the door open." D'Artagnan paused, thinking. "Look, Eight Ball, I'll snap the latch and you push."

The handle was one of the standard models found almost anywhere in the spiral arm where the beings walked on the hind legs and used the forelegs as arms with some variation of fingers, tentacles, or other, preferably with opposed thumbs. By stretching out, D'Artagnan managed to wrap a paw over the latch, the latch clicked, and Eight Ball pushed, and the door came swinging in just a crack before it hit into the dog's feet. "Youp!" said D'Artagnan. But the crack was enough. As the dog scrambled back, the cat came in pushing the door with her nose.

"So I'm free. Now what? I don't think we can play that trick on the big front door to this building. And then there's that massive wooden door or gate to the enclosure. Oh, I'm free of my room, but I'm still a prisoner of these Peacekeepers."

Eight Ball said, "From what little I know about Peter Hawley, he isn't

about to leave without you and Marthea. She's been stunned and no matter what, Peter Hawley is going to find her, and we can make it easy for him, when he arrives."

"How?"

"The guy who took her upstairs used the elevator, which means that Peter and Beauregarde might have to sniff each floor to pick up the trail. And that would be hard, since Marthea was being carried and wouldn't leave the scent of the Terrestrial Female. But I know she's on the top floor 'cause that's where the elevator stopped. So you and I will walk up the steps, leaving our scent for Beauregarde to follow, and we'll find a hiding place on the top floor and wait for Peter and Beauregarde to arrive."

"How's the paws?"

"Just a twinge. I'd hate to try a frolic for fun, but I can get along if I'm needed. Trouble is my nose. It is still numb, and if I try to tackle some malefactor, the numb nerve feeling might let me bite deep since I can't judge otherwise."

"Uh, well, let's go."

"Why not? The walk will do as good as a rub to limber me up."

Peter took the disable key from the stunned Peacekeeper and used it in the big door to the enclosure. Once inside, Peter looked about and said, in a low voice, "Hide!" They slipped aside, Peter on one side of the walk and Beauregarde on the other and they both fell flat under low bushes as Varne Farben opened the door to the Headquarters Building and came out on the run. He was after his second bundle, having rested to get his breath. It would be Peter Hawley for two reasons. First, Farben did not really like being too close to the Terrestrial Canine, and second, Beauregarde was considerably smaller and lighter than the man and the effect of the (supposed) stun would last longer.

The Xanabarian slipped out of the big door and Peter snapped, "Let's get going!" and headed for the building with Beauregarde behind him by only a step.

"Like old times," said Beauregarde. "Plunging in where neither angels nor devils fear to tread."

"We're trapped!" said Peter with very little fright in his voice.

"Just as you wanted to be," said Beauregarde. "Somewhere in this building there is a woman in stun, and D'Artagnan in a coop, and a very black cat a-prowl waiting for the action to start. And somewhere outside, there's some character we'd like to lay very low."

"Yeah," replied Peter, "and he'll be roaring back in here as soon as he finds that two of the major principals of the game have vacated the premises, leaving two stunned sentries asleep on the pavement."

"So whither?" asked Beauregarde. "Marthea or D'Artagnan first?"

"Whichever comes first. Scent?"

"D'Artagnan's been in and out of that door often enough to leave a track in the floor. The trail goes to the elevator. But wait! Scent doesn't give

a direction, but good sense says that Marthea, according to plan, came in through the back door, made her way through the hallway, and out the front. Yes, bringing Eight Ball in and leaving her to prowl for D'Artagnan.

"Now we know that Eight Ball isn't going to even *try* the elevator. Eight Ball went up the stairway. Let's go!"

"And run, Beau. Do not walk. Nemesis is after us."

"Nemesis? You mean Farben."

"Farben? Shall we grab Marthea, D'Artagnan, and Eight Ball, or shall we clobber Varne Farben?"

"Yes," said Beauregarde. "In that order."

It hadn't taken Farben more than a second to discover that two of the principals in his plan had disappeared. Now he was going to make dead certain that the third one remained where she was. He came back through the big door and headed on a dead run for the Headquarters Building. He cursed himself for being uncautious; better it would have been to give Marthea the second stun just to make sure.

Marthea was, of course, still paralyzed from the waist down. Her lower muscles buzzed with that 'asleep' twitch, but the agonizing pain of deep muscle cramp had faded. She had come awake; at least the upper part of her, and by pulling and wallowing, she had straightened out the a-sprawl legs, lifted her torso and turned to sit, straight-legged, on the bed facing the door. She had nothing to do but wait, and while waiting, she massaged her thighs and the lower part of her belly, hoping that with each rub the dead part of her was coming to life, but feeling deep inside that there was, honestly, very little change.

And as she prayed in hope and died in despair, she wondered about Eight Ball, and about Peter, and about Beauregarde, and about D'Artagnan.

And it came to pass that D'Artagnan and Eight Ball, silently and invisibly, paused at the crack at the door of Farben's apartment. The doors opened inward. D'Artagnan stretched upward, hooking the thumb-latch with his paw; Eight Ball leaned against the door. The door opened, not against D'Artagnan but with him, and went wide—

And as it swung wide, with D'Artagnan and Eight Ball landing on all fours, over their heads at human belly altitude whistled a throwing knife, turning to point-first as it crossed the empty door. It hit the far wall, and fell to the ground.

"You play rough, Marthea!" said D'Artagnan. "People can get hurt that way."

"I was aiming for the navel height of the Xanabarians," she said. "And any Xanabarian who walks through that door is going to get the next one in the belly, after what they've done."

At the top of the stairs, Beauregarde sniffed. "This way," he said, heading down the hall. Eight Ball said, "D'Artagnan, I hear someone coming; go grab that knife, Marthea mustn't waste ammunition. Go fast!"

D'Artagnan leapt for the door, took a double spring, and picked up

the knife by its handle and turned to face Beauregarde. "Well," said Beauregarde, "old home week!"

"Peter!" shouted D'Artagnan loudly, "hit the deck!"

The second of Marthea's throwing knives passed over Peter's spine as he dropped flat. "Look, m'dear, I'll be your sweetheart and your lover, and I'll cook and I'll sew for you while you're having the babies—but I'll be damned if I'm going to stand against the wall while you outline me with stickers."

"I seldom miss," she said. "How do we get out of here, Peter?"

"The answer depends," he said stepping through the door into the living area. "How are you as of now?"

"To the best of my knowledge, it caught me below the waist. It came upward from my feet and just went out on the way up."

"Um. But how does it feel right now?"

"The deadly cramp is gone, but that 'asleep' nerve-buzzing covers everything below the waist."

"Can you move your legs?"

"I'm afraid to try."

"You've got to, Marthea. I can't carry you and fight off a batch of student Peacekeepers at the same time."

Marthea took a deep breath, and gritted her teeth. "This," she admitted, "is going to hurt."

She moaned in pain as she tried to force the muscles in her legs to move at her will. There was brief motion for a moment, and then Marthea gave up and relaxed. In a whisper, she reported, "I think I might stand if someone gave me balance support. But I couldn't walk."

Peter nodded. "We're a bit better off than I'd hoped. We're lucky that the battery charge in those cartridges fades out instead of running at full blast and going out like a light. Okay, then, I'll massage your muscles and you give it the old college try and let's hope that we can make progress before hell goes out for breakfast."

Varne Farben paused to think. Instead of three outright trespassers laid out cold to be displayed and prosecuted when they recovered, he now had one for display and two—the worst of them all—alive and looking for number one. He'd lost his chance to be a one man hero, and he might win the war if he faced the fact that Peter Hawley and Beauregarde and their head-on methods were a bit too much for a desk bound Peacekeeper.

Farben took the elevator to the second floor. If what he expected were true, using the elevator would raise hell with his nervous system, but it was far better than to get where the action is completely bushed.

There was no question about it. D'Artagnan was gone.

Where?

Varne Farben questioned himself. He'd heard vague rumors that the Terrestrial Canine could follow a trail by smelling the other's scent. Rumor, he'd always heard, and said. But Peter Hawley and the woman Marthea Campbell, most likely aided by the canine, Beauregarde, had found their

way here, possibly with the nocturnal operations of the feline, Eight Ball.

And now D'Artagnan was gone. Where? Granting that this olfactory sense might be true, to locate Marthea Campbell.

She'd been stunned, and couldn't move by herself for some time. And in that time, enough resources could be called in to complete the operation to the satisfaction of Xanabar.

Farben had paused to think. Now he paused to operate. Beside the elevator there was a squawk box. He punched the button and said, "We have been invaded. Break out six of your fastest and brightest and have them come well armed to counter-invade Peter Hawley and Beauregarde in my apartment, on the top floor. Be warned. It will not be simple."

He should have waited, he knew. But he also had the notion that D'Artagnan would follow his instructions, and that meant one man and one canine against one man and another canine, and the enemy encumbered with a woman in stun. That made it possible that he might still be a hero, having called for reinforcements just to make sure.

Farben rode to the top floor, then walked rapidly down the hall to partly enter the door.

There he observed Marthea Campbell propped up with Peter Hawley at her feet massaging her calves; D'Artagnan by the side, watching. Beauregarde lying flat with his landing gear retracted. And the feline, Eight Ball was lying on Marthea's lap having her tummy scratched.

"Well, if it ain't my old friend, Bad Farben!"

"Attack!" ordered Farben in the parade ground voice he used in attack-training.

"You betcha!" snarled D'Artagnan. "Take 'im low!" he growled at Beauregarde as he roared forward.

The attackee was not wearing protective gloves. He was wearing a short-sleeved robe, and D'Artagnan's aim was not at the hand that held the stunner, but the wrist above the hand. Fine canine teeth slashed into the wrist and the fulcrum there turned the dog's body around so that the full weight of the dog's body hit Farben across the chest and sent him stumbling backward completely out of balance.

Beauregarde hit him low by taking a bite of the ankle and tripping Farben backward to land with a crash on the back of his head. Then Eight Ball topped it by making a long, soaring leap to land four-flat on Farben's chest. The cat waved a paw full of extended claws before Farben's eyes. "Souvenir, Peter? Left or right—or both?"

"It's not nice to hit a man when he's down," said Peter slowly. "He's damaged bad enough—and I think we want him alive."

"Why?"

"Hostage."

"Bah!" snarled Farben. Then with a last try, he shouted, "Plan Seventeen, Emergency One!"

Then he passed out. D'Artagnan's initial attack had slashed the wrist to

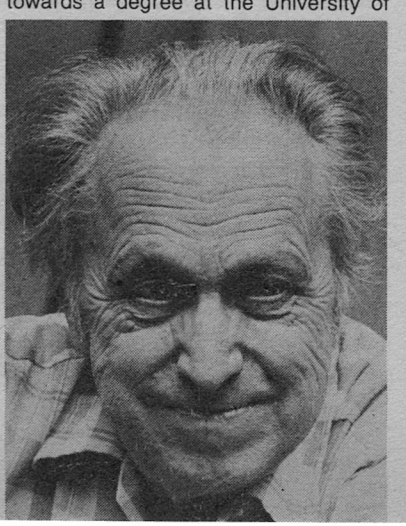
Jay Kay Klein's

BIOLOG

Under John W. Campbell, for many years this magazine represented the "engineering culture." The early stories of George O. Smith were the very quintessence of this culture, dealing with what was considered the highest reaches of technology, that of radio engineering. George's first story, "QRM—Interplanetary," in the October, 1942 issue touched a chord in the readership, garnering first place in popularity over efforts by such greats as Lester del Rey, Murray Leinster, and A.E. van Vogt.

Nine sequels followed, forming the basis for one of the earliest hardcover science fiction collections, *Venus Equilateral*, published in 1947. In the introduction, Campbell bestowed on the author what must have been the editor's highest accolade: "George O. Smith is a radio engineer."

Achieving that status came the hard way during the Depression. George lost his father at five and his mother at nineteen. He managed to get partway towards a degree at the University of Chicago, painting "lobby art" at night for movie houses before taking a full-time engineering job. When World War II broke out, he became an engineer on the proximity fuze project. At the Smithsonian, you can see a cutaway model of the finished product which he donated. Later, he wrote instruction manuals for sonar equipment under a writing program headed in part by Campbell.



George had been reading science fiction since a teenager, and decided that he could write part-time for fun and profit. In addition to science fiction, he did "how to" articles for *Popular Science*, along with a couple of popularized science books, and articles for an assortment of publications including *Scientific American*. He continued after the war, while designing radio sets and the tone compensation circuitry for the microgroove phono system. Later, he switched to full-time technical writing until retirement six years ago.

It should be noted that George also tried his hand at space opera, his three-part serial *Nomad* that started in December, 1944 achieving top ratings in the AnLabs for each installment, under the name of Wesley Long. His own name was already used in the issue for a *Venus Equilateral* story.

He now writes science fiction full-time, with a novel, *To Change the Past*, underway. George lives on the shore of a river at Rumson, New Jersey, where he has a 16-foot speedboat and a homebuilt 21-foot cabin cruiser. As befits an engineer and writer from the golden days of the engineering culture, he continues to gadgeteer in a well equipped workshop, and delights in turning out strange electronic doodads.

George O. Smith

the bones; then the curving swirl of the dog's body broke some of the bones. And the final fall backward slashed the ruined wrist to ribbons of flesh and bones.

Peter said, "Beau, bring me a bath towel. He'll bleed to death if we don't stop the flow."

Marthea asked, "What was that yell of his?"

"I think we may have company coming, and Seventeen, Emergency One means to attack with no concern for hostages or fellows held prisoner by the enemy—Eight Ball, go look."

"We've got company," said the cat, who was lying belly down on the floor in the shadow of the door.

The company came on the run, crashed the door, and crumpled with one of Marthea's throwing knives about where the spleen would be.

The rest of the company fell back and took up stations along the wall. "How many?" asked Peter. "Six," said Eight Ball.

One of them banked a tear grenade against the door. D'Artagnan caught it on the fly and landed head out with all four well spread. He flipped his head and sent the grenade down the hall where it exploded its tear gas among the student Peacekeepers. And D'Artagnan's flip of the head also turned him halfway about so that he could make the second leap back into the room.

Peter came over beside the door. "We've got Bad Farben here, badly wounded," he called. "And Bad Whatever he is has a throwing knife in his belly. And there's two sentries outside as cold as a couple of turkeys. You play Plan Seventeen, Emergency One too long by laying seige, and Bad Farben and Bad Whatshisname will be dead and gone."

"Attack!" snarled someone outside.

They came in a bunch, spaced to fill the doorway in an echelon; three on each side, half shaded by the one in front showing six aimed stunners, one in each of the visible hands of the six guards who flanked the doorway.

Marthea got another one in the belly, making two down with throwing knives and completely out of combat. D'Artagnan rushed and leapt and ground his teeth in the high upper gun arm of one and hurled the guard back against the far wall of the hallway, where he dropped, groaning. Beauregarde growled and advanced upon one of the center guards, who retreated backward to fall in a trip over Eight Ball's back. Peter nailed one gun arm nicely at the wrist, and the hand let the stunner drop to the floor. And Marthea drew back her throwing hand with the knife poised in an ugly way. "I can get one of you dead certain without trying, and with a bit of try, I think I can both of you. The last Peacekeeper to drop his stunner at the floor will be the first to get a knife in his dinner."

The guard who stood nearest to the two knifed men on the floor looked sick. Blood did not run, it seeped heavily around the wounds into the shirts of the men and lazily dribbled

on the floor between them.

"It could happen to you," she said callously, waving the knife up and down suggestively. "Peter, retrieve my ammunition, will you? Nicely balanced tossing hardware is too expensive to leave in the guts of Xanabar's Peacekeepers."

"If I pull those stickers out," said Peter cheerfully, "It'll unplug the wound and make a bloody mess of the floor."

"It's their floor."

Peter stepped to the one who'd been tripped by Eight Ball. He picked up the guard's stunner, and said, "I'd just as soon not use this. I think you might come in handy. To convince you to behave, let's count up the score. There's double-Bad Farben there with his wrist ruined so Bad-ly that he'll have to drink with his left hand the rest of his Bad-ly ruined life. We've got two with tossing stickers in their gizzards, and two just simply scared to death to think about the deadly aim my sweetheart has with throwing implements. We've got one with his shooting arm dead cold, and one with his shooting arm chewed to bits by the fearful Terrestrial Canine. And we've got you, alive and well and living in Neo-Syrtyr.

"Now let's plan. The two scared-to-death student Peacekeepers will have one minute to go and find, somewhere, a load of stretchers for the fallen and wounded; and you, my Bad friend, will grab some towels from the bathroom and do some Boy Scout first aid on the knived Peacekeepers when you withdraw my lady's hardware. Now—get!"

They got. And Peter said, "First, we've got quite a batch of armament here, as well as one man, two dogs, one cat, and a woman paralyzed from the midsection down. Doll, how's it going?"

"They tell me that a dash of adrenalin does very well for someone in partial stun. It came from the bottom up, you know; and it is going away the way it came; from the midsection down. Oh, I can't yet walk, so it'll be rape if you get me in bed—but I'll be able to wriggle and enjoy it. Ugh—Peter, let's get out of here. I don't like the decor."

Lagniappe—

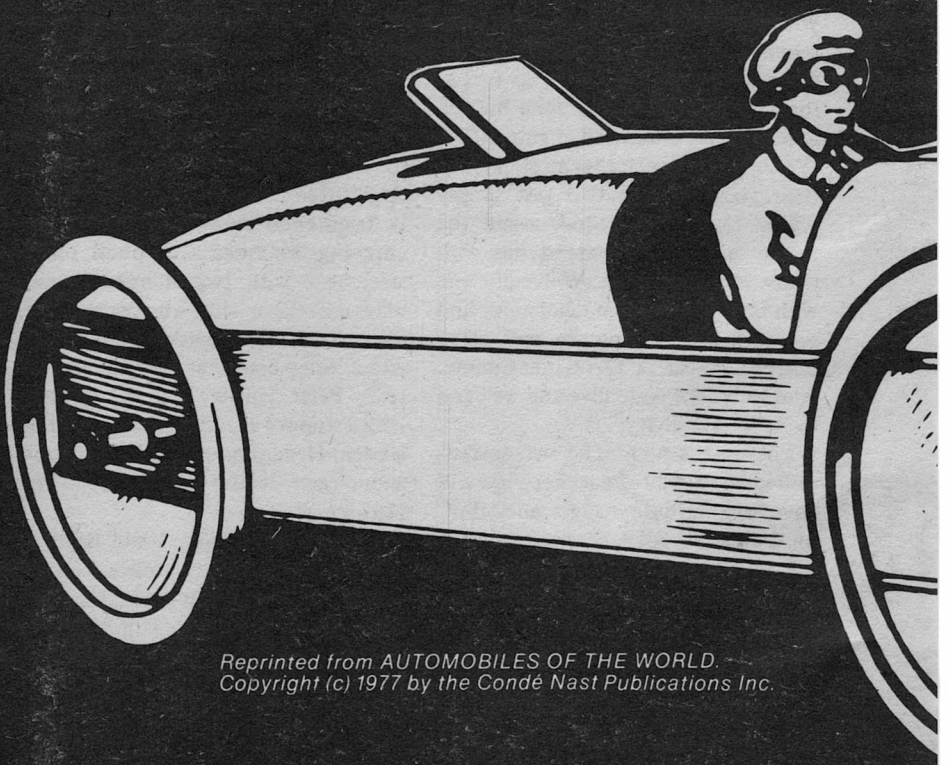
With one frightened student Peacekeeper tending to the knife wounds of two others, and worrying about what to do about the Terrestrial Canine dogbites of two others and two equally frightened student Peacekeepers carrying Marthea Campbell on a stretcher—with two dangerous canines on either side who were quite likely to bite before asking questions, and a saucy black cat bringing up the rear, Peter Hawley led the cortege with a stunner in either hand out of the student Headquarters, and back to his submerged cruiser and away from Neo-Syrtyr.

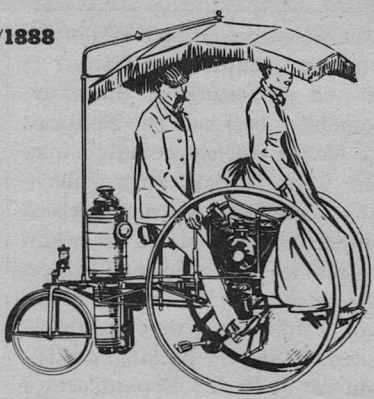
In Almada: "Peter," said Beauregarde in farewell, "I leave you in tender, capable hands—with the help of a set of fine canine teeth and four paws full of sharp claws." ■

Steam cars
were once popular.
Will present problems
bring them back?

Steamer Time (Again?)

WALLACE WEST





literature since 1977 has contained practically no mention of steamers. The conspiracy of silence which has encompassed them since the demise of the magnificent Dobles in 1929 has become complete.

There are several good reasons why the steamer remains in limbo despite its many advantages over autos with internal combustion engines. In the first place the campaign against air, sound, water and other types of pollution was quietly sabotaged by big business. This occurred during the sharp recession of the early seventies, despite the efforts of Ralph Nader and other environmentalists. Pollution standards were relaxed or not enforced as steel, cement, paper, oil and other corporations claimed that the installation of control equipment would bankrupt them. Consequently the pressure to provide cleaner auto exhausts was diverted to relatively inexpensive gadgets such as catalytic afterburners.

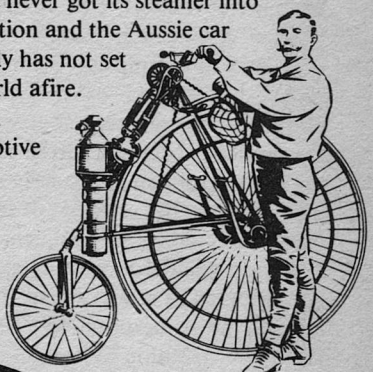
The second cause is bound up with America's so-called free enterprise, competitive economy. This holds that the primary purpose of any company or corporation is, not to produce the best possible product, but to make the most profit for its stockholders. A direct corollary is that auto manufacturers, after fighting for the easiest possible emission standards, prefer to achieve them with gadgets rather than by expensive retooling for an entirely different power train.

"We have developed an external combustion turbine which is practically free of all types of pollution," a Chrysler engineer once told me. "Even exhaust heat has ceased to be a problem." To prove this he shoved his hand and forearm into the exhaust pipe of a gasoline turbine on his workbench. He continued: "It would cost so much to retool for mass production that the company's stock would drop and we might be forced into bankruptcy. Only if General Motors or Ford came up with something revolutionary will we take that gamble."

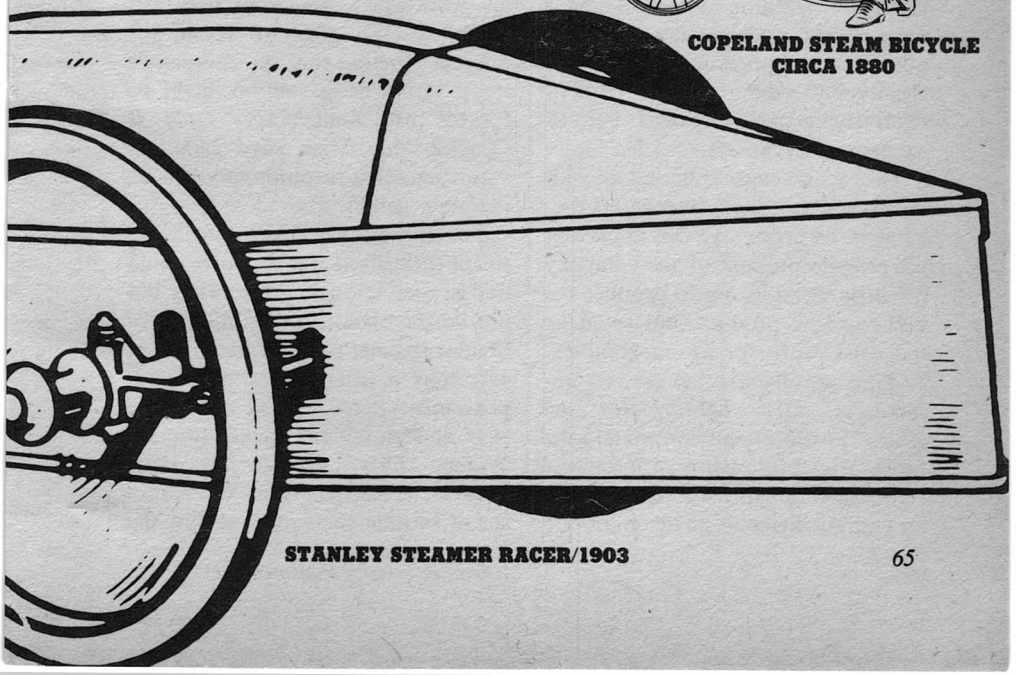
The third thing that stymied the steam enthusiasts was that they could not let well enough alone. They did not do the obvious thing: dig a 1924 Stanley steamer out of some museum and copy it after adding a few improvements made possible by modern steel and aluminum alloys. Instead, William Lear, to cite the most notable example, decided that a steam turbine car would be just the

Eleven years ago, at the height of the campaign against pollution, I predicted the return of the steam automobile because its emissions were almost entirely pollution free. Those were the days when William Lear had just received a nine hundred thousand dollar contract for steam cars from the Environmental Protection Agency, when the Williams brothers of Ambler, Pa., were practically assured of financial backing for their steam car from the Department of Health, Education and Welfare, when Toyota promised a steamer of advanced design and when Australia's government was encouraging its own Pritchard steam car. Things certainly were looking up for the thousands of steamer buffs scattered throughout the United States.

But I was mistaken. For reasons known only to itself, EPA cancelled its contract with Lear, putting that company in financial difficulties from which it never completely recovered. The Williams twins were invited to Detroit to demonstrate their invention to Chrysler and promptly were hired by that corporation to engage in research for its gas turbine. Toyota never got its steamer into production and the Aussie car certainly has not set the world afire. In fact, automotive



COPELAND STEAM BICYCLE CIRCA 1880



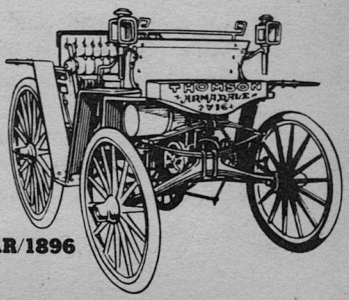
STANLEY STEAMER RACER/1903

thing. But the trouble with turbines, steam or gas, is that to operate efficiently, they must revolve at very high speeds. This is fine for airplane engines but the necessity of gearing them down to manageable levels for use in autos becomes almost overwhelming. So Lear tinkered with his steamer for years. And Andy Granatelli's gas turbine failed to win the Indy in 1967 because his gear box, not his engine, broke down within sight of the finish line. (Turbines were promptly ruled off all American tracks as dangerous by the U.S. Automobile Club just as the Stanley had been ruled off more than half a century earlier.) Granatelli lost a brave battle to get his car reinstated and Lear lost his vital EPA contract. The steamer seemed dead.

But a new day has dawned as a result of the Arab oil embargo of several years ago and OPEC's boosting the price of a barrel of crude petroleum to over twenty dollars, with threats of further increases to come. This time it is a question, not of aesthetics or health but of dollars and cents. This time, says President Carter, some new source of energy or more efficient way of using energy must be found. And he has asked Congress to put billions of dollars behind the search. No matter that he has mentioned neither steam nor atomic fusion in his speeches. Both of these fields are going to be investigated, willy-nilly. And even if fusion is found to be the answer, the return of the steamer will be assured. How else can atomic power be made available for transportation except by first converting it into steam?

By this time you must be wondering what kind of monster a Stanley, Doble, White, or one of the dozens of other steamers which dominated America's roads in the late nineties and the first quarter of the twentieth century must have been. You've heard the old stories. That steamers were so complicated that one needed an engineer's license to own or drive one; that they blew up; that nobody could drive them at full throttle; that they were as noisy as locomotives, etc., etc. Let me try to set the record straight by describing my first ride in one Stanley and my struggles to restore another.

I was a steam buff back in 1924, even though I had had a rather disheartening experience when building a steam turbine during my senior year at Arsenal Technical High School in Indianapolis, Ind. I had found a description of this machine in an autobiography of Nikola Tesla, the inventor of alternating current. It consisted of a series of polished aluminum plates mounted close together on an axle enclosed in a steel

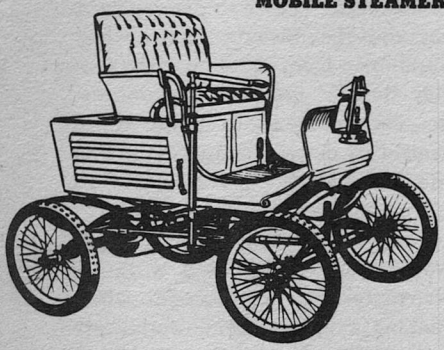


THOMSON STEAM CAR/1896

housing. The molecular friction of steam particles flowing between the plates turned them at a quite hysterical speed. I made mechanical drawings for the thing, built patterns, poured mouldings, machined and assembled them and took the little thing to my teacher for testing.

"My boy," he said, patting me on the shoulder, "I'll give you an A plus for this job, but I can't test it. We have no equipment here, and I'm sure the Marmon and Duesenberg plants have none that could possibly balance it for you. I can set it spinning with low pressure steam, but if I bring it up to speed it will fly right out the window. I suggest you take it home, put it in your attic, go up and look at it with pride and wait until balancing apparatus can be perfected which will allow it to produce its rated 200 horsepower."

MOBILE STEAMER



I took his advice. Our house burned down shortly thereafter and my Tesla turbine, the only one I know of, lies in the basement under six feet of ashes, bricks and other rubble.

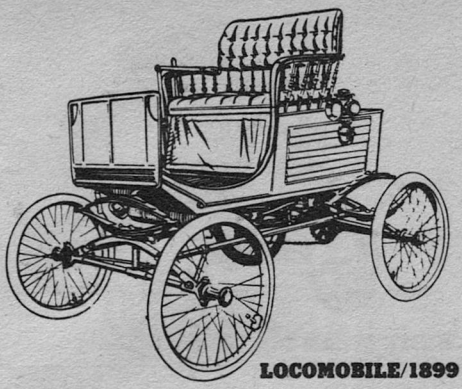
Anyway, I was walking along a downtown street in Indianapolis years later when I came upon a crowd that had gathered to stare at a strange sight. A man had parked his new car near a six-inch curb with its front wheel cramped to the right. He was rocking the car back and forth over the curb while it produced a faint whooshing sound like a contented boa constrictor.

"Want to take a ride, son?" The driver noticed my wide eyes and open mouth. I fell over myself getting in.

The car took off, not with a revving of engine and a clashing of gears, but with a sigh. At Meridian and Washington Streets it stopped for a signal. I mean the engine stopped as well as the car. (Think what that would mean in millions of gallons of gasoline conserved if all cars did the same today.)

Out in the suburbs we approached Heavenly Hill, a sixteen per cent grade avoided by most autos but used to demonstrate the abilities of new cars. We started up smoothly. After several hundred yards the driver...I had learned that he was the city's Stanley dealer, hopped out and paced the car to the middle of the hill. Then he climbed in, and accelerated to the forty-mile speed limit. I had the strange sensation that I was a cork being extracted from a bottle.

When we came back town the hill we met a spanking new Packard Twelve laboring upward in low or



LOCOMOBILE/1899

second. My friend . . . oh yes, he was a friend by now, threw the Stanley into reverse and beat the Ask the Man Who Owns One to the heavenly top of that hill.

"I'll take you to lunch just for that," said my driver.

We headed for the country at a good clip and suddenly came face to face with a barrier and a sign reading BRIDGE OUT.

"Oh, I forgot about that," lied my friend. He threw the car into reverse with a touch of a pedal. It cushioned itself to a halt as if it had been equipped with four-wheel disc brakes. Calmly he headed toward a path that led to the stream bed.

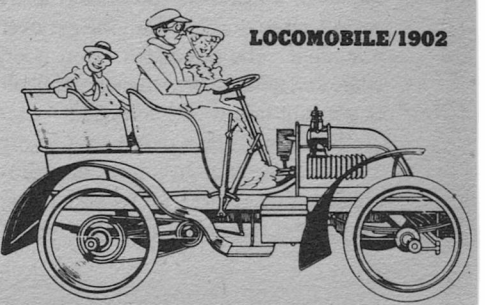
"Put your feet on the dash," he commanded. "The water's two feet deep." The car nosed itself into the creek, surging like a steamboat with water well above the floorboards.

"Now let's eat, and talk about your buying this buggy," said this amazing character. He pulled into a roadside grove . . . there were many of them in those days . . . lifted the hood, opened a plate in the round boiler that was where an engine should have been, and withdrew scalding hot coffee, roasting ears done to a turn and two noble baked potatoes. We feasted.

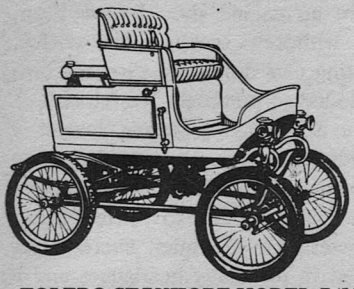
As a struggling young lawyer I couldn't afford a new $2500 Stanley or even an $1800 demonstrator. But I had to have one, so settled for a repossessed 1923 model. Thereby I let myself in for many headaches and a great deal of education and welfare.

My predecessor had been too busy outrunning revenuers on the roads between Indiana and Canada to blow dirty steam out of his boiler once a week, as the Stanley instruction book insisted. As a result, dirt had accumulated around the bottoms of several hundred macaroni-sized fire tubes in that boiler until they blew out in twos or threes, letting pressure drop. He also had neglected to put oil in the crankcase. Finally, his tires were in ribbons as the result of ninety-mile speeds on the rutted gravel roads of those days. All of which explains why the law finally caught up with him one lonely night and why I could buy his car for $800.

For a time I tried to use the old boiler. This meant that, if I was lucky enough not to be whistled down by a



LOCOMOBILE/1902



TOLEDO STANHOPE MODEL A/1901

WHITE STEAM CAR/1902

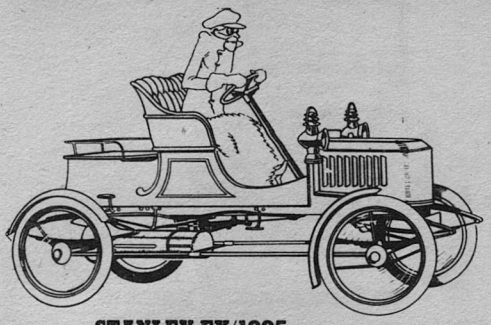
highway patrolman, or surrounded by people shouting "You're on fire," I had to take drastic action. After the steam cloud abated I crawled under the car, removed from the bottom of the boiler the pan holding the kerosene burner and found the leaky tube or tubes. These I tightened by means of a hammer and a cone-shaped tool with an unprintable name. I soon tired of this routine and bought a new boiler. Since the old one was unconditionally guaranteed for five years this only cost me one-fifth of the listed price.

Those scored slide bearings quit on me one night when I was driving a prospective client from Indianapolis to Noblesville. The Stanley still ran smoothly but slowed to a crawl on hills. Again and again my passenger and I had to jump out and push the car over a summit. The passenger was a good sport and gave me his case when I finally got him home after midnight.

There were other drawbacks to my 1923 model. It didn't have an automatic starter. I fired up by preheating the burner with a blowtorch. And I pumped water into the boiler by hand until the steam pressure grew high enough to take over that chore. I had the alternative of keeping steam pressure up by means of a pilot light that consumed a gallon of gasoline for each 24 hours of use. This allowed instant starts in the morning. It also kept the car operable during the winter months. (In those days most I.C. cars were put up on blocks during the worst months. The only way to start a Model Ford in zero weather was to jack up the rear axle and spin a wheel by means of an unwieldy crank.)

After I had it properly tuned that car was a wonder. I drove it over every road in Indiana and cherished it until the Great Depression of 1929 forced me to sell it, quit the law and turn to a career in journalism with the United Press.

I learned several peculiar things during those years. The first was that both the auto and oil industries had an implacable hatred for steamers. At every stop for kerosene (at ten cents per gallon instead of 35 or so for gasoline), the attendant sneered and



STANLEY EX/1905

asked: "Hasn't that thing blown up yet?" I am told that Hollywood stars, most of whom boasted of a Stanley or a Doble in his or her garage, were subjected to the same treatment.

Or I would be sold dirty kerosene out of some half-empty barrel. Then I would have to crawl under the car at regular intervals and clear the clogged burner orifice with my girl's hat-pin.

Or I was refused parking space in a garage on account of an imagined fire hazard and be forced to leave the car in the back lot overnight. I got my revenge for this treatment when I fired up next morning, a process that required about five minutes and developed several thousand volts of static electricity within the car. I simply handed the attendant his fifty-cent piece of silver and watched as he slammed back, cursing, against the garage wall.

Then there were the snide jokes about the Stanley. Not friendly digs such as those at the Tin Lizzie, which Henry Ford collected and used to promote sales, but mean ones claiming that only hayseeds drove Stanleys, that the gentle twin Stanley brothers were bloodthirsty murderers whose car was a death trap, and so on.

Finally, the Stanley had no resale value except for the purchase of another steamer.

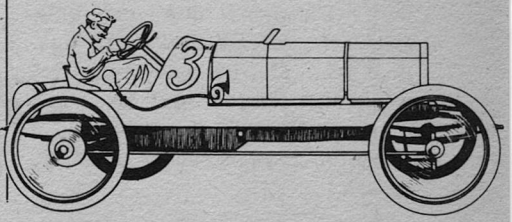
The brothers might have combatted this campaign of slurs with advertising. But they hated all advertising except that by word of mouth. Money spent on ads could be better employed to improve the quality of their product.

So word got around that:

Steamers blew up. There is no such explosion on record.

They were fuel hogs. I got twenty miles to the gallon. The record is held by a petroleum engineer who drove his Stanley from coast to coast at a total cost of four dollars and a half for used crankcase oil that he bought at service stations along the way.

In those days when a multi-cylinder Cadillac or Packard was lucky to get six or eight miles to a gallon of gasoline, such fuel efficiency was remarkable in a car of the same size. It is explained by the fact that the fuel for the Stanleys was burned outside

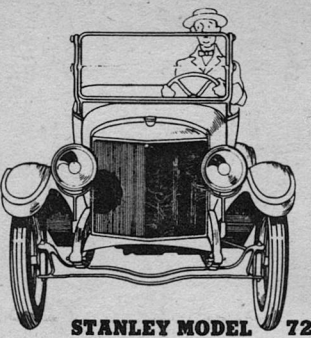


STANLEY STEAMER RACER/1906

its cylinders. The burner, which has only two positions...On or Off... can be tuned like that of an oil furnace until all the fuel molecules are completely burned and converted into harmless carbon dioxide and water vapors. By contrast, an I.C. engine is driven by fuel atomized in a carburetor that is constantly adjusting to changing driving conditions. And that fuel is burned instantaneously when compressed within those cylinders. The resulting exhausts include dozens of noxious, half-burned elements which can be only partially removed by afterburners and other clumsy, energy-consuming gadgets.

External combustion also makes possible the use of any combustible substance as a fuel. Stanleys have been driven on everything from crude petroleum through diesel oil, kerosene, gasoline, corn oil and even buttermilk.

Nobody could drive the car with throttle wide open. The fact is, the top speed of the passenger models was about ninety miles. The top official speed of a Stanley racing model was set by Fred Marriot on the sands of Daytona Beach in 1906. The next year he tried again on a day when the beach was not in its best condition. His light torpedo-shaped car was hitting 197 mph and heading for the 200 mph mark when it hit a bump in the sand, took off and flew several hundred feet. Marriot was tossed free when the racer turned over and crashed. His official 1906 record stood for six years and his unofficial for 20.

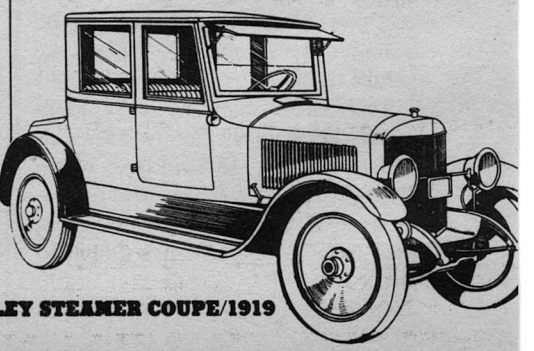


STANLEY MODEL 725/1916

After that the Stanley brothers refused to let their car be raced. In addition, the automotive powers of that day ruled Stanleys off all tracks with the excuse that they were too dangerous. These bans hurt Stanleys badly, in a day when cars were made or broken by their showing on hundreds of dirt or brick tracks.

When I joined the United Press all of this was still big sports news and one of my first assignments was to do a series of feature articles on the Stanleys and their car. The facts are fascinating. I have no room for many of them here. (You can find the whole story in the February, 1959 issue of the *American Heritage.)*

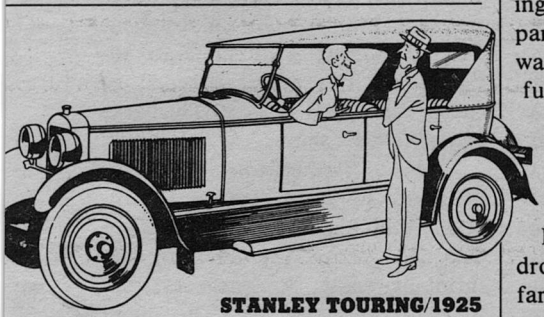
F.E. and F.O. Stanley were identical twins born at Kingfield, Maine



STANLEY STEAMER COUPE/1919

in 1849. They began their careers as woodworkers and violin makers. They turned to auto making in 1896 after attending a show which included a chugging, clanking French steamer. They decided they could do better.

Experimental steamers had been built since 1829. In that year an English coach, having two boilers and two engines was constructed. It carried 15 passengers and a tootling footman. It traveled 15 miles per hour. A horrified Parliament put it out of business by ruling that it must be preceded by a man on horseback blowing a trumpet.



STANLEY TOURING/1925

The Stanleys put their first car on the road in 1897 and climbed Mount Washington with an improved model 2 years later.

They held their own with the Hupps, Jeffreys, Americans, and even the lordly Duesenbergs and Locomobiles of that day. There were, of course, other fine steamers. First among them was the Doble, manufactured in California by Abner Doble until the 1929 crash put him out of business. It was an expensive, hand-crafted beauty which boasted a flash boiler. This permitted steam pressure to be built up almost instantaneously by spraying water against a red hot steel plate. Its main drawback was that it was so expensive that only the rich could afford it.

The White was an engineer's nightmare four-cylinder I.C. engine adapted to steam. It required constant tuning and produced a sound closely resembling that of its ancestor, the White sewing machine.

By contrast, the Stanley was amazingly simple...only 24 to 32 moving parts, including the steering wheel. It was relatively inexpensive, had high fuel and thermal efficiency and went 200 miles on one filling of water. (It also carried a long hose which could pump water, when needed, from any pond or stream.)

In 1918 F.E. was killed when he drove his car into a ditch to avoid two farmers whose wagons blocked the road just over the brow of a hill up which he was driving. F.O. lost interest in life after that. He sold out to a corporation which continued manufacturing Stanleys until 1925. He died of loneliness in 1940.

What was the secret of the Stanley's success and the fact that it still is a conversation piece as well as the winner of most classic car rallies in which it is allowed to compete? Several factors are involved.

1) An amazingly simple long-lived two cylinder opposed engine light enough to be lifted by one hand. It

turned over only 980 times while the car traveled one mile as against 4,000 to 5,000 revolutions of an I.C. engine.

2) The engine was almost pollution free, when compared to internal combustion engines or any means of propulsion other than electricity as the EPA Table plainly shows.

3) Reciprocating steam engines such as that used in the Stanley have a thermal efficiency of 90 per cent as compared to only 35 per cent for I.C. engines.

4) It was so silent that conversation could be carried on without strain at any speed.

5) It accelerated smoothly and silently, going from 0 to 60 mph in 9 seconds if need be. Tires could be spun, if really necessary, but ordinarily, tire wear was so negligible as to make rubber salesmen grind their teeth.

6) Finally, and most important of all, a Stanley engine carried its torque, not in a flywheel but in its boiler. Why is this vital? I sweat blood getting the explanation simple and accurate enough to suit Editor John Campbell in the original "Steamer Time" so I will quote it verbatim:

"Torque is the twist or torsion that a shaft undergoes when transmitting power. It is measured in pound-feet; force exerted at a point one foot from the center of a shaft. All the torque energy provided by an I.C. motor must be stored in its flywheel. There's no other place to put it. Rev up the motor and you jam a terrific spurt of torque into the angular momentum provided by the heavy wheel. Put any sort of load on an idling motor, on the other hand, and you stall.

"I saw this demonstrated at a Bahamian port last winter when a huge barge was being docked after the breakdown of its high-torque steam winch. A 500 hp diesel bulldozer was commandeered to pull the stern of the barge to the pier against a strong tide.

"A first attempt, made at full throttle, caused the two-inch cable to snap and dissipate its energy quota by threshing about the dock like a boa constrictor. Next time the bulldozer was eased into the pull . . . and stalled. Then the driver tried moderate acceleration. The cable stretched as energy was stored inside it. The barge inched toward shore.

"But, its flywheel torque drained, the motor stalled once more. Whereupon the bulldozer was dragged backward across the dock by the shrinking cable. It barely escaped teetering into the sea. The barge finally was moored after tide change.

"Unlike a diesel or other I.C., a steam engine's power is stored, not in a flywheel but in vapor pressure on its boiler. It needn't race to achieve power. Like Ole Man River, "it jes' keeps rollin' along." This provides a very fine feeling for a driver when his car is hub-deep in snow or mud.

"There were other bonuses: the burner was "On" only about a fifth of the time when the car was cruising at normal speeds. And steam engines never idle. All of this saved much

EPA TABLE

	HC	CO	NO_x
1975 Standards	1.5	15.0	3.1
1976 Standards	0.41	3.4	2.0
1977 Standards	0.41	3.4	0.4
Chrysler gas turbine	0.32	3.5	1.9
Diesel engine	0.87	1.6	1.8
Mazda Wankel	0.17	2.2	0.93
Steam engine	0.13	0.2	0.26
Stirling*	0.01	0.15	0.17

*The Stirling, still in the experimental stage, is an external combustion engine that works on the peculiar Rankine cycle. Its fuel does not participate in the expension stage. Instead, there is a working fluid which alternately is heated and cooled to provide power.

wear and fuel. The car had no trouble-breeding clutch or transmission. And the torque could be changed to meet operating conditions merely by touching a foot button that varied the point at which steam admission to the cylinders was cut off. Early cutoff allowed only a small amount of steam to enter and was used for cruising. Late cutoff permitted steam to be applied to the pistons all the way to the bottom of their strokes. This provided power for use in emergencies."

In conclusion, let me say that in view of today's energy crunch, I stand by my prediction of eleven years ago that the reciprocating steam engine is due for a strong comeback in the automotive field. Its simplicity and efficiency should give it an inside track over competition.

Some experts say that the death knell of steamers was sounded as far back as 1904, when the great Spindletop, Texas oil field came in. Crude petroleum dropped to five cents a barrel. After that nobody cared much whether their cars were fuel guzzlers or not. Gasoline was so cheap it didn't matter. If that is the case, perhaps Gabriel's trumpet will sound for the steamers when OPEC pushes the price of petroleum over $25 per barrel. ■

REFERENCES

American Heritage, *Feb. 1959, vol. 10, no. 2, p. 40 Carlova, John. "The Stanleys and their Steamer."*

Analog, Sept. 1968, p. 77 West, Wallace. "Steamer Time?"

Automobile Manufacturers Association, Inc. Automobiles of America, *1968.*

"Automobiles and Air Pollution." Report of U.S. Panel on Electrically Powered Vehicles. U.S. Gov't Printing Office. (nd.)

Business Week, *Feb. 9, 1974, p. 72. "An Iffy Future for the Steam Car" (Doble Steamer.)*

Derr, Thomas S., "Modern Steam Car and its Background." Los Angeles, Floyd Clymer Publications (nd.)

Environment, *June 1977. 19:34-40. Reitze, A.W., Jr., "Running Out of Steam."*

Homans, James E., Self-Propelled Vehicles. *N.Y. Audel & Co., 1914.*

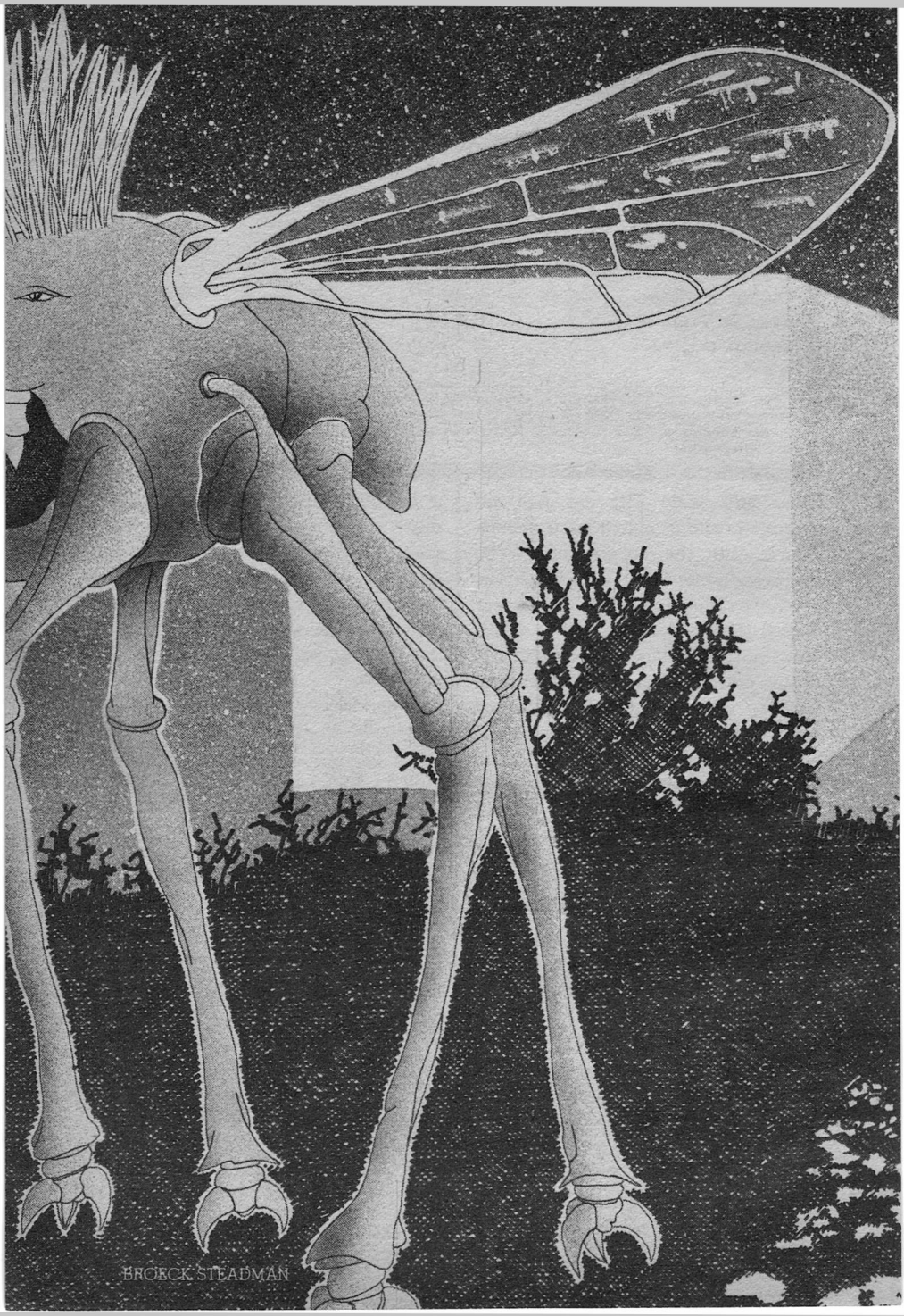
Norbye, Jan P., The Gas Turbine Engine. *1975, p. 299. EPA Table.*

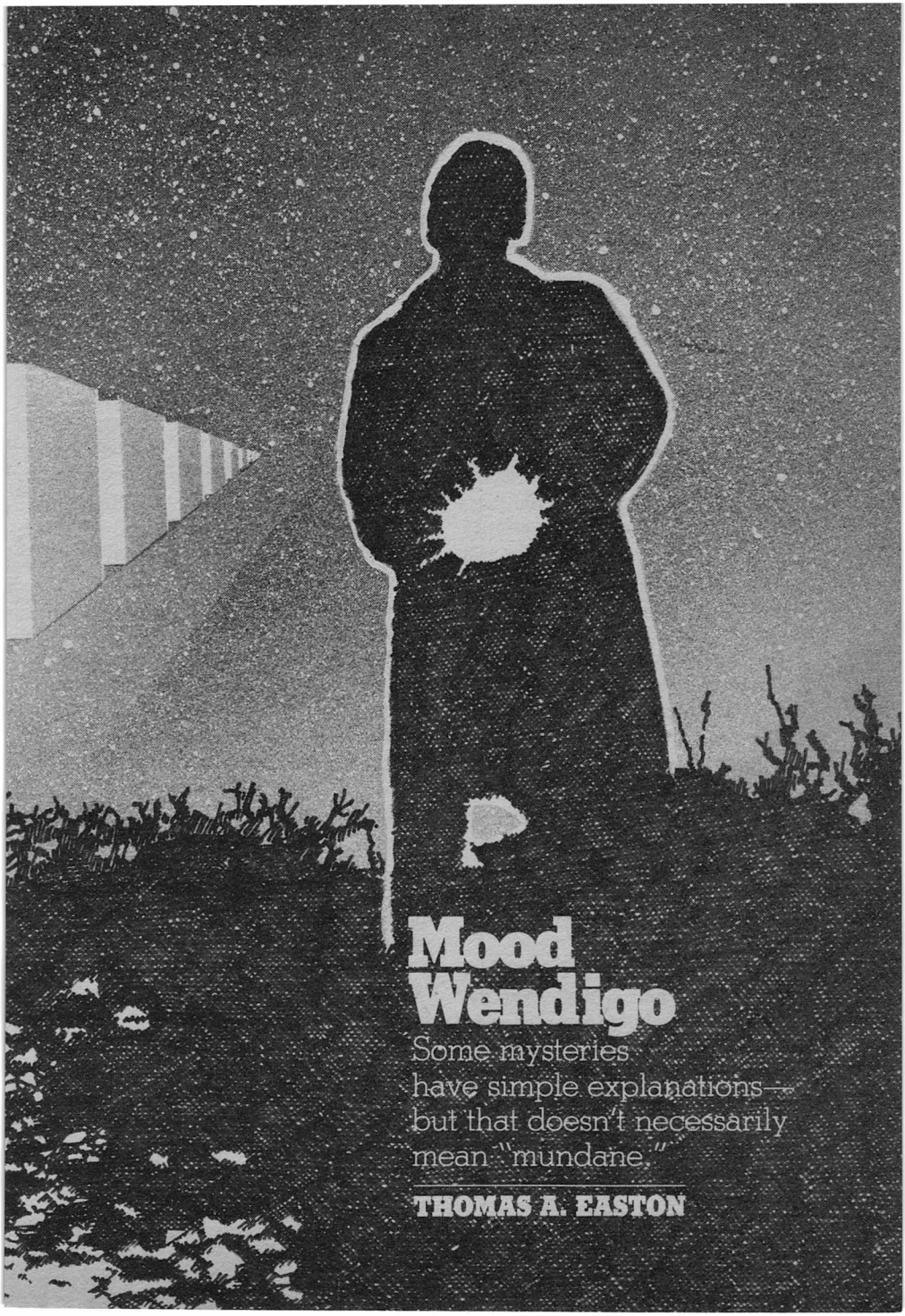
Popular Science, *Sept. 1976, p. 74. Kocivar, Ben, "Aussie Steam Car."*

Science Digest, *May 1975.*

West, Wallace, "Clearing the Air." N.Y., American Petroleum Institute, 1967.

White Company. White Steam Cars. Instructions, Models K. and L. Cleveland, Ohio (nd.)


BROECK STEADMAN


Mood Wendigo
Some mysteries have simple explanations—but that doesn't necessarily mean "mundane."
THOMAS A. EASTON

When did this story begin? It's hard for anyone here in town to say. It looped back on itself and tied its bit of time in a knot. No one is really sure just what happened, though we do know we lost a good boy.

Did it start when Lydia Seltzer told her high school biology class about the wendigo? She was talking about the world's mystery beasts, the Abominable Snowman, the Sasquatch, the Loch Ness Monster and its cousins in other lakes around the world. She told them about all the expeditions, the lack of results, the questions—are the searchers simply crackpots? Or do elusive things still exist in the hidden corners of the world? And then she mentioned the wendigo, a thing that had never been more than a story, a superstition, something no one had ever believed in enough to check it out. Its name was Indian, and it was known across the Northeast, from Maine to Ontario. It screamed in the night, and anyone who sought the screamer disappeared without a trace. If they ever returned, they were mad, too blown of mind even to say what had happened to them. There were no descriptions of the wendigo.

Or did it start the day our town acquired a second Lydia? Mad she was, and raving, but she was the same Lydia we had all known for a decade. The same wide mouth, the nose a little larger than she liked, the black hair worn short and curled over her collar. Neither was any beauty, but neither were they ugly, and it seemed surprising that she had never married. Or perhaps it was no surprise after all. She was tough-minded as only a woman can be, and she showed it at an unusually young age. Most women wait till their forties and later to show their steel. But not Lydia. She brooked no nonsense, in class or out, and for as long as we had known her she had been given to severely tailored pant suits, wool for work, denim for evenings and weekends.

When did it start? Who can say? The best I can do is tell you where I came into it. That was some time after the wendigo class. I was at home, sitting at the kitchen table, going over the town budget for the fourth time. Sarah, my wife, was in the living room, watching something inane on TV. We didn't talk much anymore, not about her job at the bank, not about mine. We had no kids.

When the buzzer sounded, I heard her chair creak as she rose to answer the door. There was a murmur of voices, steps in the hall, and "Harry? Miss Seltzer wants to see you." There was a glare with the words. I ignored it, raised my head from the papers and said, "Duty calls, then. Have a seat, Lydia. Coffee, a drink?"

"Do you have any tea?" As Lydia pulled the other chair out from the table, Sarah disappeared. A moment later, the sound of the TV rose, as if to drown out anything that might give my wife's fantasies the lie. But my attention was for Lydia. She seemed more serious than usual, if possible, and there was a folded paper jutting

from her bag. I wondered what was on her mind as I filled the kettle. I found out soon enough.

She sat still, watching me as I moved about the room, saying nothing until our tea was before us and I had sat down again. Then she said, "Mayor, I need a leave of absence. A short one."

She stirred her cup, squeezed the bag, and dumped it in the ashtray half full of my pipe ashes. "Of course," I said. "But shouldn't you be asking the superintendent about this?" I was puzzled. It wasn't my chore to handle the teachers, thank goodness. I was the town's unpaid mayor, and there were professionals, paid ones, to handle day to day affairs.

"I will," she replied. She looked at me, her brown eyes unblinking. I remember thinking that for all her mannishness she would be worth shielding from all grief. Perhaps it was the eyes. Maybe it was just Sarah. "But you can help," she said. "You know people, and . . ."

"But what do you need help with?"

She shrugged and took the paper from her bag. She unfolded it and handed it to me. "Look at this," she said. "It's French-Canadian, a rhyme, collected back in the thirties by the WPA people. I found it in the university library, buried in the folklore files."

The paper was covered with a pencilled scrawl, a copy of a poem that must have been set down by someone who wished to capture the flavor of a speech pattern:

Ze Wendigo,
Zat crazy beast,
'E never eats,
But loves t'go.

In darkest night,
'E runs and screams
And stirs ze dreams
Of second sight.

But when you go
To join ze run,
'E stays unknown,
Ze Wendigo.

I packed and lit my pipe, studying the rhyme, before I spoke. "Interesting," I said. I sent a cloud of smoke toward the ceiling. "But what does it have to do with a leave of absence?"

Her fingers tensed around her tea cup. She had come to me, but she seemed unwilling to reveal her problem. Could it be so rare or odd or shameful? Suppose it was, I told myself, and then I guessed the answer.

"You want to go wendigo hunting." I laughed.

Her lips tightened, and I was immediately sorry for the laughter. That was just the reaction she had feared. Of course. No one wants to be thought a nut, a crackpot, even if their ideas are a bit off the beaten track. "But go on," I said, trying to save the situation. "Maybe I can help. At least, I'm game to try."

She relaxed as if that was all she had wanted. I caught a faint whiff of perfume or cologne. And she began to talk. She told me of the wendigo class, of her own interest in the strange, of her sense of fairness that led her to the

library, of her conviction that all the legends must reflect some grain of truth, of her wish to seek that truth. She had come to me for suggestions on where to seek, a guess at the chances of success, perhaps even a partner in the strange quest.

Why me? Well, I do have a reputation for imagination. Last year's ad program for my oil business certainly stirred folks up enough. And then there were the gimmicks I had come up with to get more tourists into the area. And then, too, there had been a few incidents now and again to connect me with the strange. Really, I should have been more surprised if Lydia had not come to me.

But what could I do? I wouldn't know a wendigo if I saw one. Or heard one, rather. She was silent while I relit my pipe and thought. She didn't fidget much, only turning her empty cup back and forth between her hands. Finally, I said, "There's at least one fellow in this town who could help. If you'll come to the town hall tomorrow after school, I'll ask him to meet us there."

She nodded and sighed. Her breath whistled as if she had been holding it. So I would help, after all. Her voice was softer when she spoke. "Do you really think we can . . .?"

"How can we know?" I grimaced, sympathetically, I hoped. "We've no idea what it looks like or where to look. But we can try."

The fellow I wanted to talk to was Howie Wyman. Grizzled, always overalled and booted, he had been doing odd jobs as long as anyone cared to recall. He knew all the stories, too, though he didn't talk much. He seemed to prefer the woods and streams to human company, even his wife, but he was in town at the time, painting a house over on Water Street. I sent a secretary to ask him to come by a little after three.

I was still alone when he showed up, a motley collection of paint spatters, whiskers, and faded cloth completely alien to any civilized conception of a government office. My secretary showed him in, though, as if he were clad in a three-piece suit and fresh from the barber, which tells you something about our town. It's informal. Partly because it's small and partly because its people waste little energy on nonessential appearances. They dress up mostly for church and they try to keep their drinking private.

I said, "Thank you, Bonny," and waved Howie to a seat. He took it, looked for my wastebasket, and got rid of his wad of chewing tobacco. "You wanted me, Mayor."

"Ayuh," I said. "Lydia Seltzer dragged me in on a project of hers. I thought you might be able to tell us something helpful."

"Like what?" He looked doubtful. He knew Lydia was the science teacher, and he knew nothing about science. I doubted he'd ever gotten past the sixth grade. I was starting to tell him about the problem when Lydia walked in, Bonny holding the door until I waved at her. Her wool

was pink today, and her face was flushed with eagerness. The combination wasn't attractive, but I didn't imagine it was anything but temporary. I hoped she wouldn't be disappointed.

I introduced Howie to Lydia. "This is the fellow I was talking about. I was just going to tell him the problem."

She took the other chair. "Shall I go on, then?" When I nodded, she produced that paper again and then handed it to Howie. While he read, she said what she wanted, flatly and directly. The nervousness I had seen last night was gone.

When she finished, Howie set the paper on the corner of my desk and said simply, "Pork Hill." I raised my eyebrows, and he went on. "My dad was up there once. Ayuh, huntin' deer in the dark of the moon. He heard that scream. Didn't see nothin', though."

"Where's Pork Hill?"

"North by west, 'bout ten miles."

And that was all he had for us.

We now had a place to look, and the next dark of the moon was just two weeks away, in case that mattered. Lydia could hardly wait. She insisted on borrowing a tent, sleeping bags, a Coleman stove, all the gear anyone could want for a night camping on a lonely hilltop. She got most of it from two members of the school board. She got their sons, too. Keith Hutchison and Ronny Jackson were two of her best students, and she thought they deserved a field trip, a little hands-on research. They thought so too, especially since it meant a Friday away

from school. I didn't argue, since I was sure we could meet no danger from a superstition.

I wish I had been right. Keith was a lanky boy, tall, a forward on the school basketball team. Ronny was shorter, sturdier, a soccer player. Both had family, friends, girl friends, good prospects. Keith, in fact, already had a scholarship for college. They had a lot to lose, but they were eager. Danger was just a myth, and they wouldn't miss this trip for worlds.

They didn't, of course. I didn't believe in any danger myself, so I didn't try to talk them out of it, and Lydia made it sound like a lark. All the way up there, the four of us and the gear crowded into my old station wagon, she waved her camera and ran on about the splash a picture of a real, live wendigo would make.

We loaded the car on Thursday night and left town shortly after noon on Friday. When we met in the town hall lot, I was surprised to see Lydia in dungarees and a red-checked wool shirt. It was so unlike her that, even though the rest of us were dressed similarly, she seemed to stand out. But the clothes were suitable for the trip, and I soon stopped noticing them.

It took us half an hour to reach the foot of Pork Hill, and another two hours to hump the gear to the top. The hill wasn't big, no more than eight hundred feet high, but it was steep and wooded and there was no path. The going was slow until we reached the top, where the trees disappeared. Pork Hill was one of those rocky knobs scattered over the state of Maine, its top scraped clean by glaciers and still inhabited only by lichen, moss, blueberry bushes, and a few stunted birches.

We pitched the tent in a mossy hollow between boulders, and the boys went back down the hill to gather firewood. There were plenty of fallen branches there, and though we had the stove, a fire was a comforting thing to have at night. Even small mountains can get chilly after dark.

By suppertime, the woodpile was large enough to last a week. We had all taken time to explore the hilltop, too, following Lydia as she sought some clue to what a wendigo might be, some trace of something strange. We found nothing but glacial scours and animal droppings and a few weathered shotgun shells, though Lydia was hardly discouraged. As she said when the boys were finally kindling their fire, "It is a traveller, they say. Maybe it never stops here."

I said something which I now wish I hadn't. Though it probably didn't change a thing. "Then you'll have to move quickly to get a picture of it. It won't be waiting for you."

"I suppose I will," she said, fingering the camera on its strap around her neck. She bent, then, to the totebag she had brought and extracted a flash, one of those electronic ones that don't need bulbs. "I'd better be ready."

We ate—hamburgers and potato salad and coffee and bakery pie—and sat around the fire staring, satisfied for the moment by the mystery of its

flames. Only Lydia turned her head now and again to the darkness, straining to see what she waited for. But there was nothing but the odor of earth and growing things, the sight of stars like raindrops on a windshield. The air turned chill enough for sweaters, and we listened to the chirps and buzzes of insects, the lazy notes of sleepy birds, the small croaks of tree frogs, and the rare crackling of brush as some animal—deer, coon, rabbit, coyote, even a wild house cat—passed within hearing.

We talked, of what it meant to be a mayor or a teacher or a student, of sports and fishing and hunting, of politics and taxes. We told no ghost stories, though. I suppose that must have been because our mission was too much like such a tale. It would have been tempting fate to describe horrors and frights, and fate never needed tempting.

Eventually, we talked ourselves out and let the fire die. We were readying ourselves for the sleeping bags, washing up, brushing teeth, when it happened. We heard a moan at first, low as if far distant, swelling loud and clear and close. At its peak it sounded like a baby must when it is being dipped in boiling oil.

It was a little after midnight and as black as the inside of a closet. We had been using the light of an electric lantern as well as the glow of the coals. We had been contained in a small and cozy room, but that sound broke down the walls. I shuddered, and Lydia ran, the soap and water spilled on the moss, her camera ready in her hand, Keith hot on her heels. Ronny would have gone too, but I held him still with a hand on his shoulder. "Let go!" he cried. "I want to see it too!"

"Remember the stories," I said as softly as I could over the dying scream. "Someone should mind the camp." He subsided as I'd hoped he would. When the scream was gone and the night was again silent, I added, "Now. Now we can look for them."

We took our flashlights and tried to follow the marks Lydia and Keith had crushed into the moss as they ran. But the tracks soon disappeared in the tangled skein of prints we had made earlier that afternoon. We called and shouted. We covered every inch of that hilltop, again and again, shining our lights down cracks in the rock and under bushes, checking the bottom of every drop we came across, large or small. We searched until our batteries were exhausted, and then we huddled around a rebuilt fire, worrying, starting at every crackle of brush.

With the dawn, we searched and called again, but we had no better luck. Lydia and Keith had vanished without a trace, just as in the legends. I was closer than ever before to believing in the wendigo, and thus in ghosts, banshees, and all the rest of what I had once dismissed as so much claptrap.

Our second search soon ended in futility. We made a hasty breakfast, doused the fire, and broke camp. Then we lugged the gear back to the car. It took longer, since there were fewer of us now. I had plenty of time

to berate myself, to think I should never have helped Lydia with her obsession, never have let the boys come along, never have come myself. But who could have expected a myth to be real? Who could have guessed it would cost us half our party? And what was the wendigo? What was it that made a sound that swelled and faded like a freight train's whistle, that screamed like a soul in torment? Like a god on a cosmic treadmill? If only I had known, I might have left the boys in town, but I would still have come with Lydia, hoping to protect her, shield her. I felt as I might for the child I didn't have, and I mourned.

Ronny was less thoughtful. He shivered when he thought of the night, and once he dropped his load with a clatter of pans. He had lost a teacher and a friend. He might have been lost himself. The horror of that scream had almost touched him, and he could barely control his thoughts. He stayed close to me, keeping a wary eye on the woods around us, talking endlessly, trying to imagine what had happened to the others. He failed to disrupt my thoughts only because I was as obsessed myself. There was no conversation. He talked on, while I muttered responsive noises, and we both scurried around our separate skulls, like rats seeking the way out of a trap.

By mid-morning, we were back in town. I stopped the car in front of the town hall. The police station was across the street. We would have to go there first, of course. Missing persons, runaways, lost in the woods, carried off by a mythical beast, had to be reported, search parties organized, motions gone through even if they could do no good. Ronny was still talking, muttering, his skin a cold and clammy white, his eyes glazed. I helped him out of the car and steered him across the road. I remember being glad he hadn't collapsed while we had work to do. It would have been a shame to leave all that gear on top of Pork Hill.

Our town's Chief of Police was a heavy-bellied man whose moon face wore a thin moustache. He was young, about thirty, and as competent as we needed. Most of his energies were spent on rounding up drunks and vandals, occasional burglars, and the odd con man. He could do the work because the town was small and the crime rate low, but he could never hope to improve his lot. He would grow old in the job, the gut would sag, the cheeks jowl and the eyes go piggish. The tattoos on his forearms would fade, and somewhere along the line we would have to get rid of him. I wouldn't miss him; no one would. His sense of social class was far too keen.

When we entered his office, he rose and said, "G'morning, Mayor! I thought you were going wendigo hunting yesterday?"

"We did," I said shortly.

"Ah!" He grinned jovially, as if we shared some secret. "Stealing a march on your great white huntress, hey?"

"Whatever do you mean?" I asked. I was irritated by his tone, impatient with what had to be nothing but non-

sense. But his next words set me back.

"Lydia Seltzer. She didn't go with you."

It didn't sound like a question, but what else could it be? "Of course she did. That's why I'm here now. She disappeared last night. She and Keith Hutchison."

The Chief plopped his bulk back into his swivel chair. He looked startled. "But...." Then he paused, looking at Ronny as if for the first time. "What's the matter with him?"

"Shock and exhaustion," I said. "We were up all night, searching for them. Maybe one of your men would get him over to the hospital and tell his parents where he is."

"Of course, Mayor." He pushed a button on his desk intercom. Then he said, "Maybe you'll tell me what happened when..." A patrolman entered, was given his instructions, and left with Ronny. The Chief turned back to me. "Now," he said.

I gave him the story. He nodded when I was done. "The shock I can understand," he said. "But why didn't you get here hours ago?"

"I didn't think it wise to go stumbling through the woods in the dark. Besides, I hoped we might find something in the morning."

"Not that it really makes a difference. A search party wouldn't do any good."

"Why not? They could still be there someplace! Maybe they fell in a hole we didn't see, or got lost in the woods."

"No." He shook his head and rose again. "C'mon. I'll show you."

He led me back to the small cell block. When we entered the narrow corridor, lined with steel bars, I could hear a noise, a jabbering sound, wordless, random. Or almost random. As he steered me toward the noise, I began to pick out shreds that might hold meaning: "fetal train," "stars and stars," "hopper freight," "take yon train," and more, though those were clearest. I wondered what madman he was holding here. And then we faced the last cell in the row. Through the bars, I made out a form strapped onto the narrow bunk, head tossing, face bruised and scratched, denim and wool clothes torn and soiled. It was Lydia.

The Chief spoke. "We picked her up like that yesterday afternoon. She walked into town, went straight to the school, and tried to get into her classroom, raving all the time, just like this. The substitute called the principal, and he called us. I'm waiting for the judge to sign the papers now, and then one of the men'll drive her to Augusta."

AMHI. The Augusta Mental Health Institute. Where they would try to bring her back, perhaps with drugs and electric shocks. But what else could anyone do? I turned away.

Back in the Chief's office, I remembered Lydia's camera. Did he have it? He did, along with everything that had been in her pockets. "Then perhaps," I said, "it might be a good idea to have the film developed. She could have got her pictures after all, and they could help the doctors under-

stand what's wrong with her now."

"Of course," he said, and I left. I wanted sleep, but I should return the gear Lydia had borrowed first and tell Keith's family what had happened. Then, maybe, I could begin to puzzle over how Lydia had disappeared last night and reappeared yesterday. Time travel was impossible, wasn't it?

The Hutchisons and Jacksons were enraged. With me, with Lydia, with the town, with the school. One boy lost, another ill, but the lost one most on their minds. Jack Hutchison swore he would run against me come the next election, sue me for every penny I had, have Lydia fired if she ever regained her wits. But the prospect of no longer being mayor didn't bother me—after all, it didn't pay—and the trip had officially been a school field trip, and the school had insurance to cover lawsuits.

And then that fuss died down. The pictures came out. Lydia had her wendigo, twice. One shot showed a line of shiny boxes stretching down a gleaming tunnel. The other showed Keith walking away from the camera, hand in hand with a figure that wasn't human, through a vast cavern of a room. The shiny boxes covered the floor of that room, and they were surrounded by machines that bore vague resemblances to freight dollies and forklift trucks.

I could guess what the wendigo really was. An interstellar freight train, its tracks looping close to Earth at certain times and places, a freight that could be hopped by anyone who got too close to its passing field. "Fetal"? Maybe "ftl," faster than light. By "take yon" had she meant "tachyon"? I read enough to know what that was, how it might fit, and Keith was alive and well, Earth's envoy to other worlds. Lydia, on the other hand, had been sent back on the next train, going faster than light, backward in time just enough to get her home a day before she left.

By the time Lydia stopped raving and returned to her job, Pork Hill could no longer be visited, either by deer poachers or by would-be interstellar hobos. The army had taken it over, and it was now ringed by wire fence and armed guards while the experts tried to find a way to flag some passing train down.

I don't know if they'll succeed. Lydia can't tell us anything, since she now seems to have no memory of her journey, and if it weren't for that last picture of Keith I'd be tempted to compare us to the moose. For years, the rutting bulls would answer train whistles by charging down the tracks into the engine. To the bull moose, it seems, the whistles sounded like the cry of a cow in heat, and they never learned the difference. The slaughter only stopped when the companies changed the note of the whistles.

But we can't be the equivalent of animals running head-on against an oblivious technology. After all, who among us would walk out of a railway station hand in hand—or hoof in hand—with a moose? ■

a calendar of upcoming events

1-4 MAY
EUROCON 5 (European continental SF conference) at Palace of Congress, Stresa, Italy. Registration $6.25 supporting, $31.25 attending. Info: EuroCon 5, Editrice Nord, via Rubens 25, I-20148 Milano, Italy.

2-4 MAY
MARCON XV (Central Ohio SF conference) at Holiday Inn-on-the-Lane, Columbus Ohio. Guest of Honor—L. Sprague de Camp, Fan Guest of Honor—Brian Earl Brown, TM—Catherine de Camp. Registration $10 at the door. Info: Marcon, Box 2583, Columbus OH 43216.

2-4 MAY
KUBLA KHANATE (Upper South regional SF conference) at Quality Inn, Nashville, Tenn. Guest of Honor—Stephen King, Master of Ceremonies—Andrew J. Offutt. Registration $7.50 in advance, $10 at the door. Info: Khen Moore, 647 Devon Drive, Nashville TN 37220. 615-832-8402.

2-4 MAY
Leprecon VI (Arizona regional SF conference) at Hyatt Regency Phoenix, Ariz. Info: Leprecon VI, 3112 N.26th Place, Phoenix AZ 85016. 602-956-6533

8-11 MAY
Science Fiction and Fantasy Art Show (sponsored by the West Coast Comic Club) at the Mall of Orange, 2200 N. Tustin Ave., Orange, Calif. The show will be judged. Info: 420 West 4th St., San Dimas CA 91773. Entry deadline is 1 May.

29 AUGUST-1 SEPTEMBER
NOREASCON TWO (38th World Science Fiction Convention) at Sheraton-Boston Hotel and Hynes Civic Auditorium, Boston, Mass. Guests of Honor—Kate Wilhelm and Damon Knight, Fan Guest of Honor—Bruce Pelz, Toastmaster—Bob Silverberg. Registration $30 until 1 July, non-attending membership $8 at all times. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, the works. Join now and get to vote for the Hugo awards and the John W. Campbell Award for Best New Writer. Info: Noreascon 2, P.O. Box 46, MIT Branch Post Office, Cambridge MA 02139.

ANTHONY LEWIS

*Items for the Calendar should be sent to the Editorial Offices, **four months** in advance of the issue in which you want the item to appear.*

A Modest Inquiry

Ever wonder why some folks insist on reading foreign literature in the original?

WILLIAM TUNING

MARK CORCORAN

"Lang!"

Lieutenant James Lang's chin slipped off his hand and he jumped to his feet, suddenly wide awake.

The intruder in his quarters was Commander Bonspiel, ship's officer of the *W.R.S. Lord Byron,* section leader in charge of Alien Contacts and Evaluations, and Lieutenant Lang's boss. He was just coming to a nice, red, rolling boil.

"Yes, sir!" Lang saluted. The tone of the Commander's voice seemed to indicate that formalities were advisable at this point.

"You've done it! I knew you'd do it! You stumblebum excuse for an officer!"

"Sir?"

"Shurrup!"

"Yes, sir!"

"Siddown!"

"Yes, sir!"

The Commander mopped his florid jowls. "Lang, do you perceive that the seat of my pants appears to be shredded and tattered in a most undignified way?"

Lang edged around to take a look at the Commander's pants. "Uh—no, sir," he said aloud. "There is nothing that I can see wrong with your—"

"Well, they are!" snapped Commander Bonspiel. "The Captain has just had me on the carpet, and given me a fine, detailed, professional going-over, as only he knows how. By God, if this ruins my fitness report,

I'll see to it that you spend the next five years on Arcturus IV, cataloging conjugations."

"But, sir," said Lang lamely, "they don't even have an alphabet..."

Commander Bonspiel laughed nastily. Then he looked hurt. "Dammit. I'm up for promotion! How could you do this to me? I've tried to be like a father to you...taken you under my wing..." The Commander's voice choked off, and he dabbed at his eyes with a handkerchief.

"Sir? Commander Bonspiel?"

"Ummm?"

"What *is* it that I've done, sir?"

Bonspiel wheezed. "If you don't know, I guess I'll have to tell you."

"Yes, sir. Please do, sir." Lang poured the Commander a drink and offered it to him.

"Thank you. My nerves are absolutely *ruined*. I don't know; I just don't know. I think I'll transfer to Docks and Yards when we get home. These evaluation missions just take too much out of me." He bit his lip and shook his head from side to side. Bonspiel tossed the drink down his throat, made a little humming sound, and held out his glass.

Lang refilled it. "Now, sir, if you'll tell me what I have done, I shall put myself on report."

Bonspiel's face clouded. "We don't have a Llogan translator aboard!" he lamented.

"Oh, but sir. Yes—"

"We can't communicate with the inhabitants of Lloga," he wailed. "We're running behind schedule. Dr. Selsius and the survey team will probably have gone from the planet, taking with them the translation keys they've made. It'll *ruin* my fitness report!"

"Uh, sir? I have just been going over the data tapes and we *do* have a Llogan translator aboard."

"What the hell?" asked the Commander severely. "This is no time to joke. The Old Man asked for a Llogan translator and they all just looked at him. How can we have a translator? You calling the O.M. a liar?"

"No, sir. Emphatically no, sir. We *do* have a Llogan translator. He didn't speak up to the Captain because he doesn't speak Terran. That's all."

Commander Bonspiel looked hard at Lang, as though he had personally just uncovered a mutiny conspiracy. "Isn't that enough?" he said evenly. "Just what the hell good, *Mis*ter Lang, is that going to do us?"

"Wellll," said Lang mournfully, "it's the—ha-ha—computer's fault, sir. It printed out the data all right, but the translation link from Terran to Llogan just isn't the same translator. It's—eh-heh—my fault, actually, sir, for not checking up manually on the print-out—sir. I *know* the computer can't always be trusted, and I usually run a manual check, but—ha-ha—I was just a teensy bit late getting back from liberty, and I didn't—really—have—the—time—this time. Sir."

Commander Bonspiel pinched the bridge of his nose and shut his eyes tightly. "Okay, Mister. How we gonna get out of this one?"

"Well, sir. I had just worked it out

before you came in. We feed the question to our Terran-Borkan translator. He gives it in Borkan to the Borkan-Xeycan translator, and *he* gives it in Xeycan to the translator that speaks both Xeycan and Llogan." Lang sat back happily, waiting for Bonspiel to congratulate him on his acuity.

Bonspiel looked crushed. "Well," he said slowly, "it beats a court-martial for stupidity, I suppose." A vision danced up before his closed eyes of himself wearing a set of threadbare blues, third officer on a scorched merchant tub; a ruined, ashamed man, broken and cashiered from the Terran Fleet for stupidity. No friends. No comrades. Wandering aimlessly from one sinkhole of corruption to another, swilling rotgut booze with his cutthroat crew in some filthy dive.

The vision expanded and grew alarmingly real. Then his face brightened and wreathed itself in smiles. He saw ex-Lieutenant James Lang, worthless and besotted, beached and stranded on a hell-world, being pressured by an ugly assassin about his gambling debts.

Then, he, Bonspiel, showed up and rescued Lang. He paid up Lang's liquor and gambling bills—with the proceeds obtained from shanghaiing onto a leaky slave-ship, bound for another hell-world located at the most remote tip of the galaxy.

He laughed evilly to himself. He could hear the meaty *pop* of the whips. He could hear the rusty thumping of tortured engines as he watched Lang plying a hovercraft through the stinking swamps, searching vainly for slaves—vainly because he, Blackbeard Bonspiel, had gotten there first and cleaned out the planet. Even now, he was laying in orbit around the hell-world in his own trim, black pirate cruiser, the *Prince of Darkness,* waiting to ambush Lang, destroy his ship, and set him adrift among the moldering swamps—where the insects would slowly eat him alive.

He would destroy everything, leaving Lang just enough to stay alive, and cast him off on a slimy lagoon in a corroded, decaying swamp-buggy. He could hear the pathetic conveyance, pitted and blistered by countless alien suns; the crippled engines, held together with spit and glue, laboring to keep her afloat—*pocketa, pocketa, pocketa.*

Lang would become delirious from his gangrenous wounds. His toes would swell up and turn black. Steam would come screaming out of his navel. Slowly, ever so slowly, the remaining natives would close in on him, smacking their simian lips, saltshakers and forks at the ready, drooling at the thought of soon feasting on his flesh.

"Sir!" Lang was shaking him by the shoulder. "Sir? You all right, Commander?"

"MMMRPH!" Commander Bonspiel's eyes bulged open. "Oh. Sorry—dammit!"

"We're coming in, sir. You'd best get to your cabin and buckle in. Van Zeeland is the flight officer, and he's apt to hit the deceleration pretty hard.

I think he's a bit tight today."

"Yep." Bonspiel clapped his hands on his knees and got to his feet. "Yep," he said again. "If this hare-brained scheme of yours doesn't work, the Old Man is liable to set us adrift on this planet. He has a fitness report, too, you know."

"Yes, sir. I'll see you after we secure on the surface, sir."

"We who are about to die...." muttered Bonspiel as he stepped into the hatchway. His voice trailed off.

Lloga was a pleasant little world, somewhat smaller than Terra, populated by bandy-legged humanoids about four and a half feet tall. Their culture was in the steam power/agricultural stage. They knew a little about chemical power, but nothing of nuclear physics. They had railroads, paddle-wheel steamers, and peripatetic, steam-powered ground vehicles. Aside from the energy source of steam, the Llogans were just figuring out how to produce electrical energy in commercial quantity. Everything else on the planet dawdled along at a speed comensurate with the warm, drowsy climate.

When Terran civilization had first made contact with them, the Llogans had been curious, but not terribly interested. They were a phlegmatic people, and had long ago discovered, in the warm weather of Lloga, that getting excited when the weather is hot is unhealthy and fatiguing. It was only since the arrival of the Terran survey team that they had discovered something they needed which Terra had.

Aboard the *W.R.S. Lord Byron,* fondly referred to by her crew members as the *Good Ship Clubfoot,* the landing party which was supposed to make contact with the survey team was preparing to disembark.

Lieutenant Lang, Commander Bonspiel, the three translators, a yeoman, and the astrogator were in the ready room, preparing to face up to—whatever.

"Twenty-three hour day," droned the astrogator as he labored through his briefing. "We are grounded on the morning side of the joint, near the equator—uh—well, it's here, somewhere. It's about 0900, local time, and, we're nearby to this small town—here." He pointed to a point on the sketchy map of Lloga.

"Why didn't we land," Commander Bonspiel asked—mainly because one is supposed to ask questions at a briefing—"nearer that large city on the river? More apt to be an outpost of some large government there."

"What city?" asked the astrogator.

"That city. There." Bonspiel rapped his finger on the map authoritatively.

"That's a grease spot."

The translators tried to look interested, although two of them hadn't the foggiest notion of what was being said. The Xeycan, in rather baggy dress blues, was standing on one leg, preening his feathers.

"We landed here," the astrogator explained, "mainly because this is where van Zeeland chose to drop us.

Personally, I'm glad to be on the surface and in one piece, without being excessively picky about geography."

"Uh, have we made contact with the survey team?" Lang asked.

"Nope." The astrogator started to go on to something else.

"Uh," Lang interrupted, "are they still here?"

"Dunno. If they are, they're not answering our commo."

"Then, they've left." Lang's heart sank.

"Hell, Lieutenant," snapped the astrogator. "In that business, you never know. Maybe the natives ate them for breakfast."

Commander Bonspiel shuddered violently, then stiffened his upper lip.

"Let's get on with it." The astrogator looked at his watch, fidgeting. "I go off duty in ten minutes."

The debarkation hatch grounded with a pleasant *crunch,* and the lander edged down the ramp, bearing its cargo of intrepid pathfinders. Contents: two officers—apprehensive; three translators—bored; one yeoman—hung over. Thus opened primary diplomatic negotiations between the Terran civilization and the Llogan culture.

Lang noted, with a slight distaste, that the contact pod was grounded in a field by the side of a dirt road. "Not good form," he thought to himself, "setting down in some poor native's corn patch. Ah, well—*fait accompli.* The thing that must be done is to *cordiale* that old *entente.*"

Off in the middle distance, a column of smoke and dust indicated that a vehicle was approaching. The yeoman stopped the lander and got out. Best not to rush too abruptly and enthusiastically toward the envoy of the indigenous population, lest they think thee excessively aggressive and bash in thy skull.

The little Llogan ground car drew closer. Commander Bonspiel could hear the steam engine going *pocketa, pocketa.* The vision of Lang in the swamps oozed back into his consciousness. He shook his head vigorously, and it went away.

One of the Borkan translators was scratching his back on the front corner of the lander.

The yeoman set up his equipment, plugged the multi-corder into a power jack, and carefully set his levels. He lit a smoke and sat down on the forward tread of the lander.

The Llogan steam car stopped about fifty meters from them as the natives on board jumped up and down on their little bowed legs and jabbered excitedly among themselves. Two of them pointed at the Terrans with one hand and made index-finger-circling-at-right-angles-to-the-temple gestures with the other.

"Well, I'm damned!" said Bonspiel indignantly.

"Easy, sir," Lang said. "In their vernacular it may mean something else."

"Mmmmrph!"

At length, the Llogan vehicle approached them and the passengers debarked and queued up, presumably

in order of rank. They wore little knee-length kilts and sandals—nothing else except a purse at the belt. In the balmy climate of Lloga, more clothing was hardly needed. One Llogan appeared to be the headman of the group. He was wearing a hat of some kind and carried what appeared to be a scepter of office in the crook of his arm—although it might have been a powered weapon of some sort.

Rather than wait for the translators, Commander Bonspiel tried to get his message across in sign language. He waved his arms, pointed at the sky, himself, the rest of the Terrans. He waggled his fingers and looked wildly around. He made elaborately posed "Hiawatha-by-the-waterfall" gestures, shading his eyes with his hand and staring intently at the horizon.

Lang concluded that Bonspiel was trying to make a preliminary inquiry about the whereabouts of the scientific survey team. He didn't interfere, partly because the Llogans seemed to be enjoying the show. But, sign language is a hard way to make friends with aliens. It's not the best way to initiate communications when you have no idea what the other side considers to be an obscene gesture.

While Bonspiel was making a refreshing breeze with his arms, Lang idly cataloged the possible consequences of such impetuosity. The one he liked best was the one that developed logically from Bonspiel committing some error so gross, some insult in such bad taste that it could never be expunged or excused.

The natives would howl savagely and stampede them back to the pod, pelting them with arrows and spears. Perhaps some gunfire would be nice, as well. A hideous war would develop with the Llogans. Bonspiel would be cashiered for stupidity. Lang could see him vividly, in his threadbare blues, the third mate of a grimy, scorched merchant tub, plying some smelly cargo between the hell-worlds, the tortured engines of his space scow going *pocketa, pocketa, pocketa*...

"Look alive, gahdamid. Lang!"

"Eh?"

"What does that mean?"

The chief Llogan had just made a gesture that involved his simultaneously poking out his lower lip, shrugging his shoulders, and raising his hand skyward, palm up.

"I don't know, sir."

"Whaddaya mean, you don't know? You're the Language Officer, aren't you?"

"Yes, sir."

"Well?"

"Sir." Lang drew himself up professionally. "I presume you were attempting to find out something about our survey team?"

"Quite so, Mister," Bonspiel replied through gritted teeth.

"Well, sir; assuming the headman caught and correctly interpreted your gestures, the headman's response-gesture *could* indicate..." He ticked off the alternatives on his fingers. "*a.* 'Get off our planet.' *b.* 'Get the hell off our planet, *right now.*' *c.* 'I don't know what the blazes you're talking

about.' *d.* 'The others like you done left already.' *e.* 'The Terrans' spirits have risen to the sky to join with those of their ancestors.' *f.* 'You are a vile abomination to the gods, and when I drop this hand, my gunnery sergeant is going to blast you to atoms.' And so on." Lang shrugged. "I don't have any information about these people's communication values, Commander. He could have meant anything."

"Very good, Mister," Bonspiel said sulkily. "Carry on with the translators." He looked up and down the three translators and shook his head sadly. "Find out about Dr. Selsius' team. Yeoman, start your machine."

The yeoman stifled a grin and reset the multi-corder.

"Okay, boys, go into your act," Lang said to the translators. He had carefully and painstakingly drilled them before they left the ready room on the *Good Ship Clubfoot.*

"I presume, sir," Lang asked, "that you wish to know, first off, if our survey team is still on the planet."

"Correct," Bonspiel replied clippedly. "Carry on."

The first Borkan regarded Lang attentively with large, cocker spaniel eyes and absently snapped his nostrils open and shut, making a *gooshing* sound, as he waited for the question.

"We desire to know," Lang said thoughtfully, "if the other beings, like myself, who came to meet you earlier, are still on the world."

The first Borkan took a deep breath and began to speak rapidly to the other Borkan. "*Bytokka, pititatka byvatik-kitapa dzy kjl. Pitibatilpaka Titktika pavripatata....* We-hee would want to find out if the cree-heatures like tha-hat one are in your place."

The second Borkan scratched his head and poked the Xeycan in the ribs. In Xeycan, he asked, "Ssay want to say if you ssink ssose ssings are still here. Uh—while we are pleased beyond expression at sse hospitality of your world, we are most anxious to locate our own countrymen who came here earlier."

The Xeycan turned to the Llogan headman. "Wje think they are stjill here. Cjan jyou sjay if they are?"

The Llogan headman spoke to one of his assistants. The assistant answered, making some incomprehensible gestures. The headman turned to the Terran party, smiled for the multi-corder, and then replied. "Thjank jyou, bjut jyour friends jare gone one djay's journey, jand are very anxjious to see jyou."

The Xeycan ruffled his feathers and fed it back to Borkan number two. "Your friends are nice, but ssey are not anywhere here, today. Ssank you."

Borkan number two gave it to Borkan number one. "The-hey, like you nice men, do not occur in thi-hiss time period, tha-hank you."

Borkan number one blinked his eyes and turned to Lang. "They are nice, but we do not care for any today, thank you."

Commander Bonspiel's neck was beginning to bulge over his collar. Lang rapped the yeoman on the

shoulder and pointed his index finger to his temple, waggling the thumb, which meant, "Turn the multi-corder on the aliens and kill the sound. I think old puffing-belly is about to blow a bulkhead."

Bonspiel made a rich, yeasty sound. It had an interrogative quality. "What in blazes do they mean?!" he whispered hoarsely.

Lang shrugged. "Hard to say, sir. What with three translations in each direction, we're bound to get some syntax irregularity."

"Well, I should say!"

"Maybe we can unscramble it by feeding the multi-corder data through the navigation computer."

Bonspiel mopped his forehead in the increasing heat. There was no sound from either the Terran or the Llogan party. Far off in the distance, insects or birds or—whatever—chirped cheerfully. The aliens' steam car idled its engine quietly: *pocketa, pocketa, pocketa...*

"Well, let's blunder ahead. Ask—"

Lang held up his hand, and motioned for the yeoman to crank up the gain on the audio. He pointed his index finger at Bonspiel and cupped his left hand alongside his mouth, meaning, "You're on. Talk."

Bonspiel cleared his throat. "Ask—harrrumf—ask them how many of them there are in the town."

"How many of your people live in the village?" Lang asked.

"In thi-hiss place, how in numbers are you?" said the first Borkan to the second Borkan at his side.

"When stationary, what is sse counting to yourselves ssat you posssesss?" said the Borkan to the Xeycan.

"Whjen jyou stjand, tjo whjat njumericjal extjent djo jyou exist?" asked the Xeycan of the Llogan.

"Thjey sjure jask sjome jof the djumbest qjuestions," the Llogan headman said to his assistant.

The assistant made circles at his temple with his index finger.

The headman elbowed him sharply in the ribs.

The assistant said, "Oof!"

The Llogans huddled and made hurried conversation among themselves, which sounded a bit like a punctured tire learning to yodel.

The Llogan headman turned back to the Terrans and put on his soberly cheerful official expression. "Wje juse, jas a junit of—juh—mjeasjure-mjent," he replied to the Xeycan, "a djistanace wje cjall a *'grjuljak.'*" He laid his scepter on the ground and measured off with it seven equal units of about eight inches each. "Wje jhave jan javerage—tjo jeach pjer-sjon—jof sjevjen grjuljak. Ji trjust thjat wjill janswer jyour qjuestjion."

The Xeycan flipped his crest up and down a couple of times as he pondered the translation. "In sse ssentimeters, you could ssay sse norm would be about one hundred twenty."

The second Borkan puffed air out through his nose and clapped his nostrils twice, thought for a minute, and turned to the first Borkan. "Broadly spe-heaking, you under-

stand, we-hee would wa-hant to reply about one hundred twe-henty ce-hentimeters."

The first Borkan eyed the broadness of the Llogans at the midsection, tugged at his lower lip, and said to Lang, "On the average, about four and a half feet high and fourteen inches wide."

Next question: "What system of governmental organization is prevalent on your world?"

Answer: "We have very rudimentary sanitation facilities."

The yeoman, by this time, knew enough to kill the sound as the Terran reply to any question was received.

"Gahdamid, Lang! They're making fun of us."

"I don't think so, sir. Really, sir."

"Then, *you're* making fun of *me*!"

"Sir?" Lang looked hurt. "I'm asking them the way you give them to me."

The aliens' steam car was sending little rings of gray smoke into the still, blue sky.

The Xeycan, standing on one leg, had gone to sleep and had to be awakened for the next question.

Bonspiel shoved Lang aside and said into the Borkan's face, "What is your principal industry?"

The first Borkan snickered and asked his countryman, "We-hee would wa-hant to find wha-hat you do most to exist."

"In sse relationships of businessss between you, what activity do you perform sse most of during sse bulk of sse time-period?"

The Xeycan yawned and stretched his arms. "Whjat djo jyou djo the mjost jof?"

The headman took off his hat, scratched his head, and scuffed his toe in the dust. "Njothing wje djon't hjave tjo," he replied.

The Xeycan sat down on the tread housing and yawned again. "Most of sse time we do nossing," he said wearily to the second Borkan.

The second Borkan looked a little fearful. That wasn't much of an answer, he thought. "During the grheater par-hart of the ti-hime period, we do not have any acti-hivity. Uhhhh. Your 'business' is something wehee have almost none of."

The first Borkan turned to Commander Bonspiel and barked in his face, "None of *your* business!"

Bonspiel edged closer to Lang. "That was pretty sharp, even if it does sort of make some sense—finally. You don't think they're—uh—hostile, do you, Mister Lang?"

"I shouldn't imagine so, sir. Touchy, perhaps, but not hostile."

"Mmmm. They look like something of a cowardly, superstitious lot to me."

"Tut, tut, Commander. See how they're smiling at us."

"No matter. Cannibals smile, too, you know."

"Let's ask them if they like us."

"Good idea. Do it."

Question: "We are here on a peaceful errand, and have come from beyond the stars to make friends with you. Do you wish to become our

friends and our allies?"

Answer: "We, as a culture, do not necessarily believe that the personality lives on after bodily death, but if your people believe in "angels" we are willing to accommodate you."

"Does that sound hostile to you, Commander?"

"Mmmmrpf. Not really hostile. More diplomatically aggressive."

"That was my thought, too. Wait a minute, sir." Lang turned to the first Borkan. "Are you," he asked, "giving me the answers exactly as you get them from your buddy here?"

"Why sure, Lootenant," the Borkan replied. "I can't make a perfect, *literal* translation, of course, on account of little wrinkles in the language that just don't come over precisely into Terran. You know that. Besides, Stinky, here," he indicated his Borkan colleague, "is a college man, and is inclined to couch the translated statement in a pretty embroidered, flowery gutch of protocol, heavily larded with diplomatic terms. Naturally, I'm stripping all that gutch off in my translation. Otherwise, it would be afternoon before we'd said good morning. It's not his fault, though, really. He just finished doing a hitch at the Borkan Embassy on Xeyca. Filthy business, if you ask me—all that bowing and scraping..."

"But," Lang broke in, "are you giving me a *correct* translation?"

"Hell, yes! I'm up for petty officer, you know. Why would I want to give you a bum translation? Gee-hee, Lootenant."

"Okay. I wasn't impugning your ability to perform the duty. Just asking a simple question."

Question: "Is it acceptable for us to remain on your world for a few time-periods?"

Answer: "Mostly, we are carnivores, but we will eat anything."

Question: "Just exactly what *did* happen to the scientific survey team?"

Answer: "They were very good men."

Question: "We desire to extend the benefits of our science and the technology of our civilization to you. Do you accept our offer of this assistance to your people?"

Answer: "We have already stated we will eat anything."

Question: "We would like to return at a future time, when we may discuss these matters further. Are you agreeable to that?"

Answer: "It is almost lunch time, now."

"....And, while the native population appears to be friendly enough and cooperative to a certain degree on the surface of our contact with them, I seemed to detect a certain covert hostility—or latent aggressiveness—through their constant comments on diet, which suggested to me the possibility that they are inclined toward xenophobic cannibalism.

"I would conclude from my observations that a recommendation would be in order that further attempts to open cultural contact on any intensive

level with the people of Lloga be maintained on a responsive organizational capability level, on a strictly military basis, accompanied by appropriate shows of force and optional policy contingencies.

"A most interesting and culturally significant factor about the Llogans is their accomplishment of developing their civilization to its present level, in spite of the fact that they have no empirically demonstrable concept of linguistic communications. A likely reason for this phenomenon—to me, at least—could lie in something along the lines that they may be a partially telepathic race, the subsequent use of spoken language having deteriorated to a level that no longer has any perceivable syntax."

Commander Bonspiel turned off the dictating machine. He went across the compartment to his bunk, where he lay down, pinched the bridge of his nose with thumb and forefinger, and closed his eyes.

"I've got to do it," he said aloud to himself. "I am going to put in for that transfer to Docks and Yards when we get home. This is a dangerous business, and I'm not getting any younger."

He rolled over and yawned. "I don't have the starch I used to. Who wants to face the possibility of winding up in some native stew-pot on the other side of the galaxy? Ruins a man's disposition. Hard on the digestion..."

He slept.

"Come on," grumped Doctor Selsius. "Can't you get any more speed out of this thing?" As project engineer and xenologist on the survey team, Dr. Selsius felt somehow responsible for the accident that had smashed their vessel and left them marooned on Lloga. He had been on the prod ever since.

Corrigan, the team exobiologist, was sweating visibly in the noontime heat of Lloga as he fought the controls of the steam car the Llogans had loaned them. He muttered under his breath, praying that they could make contact with the evaluation team which they knew would be landing from the *W.R.S. Lord Byron*. "Take it easy, Clyde. I'm still not quite sure how to steer this thing. Besides, when we got the message that some more Terrans were landing, we told the Llogans to pass the word. They'll wait for us."

Dr. Selsius mopped his balding forehead with his handkerchief. "Sure, sure, sure. I don't want to risk missing the boat, again. That's all."

It was mid-afternoon before Doctors Selsius and Corrigan discovered that they had, in fact, missed the boat. Several hours of scurrying around the back roads that ringed the Llogan village where, they had been told, the Terrans had landed had produced no evidence to that effect. Their steam car was puffing peripatetically from Corrigan's abuse of it. The steam car chugged persistent protests at them. *Pocketa, pocketa, pocketa.*

Finally, they encountered a Llogan farmer who was in a rather bad mood. He was smoothing over a large depression in one of his fields and mending

the fence where the Language Section's lander had broken it down.

Using the electronic translator and the keys to the Llogan language which they had spent several weeks preparing and programming, the two survey team members incredulously received the news that the "others like you," meaning without any doubt other Terrans, had landed, talked to the village headman, then departed into the sky.

"Oh, my God!" wailed Dr. Selsius, his eyes bulging. "It's not possible!"

Corrigan chuckled cynically.

Further questioning of the farmer proved fruitless. He was vastly more interested in crops than in politics. While he was perfectly polite to the two Terrans, he simply was not possessed of sufficient interest to have absorbed any other information that could be useful to them.

"Watch out for the equipment, Clyde," Corrigan remarked drily, as Dr. Selsius stumbled in the dust of the village street and nearly fell.

At the arrival of the two Terrans in the steam car, the village headman had opened his eyes to see what the commotion was. He did not get up, but remained seated in the shade. "Tjerrans!" he snorted quietly. "Alwjays rjushing arojund in the hjot sjun. Cjooks their brjains, Ji jimagine, jand *that's* whjat majakes thjem crjazy."

By the time the headman had finished his *sotto voce* speculation, Dr. Selsius stood, panting, before him and fiddling with the controls of his translator. Corrigan, who always wore a hat and avoided any exertion he could in the hot climate of Lloga, was coming up slowly behind him.

After considerable questioning, it was determined that the Terrans had, indeed, landed in the field. No, they hadn't stayed long. They appeared to be in a hurry. Yes, we asked them to stay until you could get there. Yes, we told them your ship was disabled. Why didn't they stay? I don't know, except they didn't make much sense.

"Egad!" exclaimed Dr. Selsius. "Did you tell them about the *vitis purpurea llogis*?"

"The what?"

"The *grjubwjort*!" Selsius stuttered over the unfamiliar syllables.

"Oh, the *grjubwjort*. Sjure, I told them we have a plant here that your people thought was very important."

"Very important," lamented Selsius. "Only the medical discovery of the century, is all."

"To you, maybe," the headman replied. "To us it's a weed."

"What did they say?" Selsius asked, mopping his forehead.

The headman shook his head. "I know this will sound strange, but they said their leader was a string saver."

Dr. Selsius turned to Dr. Corrigan. "If I ever get off this—" he clapped his hand over the pickup on the translator, so the headman would not hear "—nutty planet, so help me God I'm going to transfer over into Research and Development. These prelim surveys just take too much out of me."

"Did you tell them," he asked the

Llogan, "we think a compound can be refined from the *grjubwjort* that will initiate tissue regeneration in humans?"

The headman nodded. "Sjure. They replied that they were too busy to talk about frogs just then."

Dr. Selsius sank wearily down and sat on the bench next to the headman. He fished in his pocket and dug out a small billet of aluminum sheet, about four centimeters square, and handed it to Corrigan. After the supplies had run out on their crashed vessel, the survey team had been cannibalizing the aluminum from it in order to stay alive. Aluminum, being the scarcest metal on Lloga, was the medium of exchange. The natives used it for money.

"Corrigan," Dr. Selsius called to the exobiologist. "Send over to the tavern and get us a couple stiff belts of the local spirits that these people drink. I've got to get some alcohol and quinine in my bloodstream or I'm going to have a stroke."

Corrigan moved with surprising speed as he confronted a passing Llogan and briskly asked him to bring a large measure of *busthead*. He couldn't pronounce the native word, but it sounded a lot like *busthead*.

Safe in his compartment aboard the *W.R.S. Lord Byron,* Lieutenant James Lang sat, hunched over his micro-reader. "Let's see, now," he remarked aloud. "We have a computer-keyed soundprint tape of the language on Vega II, but when we set down on Gamma Lyra VI, we'll have to use manual vocable translation—with two translators. Hmmm. I wonder if I could get my next promotion any faster if I transferred to Docks and Yards. . . . Maybe there's an opening somewhere in a quiet little embassy, off the beaten track. . . ."

The air changing equipment was acting up, again, and the sounds of the malfunction were carried softly, through the system, to every part of the *Good Ship Clubfoot. Pocketa, pocketa, pocketa. . .*

Dr. Selsius felt better after a nice cool drink that was about fifty percent *busthead*. He turned to the Llogan headman and switched on the translator. "*Please*," he implored. "The next time Terrans land here—the very next group of our own people that you see—get them to wait for us before they leave."

The headman poked out his lower lip, shrugged his shoulders, and lifted his hand skyward, palm up. "I'll do the very best I can," he replied.

Dr. Selsius looked wistfully up into the blue sky. "They *have* to have some more evaluation missions scheduled," he said. "Another ship is bound to come by and land—especially when they find out we missed our next log checkpoint."

He turned back to the headman of the village. "We've *got* to make contact with our own people. Do you suppose—the next time some Terrans land here—you could be *sure* they pick us up and take us home? Could

you—I mean, would you—use force if necessary to make sure they stay until we can meet them? So they can—for God's sake—*rescue* us?"

"Sjure," the headman replied amiably. "As long as you keep giving us those little pieces of *ajajiht,* we'll do anything we can for you."

Dr. Selsius sighed and looked down at the native ice in his glass. He shook it slightly from side to side. The pieces of ice clinked against the Llogan glass, making a soft *pocketa, pocketa* sound that comforted and reassured him. ■

In Times to Come

Anybody who reads this magazine inevitably encounters the name of John W. Campbell, Jr., who so profoundly affected the shape of science fiction as the editor of Astounding/Analog from 1937 until his death in 1971. But that's long enough ago that many readers who've joined us since then probably have little feeling of knowing him as much more than a name. Next month we feature a two-pronged tribute to Campbell, to remedy this situation. First, there's a very personal remembrance of John and his wife Peg (who died late last year), by Kelly Freas, who, as a long-time top illustrator for the magazine, was very close to both of the Campbells, both professionally and personally. Second, I yield the June editorial floor to John. I mentioned earlier that I planned to avoid reprinting old material during our Fiftieth Anniversary year, but this is the one exception I feel I *must* make. You've all heard about the famous Campbell editorials; if you've never actually read one, here's your chance—and you may be surprised at how timely it remains.

Our cover story is Jack Williamson's "The Humanoid Universe," a new tale of the "humanoids" created "to serve and obey and guard men from harm." It sounds like a good idea, but think about the implications of doing *exactly* that. The original humanoid stories were some of Williamson's most famous stories in Astounding; the new one, with a striking cover by Paul Lehr, is set still farther in the future, when the humanoids' dominance has spread and spread . . .

We'll also have a new Callahan's Bar story by Spider Robinson, a speculative article on what happens "Beyond First Contact" by M. David Stone, and the usual mixed bag of other stories and features.

A Cynic's View of the Moon Treaty

G. HARRY STINE

The current "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" of the United Nations is causing a lot of furor and worry. My esteemed alter-ego of this column, Dr. Jerry Pournelle, devoted the entire January 1980 column to it. Since it is our charge to present alternate views on various subjects, herewith is a cynic's view of that agreement.

I am a firm believer in the words put into the mouth of Delos D. Harriman by Robert A. Heinlein in *The Man Who Sold the Moon* (Shasta Publishers, Chicago, 1950, page 189):

"Damnation, nationalism should stop at the stratosphere."

Unfortunately, it hasn't.

I am one of those cynics who believes that the U.N. moon treaty is a piece of paper on which is written an agreement between separate parties. Such agreements, contracts, treaties, etc. are as ephemeral and as subject to reinterpretation as any promise. There are over half a million lawyers in the U.S. alone who will confirm this. If agreements on pieces of paper were truly binding, most of these lawyers would be out of work.

The United Nations currently has three resolutions or treaties relating to astronautics:

1884(XVIII) Question of General and Complete Disarmament, 1244th Plenary Meeting, 17 October 1963.

1962(XVIII) Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1280th Plenary Meeting, 13 December 1963.

The Treaty Limiting Military Activities In Space, passed for signature on 19 December 1966. By 27 January 1967, this treaty had been signed by 62 nations, including the U.S., the U.K., and the U.S.S.R. It forbids the placement of nuclear or mass destruction weapons in orbit, on the moon, or on other celestial bodies; forbids military installations on the moon or planets; and bans military maneuvers originating from the moon or planets. By 27 January 1980, it was becoming meaningless because of the development of particle beam weapons (PBW) and high energy lasers (HEL). This treaty will become increasingly meaningless as technical developments progress because none of those who drafted it foresaw the development of PBW and HEL *less than 20 years in the future!*

The U.N. moon treaty not only suffers from this same sort of shortsightedness in its technology forecasting, but suffers an even greater drawback: it is an agreement, which can be abrogated at any time.

Some people have loudly claimed that the U.N. moon treaty amounts to

a death warrant for the human race because it would prevent the industrial development of space beyond the Earth just as the U.N. treaty on ocean resources has prevented the development of ocean-bed mining. Let's look at it from an alternate viewpoint: the U.N. moon treaty may be the death warrant for the *United Nations* because it is unenforceable, unrealistic, and will go the way of most other treaties in history.

There are few international treaties of any consequence that have lasted more than twenty-five years, much less a century. One of these few is the agreement reached between U.S. President James Knox Polk and the British Ambassador to the United States, Richard Parkenham, on 15 June 1846 establishing the boundary between the United States and Canada at the 49th parallel.

On the other hand the obituary list of international treaties is long. Here are only a few of the most recent and important ones:

The Treaty of Tordesillas in 1494 divided the western hemisphere between Spain and Portugal, while the Treaty of Zaragoza in 1529 divided the Far East between the same two powers. The authority standing behind these two treaties was the international equivalent of the U.N. of the time: the papacy. Neither Spain nor Portugal followed either treaty, and the other European nations who were carving out colonial empires ignored them completely.

The Congress of Vienna in 1815 established the international order in Europe following Napoleon's stirring of the pot. That went down the drain for good in 1871 during the Franco-Prussian War.

The Congress of Berlin divvied-up the Balkans in 1878, but the Balkan Wars of 1912-1913 made a shambles of that long-forgotten agreement.

The Covenant Provisions of the Treaty of Versailles in 1919 set up the League of Nations. No additional comment necessary.

The Washington Naval Treaty of 1922, including the four-power Pacific Peace Treaty also signed at that time, set limits on naval power in the Pacific Ocean area. Less than 20 years after it was signed, the signatories thereto were involved in a general war.

The Kellog-Briand Pact of 1928 outlawed the use of war as an instrument of national policy. *Sixty* nations signed it, including the U.S. Some of them were at war when they signed it. All were at war a mere eleven years later.

The U.S. Neutrality Act of 1935 is a fine example of what we are discussing. Not only had the U.S. signed the Kellog-Briand Pact stating that we ain't a-gonna study war no more, but the U.S. Congress passed a *federal law* stating that private enterprise in the U.S. could not supply weapons or munitions to any warring nation... which U.S. firms were doing at the time and which they kept right on doing anyway. But it made good PR.

The Atlantic Charter of 14 August 1941 was solemnly signed amidst much

PR flak during a war planning meeting between U.S. President F.D. Roosevelt representing a nation that was not formally at war, and British Prime Minister W.S. Churchill, representing a nation that was. Fine-sounding document! How well has *either* nation lived up to it, much less any other nation in the world?

Recently, a most important legal precedent was established: an international agreement must, under the Constitution of the United States of America, be approved by the United States Senate; but *any* international agreement approved by the United States Senate can be abrogated by a simple Executive Order of the President of the U.S. *without* the approval of the Senate! How many people realized that this was the motivation behind Senator Barry M. Goldwater's lawsuit against the federal government over the Taiwan defense treaty abrogation by President Carter?

Pardon my cynicism. I have made the mistake of reading too much history written by diverse sources.

Forecast: The U.S. will most likely *not* be a signatory to the U.N. moon treaty. However, in the unlikely event that it mistakenly does sign said treaty in a burst of altruism trying to curry favor among the Third World nations who intend to bring the whole world down to their level anyway, it is most likely that space industrialization will be set back only twenty years *at the very most*. Space transportation is no longer high technology. The know-how exists in demonstrable form in at least seven nations who have built and launched their own indigenous vehicles; it exists in latent form in at least seven other nations right now who *could* do it if they *wanted* to do it (but find it cheaper to buy launch services from the U.S.A. or the U.S.S.R. instead).

International forms of private enterprise organization exist that permit those who want to do it badly enough to be able to thumb their noses at international law, treaties, and the ephemeral "world opinion." How? Study some history. It's been done before, and it will be done again, albeit perhaps not in the same ways it was in the past, but in some variation of those ways. (Part of the reason for *The Alternate View* is to get you inspired or angry enough to do some thinking on your own, which is an Analog policy developed by John W. Campbell that has been carefully nurtured by the Editor ever since.)

The other side of the aisle claims that the U.N. moon treaty will prevent the investment of the required capital in space industrialization by private enterprise just as the U.N. ocean treaty has prevented the development of ocean-bed mining. There are a number of important factors to keep in mind before attempting to justify such a similarity.

There are some manganese nodules on the ocean bottom. Using off-shore deep water petroleum drilling techniques, these can be sucked off the ocean floor and brought to the surface. But deep ocean mining is in direct competition with other ter-

restrial sources of the same materials that are already established within political boundaries, that have well-developed technologies, and that have a track record that hollers "low risk" to investors. Therefore, commercial extractive industries have opted for the easy way out: to hell with mining the ocean when there are mountains of manganese in Colorado and elsewhere that only require enough money to battle the environmentalists in order to work the sites. Speaking of international treaties, how well are we all doing with respect to former agreements on the limits of territorial waters? Incidentally, the ocean treaty has *not* stopped the development and establishment of deep water off-shore petroleum rigs; why?

Space industrialization, on the other hand, is *not* just extraterrestrial materials. It is *not* just space colonization. It is *not* just space processing. It is *not* just solar power satellites.

Space industrialization is an inadequate term now used to describe the expansion of a social activity, industrialization, beyond Planet Earth. It involves every one of Herman Kahn's four industrial categories: (a) the primary or extractive industries such as extraterrestrial mining, (b) the secondary or manufacturing industries which include the area now called "space processing" or "materials processing in space," (c) the tertiary or service industries category which is exemplified by the highly successful and profitable segment of space industrialization utilizing communications/information satellites, and (d) the quaternary industries which are activities "done for their own sake" and include the arts, scientific research, and exploration, all of which are already established parts of space industrialization.

On Earth, our industrial base proceeded from the primary to the quaternary. In space, it has been just the opposite! We started out with the quaternary category and are proceeding toward the primary category! Let's kick that one around for fun some time....

The U.N. moon treaty specifically exempts the tertiary and quaternary categories already established in Earth orbit. No international diplomat in his right mind is going to throw a monkey wrench into established systems already in place, especially when one of them handles more than half of all the communications traffic of the world and permits him to talk to his boss by telephone anytime he wants to!

Space industrialization is a juggernaut. It is bigger, more complex, more all-encompassing, and more predictable than most people believe, even those who know something about it. It involves riches beyond our wildest dreams and far exceeding those of the Indies and Far Araby and Cathay that motivated our European ancestors 500 years ago. It involves one average middle-aged star, nine major planets (only one of which we know even a little bit about), 34 major planetary satellites (some larger than our own moon), 4 major satellite-sized plane-

toids, an estimated 40,000 planetoids, and an unknown number of comets and other pieces of space junk. One planet alone, Jupiter, contains nearly three-fourths of all the mass in the solar system other than the sun.

A paltry sum of $80 billion has been mentioned as an up-front requirement to set up only the solar power satellite system. I label it a "paltry" sum because it is indeed when compared to the investment that will be required for space industrialization itself. Nobody ever said it was going to be cheap! But two things have not been mentioned:

(1) We are going to have to spend that $80 billion *anyway* to insure an adequate electric power supply for the U.S. alone, but it will be spent over the next 25 years, not next month. It costs $2000 per kilowatt (installed) to build a coal-fired electric generating plant *or* a solar power satellite.

(2) With the solar power satellite system, a large and low-cost space transportation system is also purchased as part of that $2000 per kilowatt (installed) cost!

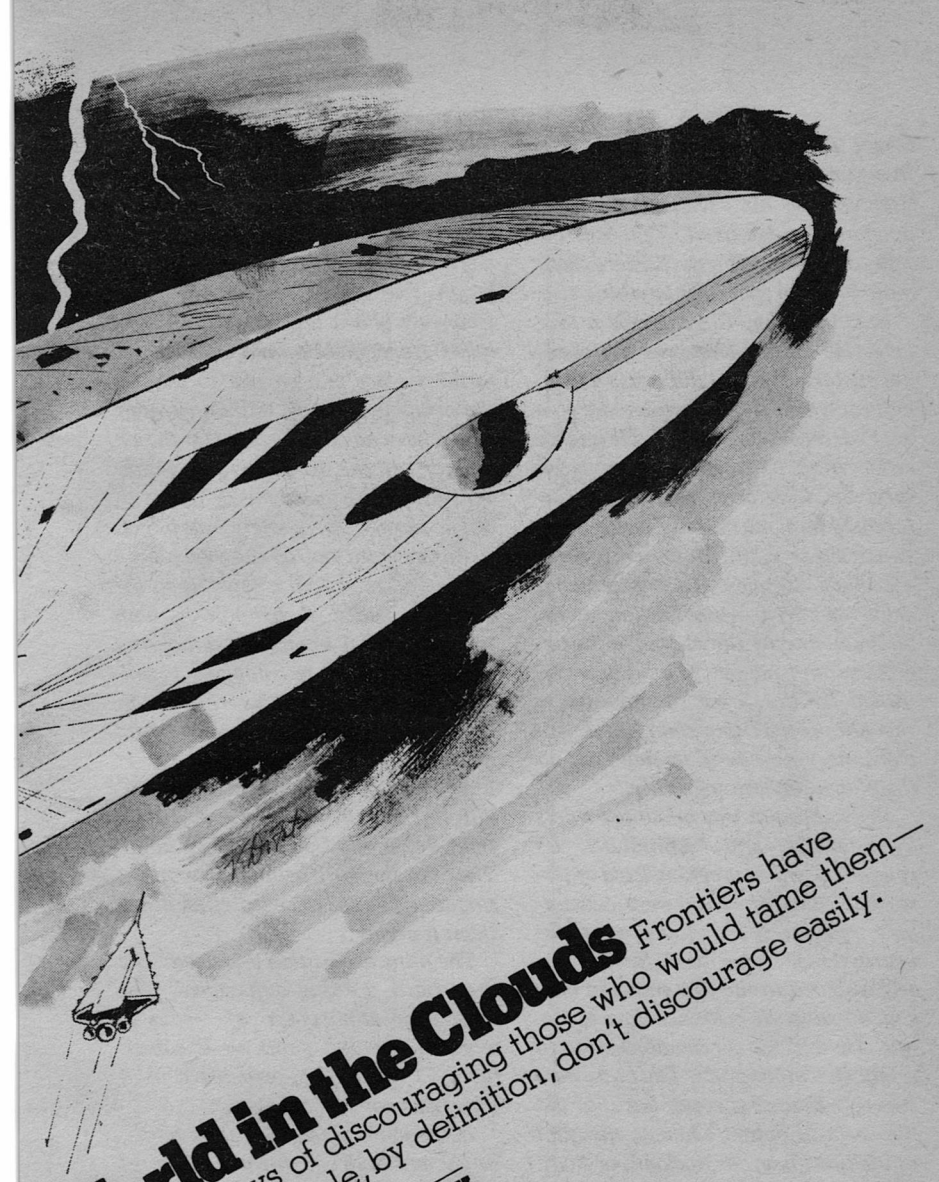
It is becoming increasingly apparent that the human race *needs* more than one planet. It is also apparent from history that the "common heritage of all mankind" (whatever that really means) is best developed through joint government and private enterprise arrangements. We *know* the system works, and we know several variations of the basic system that can be brought into play to get the job started. The U.N. moon treaty isn't one of them. Sorry, but history tells us that the chances are very slim that the treaty will hold up for more than twenty-five years if it is ever signed by the U.S....and a twenty-five-year hiatus will *not* result in the inevitability of Doomsday. This statement is based on the comprehensive 1978 study on space industrialization conducted for NASA by Science Applications, Inc. which included, by the way, a scenario wherein a cooling of the northern hemisphere was considered as a possible driver...and dismissed because data indicated it to be a "bizarre" scenario.

Beyond the year 2025, however, it could be a different story. But that is so far in the future that it's difficult to call the shots with any degree of precision. The decision tree has branched too widely by that time. After all, that's 45 years away.

To get some perspective, 45 years in the past was 1935. The critical experiment in nuclear technology would not be made by Otto Hahn and Frantz Strassman in Berlin for another three years. Oberst Dr. Ing. Walter Dornberger and Dr. Wernher von Braun were working with a 1.5-meter 150-kilogram test rocket called "A.2" on an artillery range called Kummersdorf West 17 miles south of Berlin and hadn't even heard of places named Tyuratam or Cape Canaveral. Nobody knew what a transistor was in 1935, much less an LSI or a laser. And all engineers used slide rules....

There's more to this alternate view ...next time. ■


VINCENT DiFATE



World in the Clouds

Frontiers have many ways of discouraging those who would tame them—but frontier people, by definition, don't discourage easily.

BOB BUCKLEY

Part Three of Three Parts

SYNOPSIS

Roger Teale, while a youth, lived as free-hunting street tough, and by the standards of his peers, was nothing outstanding. He lived. That was the sum total of his efforts, there was little motivation to strive for anything else.

But, in living, Roger made a mistake. He killed. That was not really the mistake... but it did cause a commotion which in turn attracted a roving Federal Welfare patrol. He and his little group of tattered, incorrigible survivors were arrested, brought before a federal magistrate, and quickly sentenced to a life labor term in the planetary colonies. Roger's sentence delivered him to Venus Station, an orbital satellite of the cloudy, inhospitable second planet. The Station was owned by the Sayre Foundation, a vast nonprofit corporation whose motivations were nearly as nebulous as the planet undergoing study.

Venus Station was inhabited solely by scientists and technicians. Its roughneck workforce consisted of terrestrial convicts. They were expendable, more so if they failed to follow instructions. Roger soon found himself assigned to the first manned mission down to the hellish surface of Venus. He and his companions were to establish a mining site. The odds were strongly against success, but that did not seem to bother Chaney, the pilot of the first glider; or Borland, or Beth, Roger's crewmates in the second.

Beth was attractive and more friendly than most of the free technicians had been to a mere convict. Roger, despite his cold, unfeeling façade, began to develop a liking for the girl. But the pressures of the mission, and his own clumsiness got in the way of any progress.

The trip down to the surface was rough. The landing was rougher. In it, Chaney's glider crashed and he was killed. Roger and Borland went out onto the surface in a crawler to retrieve the portable reactor. Without it, they would have no power source for the excavator and the life-saving first chamber of the mine could not be dug.

The reactor, fortunately, was intact. It was dragged out of the wreck on a sledge and rigged on a tow line to the surviving glider. A temporary camp was set up. But Venus had not agreed to allow herself to be colonized. A sudden windstorm wrecks the camp. Borland is killed, and Roger and Beth are forced to flee in the glider.

Whether because of the savage conditions, or through genuine attraction, Roger and Beth develop a bond. They are the only people alive on the surface of Venus. The isolation draws them together.

The mine excavation is started. The first shafts are dug and sealed. The poisonous atmosphere of Venus is pumped out and good air is substituted. The landing, expensive as it was, has proved a success.

After some time celebrating alone, Roger and Beth call down the support team that will put the mine into full-scale operation. Venus has been tamed.

But with the influx of strangers, scientists and free technicians, Roger

finds himself an outcast again. He is no longer at the forefront of the action. Beth is busy with her work. He finds himself alone, unimportant and ignored. Then, while wandering one of the deep shafts, he comes across a scientist, Forsyth, a geologist. Forsyth offers to get him enrolled in the Venus Station college. At first, Roger refuses. But, after reflection, he realizes that it is one way to get a handle on his future. Forsyth accepts his application with pleasure. Beth, however, takes the news with something less than enthusiasm, and accuses Roger of deserting her. The parting is not a pleasant one, and it leaves Roger feeling guilty.

Three months later he is called into Forsyth's quarters from class. The old man is distressed. He tells Roger that the Mining Station on the surface has been destroyed. Beth is dead.

Roger hits his emotional bottom. He goes off and sulks.

The rough life on the streets had given him a certain resilience, however. Soon, he is back at class, working hard to drown the memories. Also, there are other things to worry about. Like work parties, and faulty equipment. There are times when it seems that Venus Station is falling apart. Money is short, and new supplies are almost nonexistent. There is a lot of antagonism directed against the Sayre Foundation by the convict students, and even the free students. There have been too many preventable deaths. And other accidents, as well.

Then it is time for grades to come out. Graduation time. Roger is lucky. His work has paid off. He graduates. His buddy, Dennis, is less fortunate. He is set back, and is bitter.

But now, Roger's career is really starting. He is hired into Forsyth's section and discovers that the Sayre Foundation is determined to terraform Venus, to make it livable for men. It is a staggering task. Roger doubts that it can be done...publicly at a party for the new-hires.

The next day, as the work periods on the Station are called, Roger and Forsyth witness the test of one of the machines which will tame the savage Venusian conditions. But during the test there is an accident. An accident that looks very, very suspicious....

Sabotage. Roger learns from Forsyth that there is a destructive element making itself known in the colony. The Foundation has no idea who it is, but with a station crewed by convicts there is always a fertile bed for dissent. Forsyth enlists Roger's help in ferreting out the group. For lack of a real name, that is what the countergroup becomes known as, simply the Group.

But there is more to be accomplished than spying. It is decided to test an atmospheric conversion device and a model Skystation under actual Venusian conditions. Roger, his flight training behind him, is elected as pilot for the mission. There is some dissent about his qualifications from another crew member, but he toughs the situation out, and takes the shuttle down. His new romantic interest goes along, a technician named Irene, and the

flight begins well. It can't last, not on Venus, and it doesn't.

After releasing its two remotely controlled test models, the shuttle is seized by an upper atmosphere storm. In the violence of the winds Roger loses control The shuttle enters a downdraft and dives toward the hellish surface of the planet. It can only be a one-way trip....

Against all odds, the shuttle survives...partly due to Roger activating an automatic pilot, and partly to the shuttle entering an updraft equally as powerful as the downdraft that was dragging the ship to destruction.

Back at the Station, Roger and his crew are debriefed. Although risky, the flight has made a professional of Roger. He even receives some low-key praise from Smyth, the Station manager. Smyth also warns him that he will keep an eye on him, something Roger is not particularly enthusiastic about.

A major stage in the mission now begins. The first, large-scale Skystation will be assembled between the second and third cloudbanks where conditions are as tolerable as they ever could be on Venus. The Station will float like a metallic balloon, supported by helium chambers, with an internal gondola as living quarters. It will be saucer-shaped, to present as little resistance as possible to the violent storms of the upper atmosphere.

During his training phase, Roger begins to notice a change in Dennis, his school chum. The boy is depressed. What Roger doesn't know is that the Group has made contact with him and recruited him as one of their pawns.

Alone, feeling set against, Dennis decides to work actively against the Sayre Foundation so that he can be sent back to Earth.

Ignorant of this, Roger asks the boy to join the section as a crew member on the Skystation project. At the same moment, Roger is introduced to a newcomer: George Callaghan, the man who had the sorry job of inspecting Mining Station Charlie after the blow-out killed all of its inhabitants. At first, Roger is uncomfortable and cold to the pilot. But, gradually, a friendship develops between them. Callaghan is mature, experienced, and seems unruffled by the almost daily emergencies on the Station. He is just what the boy has needed as an example.

When everything is ready, the shuttle crews descend and start constructing the Skystation. At first, all goes well. Then, while Roger is waiting for his work team to finish up their shift, he notices that Dennis is acting very nervous. When questioned, the boy can only make bad excuses, and Roger becomes suspicious. He orders his team leader to start a search of the partially finished Skystation. At this point, Dennis breaks down and confesses that he has put a bomb aboard the Station. He yields the location and Roger informs Mike. The bomb is discovered and tossed out into the clouds. It explodes far below.

Even Dennis is surprised, for the explosion is much more powerful than he expected. Apparently the Group wanted to remove its operative as well

as the Station. This hits Dennis hard.

Now, back at Venus Station, a traitor must be dealt with. Smyth votes for immediate execution of Dennis. Roger pleads violently and with very little tact, for mercy, for a chance to turn Dennis against the Group. Finally, he wins. Dennis becomes a double agent. He is to cause the Group to bring Roger into its ranks so that the Foundation can find out who the Group really is. A dangerous ploy, but a necessary one.

The Skystation is now finished. Roger, Irene, Callaghan, and a crew of technicians transfer to it. Theirs will be the honor of the shake-down cruise, not that the Station cruises anywhere except around and around the planet borne by the 200 mph winds of the upper atmosphere.

The Station proves airworthy. After a while, Forsyth joins them. He is still trying to perfect his atmospheric conversion unit, a device he calls VACU, which will slowly convert some of the excessive CO_2 in the Venusian atmosphere into oxygen. The units will have to be mass-produced and set adrift in great numbers to be effective, but Forsyth is hopeful about his plan, more so than Roger.

When Dennis messages them from Venus Station, they discover that the Group also has an interest in VACU . . . they want to destroy it, and all its copies. It's another bomb plot, but this time they are in on it from the beginning. They develop an ingenious defense, one which can only confuse the organizers of the Group. Round Two goes to the Foundation.

Irene begins genetic engineering experiments, trying to develop a simple alga that will be able to exist adrift the cloudbanks of Venus. It's all beyond Roger's experience, so he concentrates on studying the violent Venusian meteorology.

Then, he receives a message and policy book from the Group. At first glance, it looks very harmless. Here is one more crackpot cult, secret and ineffective. Then, using a UV lamp, Irene discovers secret writing. Roger is in! All he has to do now is prove himself to his invisible masters.

And he has one other master, besides. Irene has fallen in love, and he is the object. Roger also discovers that he and Callaghan have been elected to disperse the first crop of algae cells. Their craft will be an insubstantial balloon called a squid. Callaghan doesn't seem to mind, but Roger is uneasy. He finds it difficult to trust a craft with plastic sheeting for bulkheads. But the squid is more sound than it seems. They jet away from the Skystation and begin their mission. At the proper altitude Roger releases the crop. It spills away like green snow and vanishes into the mists. Callaghan turns the squid and heads for home . . . directly into a storm. The squid is tossed and buffeted by the winds. Soon, they are totally lost, in a sea of clouds as large as a world, and only one small port to call home. As the lightning lashes about them Roger begins to doubt that he will ever see Irene again. If there were any odds at

all to bet on that they would get back to the Station they were all bad . . . .

14

The deck creaked and swayed as I crawled up beside Callaghan. Outside, and overhead, guylines were groaning as the wind strained at them. It was dark everywhere. The storm had died away to an ominous calm. But the wind held true, due west. We were still trapped fast in its grip.

"I'll take over," I told Callaghan. "Crawl aft and have a rest. You can't keep this up much longer."

At first, he resisted giving up the guidelines. But he had caught himself nodding off at more frequent intervals and he knew my suggestion was a good one.

This was no place for false heroics.

I lowered myself into the seat and pulled the belts tight about me.

"Don't forget to check the DF," Callaghan told me sleepily. "It's the only way we have of locating the Sky station."

"Got 'ya. Just sack out and don't worry."

What a liar I was. There was no hope in the world of finding the Station, and I think both of us knew it by then. The storm had separated us completely. We'd never find our way back before we ran out of tanked air. We were about to become a legend, one of the 'lost ships' of Venus, forever doomed to wander the clouds seeking a home.

But lack of hope didn't prevent me from keeping the strobes going atop the gondola. The red and blue flashers probed far out into the clouds with their piercing beams, making circles of radiance as they pivoted around and around on their mounts.

If only there were something out there to see them.

The motors were stopped. I was conserving the batteries, as Callaghan had been doing before I had taken over his station. The wind was strong enough that the jib and balloon canopy gave us more than adequate control.

It was just that we didn't have anywhere in particular to go that made everything seem so futile.

Darkness continued, endless and bland. Time merged into the same dull stream until a minute seemed as long as an hour. Or was it that an hour was as long as a minute?

"Roger! What's that? Amidships, look there! What do you see?"

Groggily I turned at Callaghan's prompting. Was the darkness less intense where he was pointing? A faint red gleam seemed to flicker momentarily at the limit of vision.

"Just a reflection of our lights," I muttered. "Go back to sleep."

"No, it's not a reflection. Shut off the strobes, hurry."

I fumbled for the switch. My gloves rasped over the control panel. The strobes died away . . . but the phantom glow remained. There was something out in the clouds.

Callaghan came stumbling forward in a rush. He pulled down on the klaxon wire and the hooting shriek deafened us with its shrill loudness. Five times

he pulled the wire, and five times the sound leaped out into the night, echoing off the clouds until it faded finally into the distance.

"Lights," he choked. "Hit the lights!"

The strobes swelled into life.

And then, mercifully, a sound came to us out of the darkness.

Another klaxon! It was the second squid, they had come looking for us.

Thirty minutes later our two ships had found each other in the gloom and docked. Irene was the first to jump through our open hatch. She hugged Callaghan, then me. It seemed as though we would never break away, although the bulky suits made intimate contact almost impossible.

But it was the nearness of our bodies that counted. We rubbed our helmets together and wished aloud that such restraints had never been invented.

"You louse! What the hell do you mean by getting lost? That was a fool stunt."

"I know it," I agreed. "But what the hell, whoever said I was perfect?"

"I never did."

"I know that, cuddles. But one of these days you'll make a slip."

We rattled helmets again, mouthing love at each other.

"Thanks for finding us," I told her.

"Thanks, nothing. I had to find you, louse. Couldn't let you run out on me and get killed. I'm pregnant."

A moment of shock hit me.

"What? How could that be? I thought you were taking something?"

"Of course I was, at least until I was sure of you. But when we notified Smyth of our legal intentions last week by radio I didn't see any reason to wait any longer. It's best to take care of these things while you're young. And I'm not getting any younger. You found me as a desperate girl in need of a mature provider."

The shock turned to awe.

"I'm not sure I fit that mold... maybe you're expecting too much of me. My background isn't the best."

She laughed and pulled away.

"Captain Callaghan, would you transfer to the other squid? Dexter has a lock on the Skystation. We'll follow you back. There's replacement air for your tanks. Bring two over for us before you cast off."

"Yes ma'am."

Callaghan's dark shape moved off into the other squid through the narrow docking tube. He was back in a minute, trying not to grin.

We busied ourselves with replenishing my air. Then Dexter and Callaghan separated from us, and sheered away. I kept our squid astern of them and followed their lights through spotty patches of cloud.

Eventually, our long night began to break up into a milky, yellow dawn. And far ahead, a dull-colored saucer framed against a towering thunderhead, was the Skystation. It looked beautiful, but incredibly small.

"That's no place to raise a child, much less to have a baby," I told Irene firmly. "I believe it would be best for both you and the child if you were to abort and wait until later."

"You don't want my child?"

She had a hurt tone in her voice, and just a little anger.

"I want it very much, but I'm not going to risk losing you. And that's just what we'll both be doing if you keep this up."

"Why don't you just wait and have faith in me? I might surprise you. I know the present Station is too small, after all, it's just a prototype. But do you really think that this is the only Skystation on the planning board of the Foundation?"

"There's another?"

"It's already under construction on the opposite side of Venus. This one is to be a permanent settlement with a crew of one hundred and fifty. We'll transfer there once it's finished."

"And you never told me?"

Again the mischievous laugh.

"Well, you never asked me, jerk. Besides, it was a surprise."

"Some surprise," I grumbled to myself as I brought the squid up before the hatch and allowed the techs to catch our mooring posts. The main canopy deflated with a whoosh, and I gunned the engines and sent us darting into the wide interior of the lock before the gondola could drop.

Irene, considering that she was a potential mother, did not slack off on her work schedule. If anything, she began to work harder. She and Forsyth had developed another idea for dispersing algae. Now that it appeared her algae strains were surviving and actually reproducing in their harsh environment, she wanted to keep some of them close at hand. That meant tethering them near the Skystation.

Forsyth and some of the technicians devised a powered framework, a three dimensional trellis with electric stabilizing motors and a solar energy collector. It was fifty feet across, and one hundred feet deep. A catwalk crossed the center sections and allowed entry to the planting levels.

Algae do not have roots, but anchor themselves with holdfasts. Irene developed a trailing variety of algae which didn't mind dry air, and which grew like a vine. This was a cross of algae and fungus, and the end result was something like an interplanetary lichen.

But at least it looked like a plant.

We spent most of a day cementing embryonic buds to the plastic framing of the trellis until it was covered. Then, our work finished, we photographed the initial result and waited for the stuff to grow.

Not all of it did. Blame it on chromosome faults, or whatever, seventy percent of the planting withered and died. But the remaining thirty percent began to multiply. Long trailers twined up the supports, exposing bladderlike leaves to the watery sunlight. Again, this alga produced hydrogen and concentrated it in bladders, providing its own floatation, so the trellis was in no danger of sinking under the weight of the plants. The buoyance tanks, and slow-moving guidance props kept it about fifty yards off the Skystation. That was close enough to keep track of the plants, but not so near that storm

winds might smash the structure.

The engineered algae reproduced like crazy, growing so vigorously that it soon covered the entire trellis and trailed far below it in dark green hanging curtains.

That gave Irene another idea. The algae supported its own weight by its bladders. Why not 'seed' long tubes of plastic and set them adrift?

We attempted this as the next experiment, but kept the tubes tethered to the trellis until we could determine the end result.

Once the tubes were covered with growth, trailers hung down from the centerline. But because of the floatation bladders, the trailers soon curved upward. Instead of a green curtain, a pad of foliage began to develop as each trailer linked with the next and intermingled runners. The result was difficult to describe. Some of the techs labeled the mass of greenery a cloud jungle because it continued to spread and grow. Finally, we had to cut the tethers because the 'jungle' was threatening to take over the trellis of the experimental farm.

As the island of green drifted away from us on the wind, Callaghan turned to Irene and told her that she just might have created a monster. There was nothing to keep the algae in check. It had no natural enemies. And the savage weather hardly bothered it at all. In a few years wouldn't we run the risk of having the entire sky filled with drifting masses of plant life?

Irene didn't say anything, then. She merely looked thoughtful.

Two weeks later I was called up to Venus Station.

I had almost forgotten what it was like to have a solid deck under one's feet again. Smyth was unable to meet me at the lock. Instead, he sent one of his assistants, an administrator who introduced himself as Patrick Hobart.

I took an instant liking to him, and that was bad, since I didn't know anything about him. I was still a paranoid. To me, the Group had its tentacles everywhere. They were murky and invisible. They tainted everyone with their insidious presence.

Hobart was an engineer. He was the Master Designer of the new Skystation. The first thing we did after shaking hands and throwing platitudes at each other, was to go to his office to view the plans and scale model that was revolving over his drafting table.

It was here that I began to see him as a man, and not merely a symbol of authority for the Foundation.

You can know a man by his work. It's there that his true strength and character shine through.

If our own tiny Skystation were a flying saucer, then this second station was the great grandmother of all mother ships. She was huge.

Twelve hundred feet across, the upper surface was smooth and featureless, a great, flat arc of teflon coated boron composite sheeting. The underside repeated the same flat arc, but breaking the smoothness were three shallow domes. Each had three airlocks, and where our Skystation was windowless, this bore observation

chambers on her undersurface so that one could gaze down at the cloud-banks sweeping past.

It was a beautiful creation. There was no other way to describe it. The design was strong, simple...it would last. Critics had said the same thing about works of fine art.

I believe that Hobart had caught my feelings even though I hadn't uttered a single word of praise. Perhaps praise would have cheapened the feelings, in any case. We just glanced at each other, and Hobart understood.

He smiled.

"It's just too large to assemble in the clouds, so we built her up here beside the Station, and let her go down under her own power. Skipped her across the upper atmosphere like a flat stone until she matched airspeed with the first cloud deck. Couldn't have done it on Earth, but here, all of the atmosphere is like one vast, jet stream. Once the Station was in the flow we filled the buoyancy tanks and took her down. Ever hear of an atmospheric submarine?

"Well, that's what we've got down there."

"I hope you decided to call her something other than Skystation Two. She deserves better than that."

Hobart nodded. He reached out and touched the rim of the model. It began to spin faster under his touch.

"There was an election, of sorts, among the staff and workers. It was decided that she would be called Cytherea Station. A beautiful name for a beautiful lady. But most of us, in everyday talk, simply refer to her as Outpost. There's only a skeleton crew on her, now. But I expect your people from Skystation One will be boarding soon. That's the plan. You were informed?"

"In a round-about way," I admitted to Hobart hesitantly.

"We brought you up for orientation. You'll be trained firsthand on the new systems and then sent down to brief the others on what you've learned. Agreeable to you?"

"I can live with it. When do we start?"

"We already have. Take a seat."

It was like being back in school. From Hobart's office we traveled to a research lab and I was shown the computerized guidance and stabilizing systems that were in use aboard Outpost. Everything was automated, with triple backups. There was a manual override, but this was only for emergencies. Outpost flew herself, and maintained herself at a preselected altitude. She was an immense, semi-intelligent dirigible. She was also the first Venusian city.

Irene and I weren't going to be the first family in residence, either. Several other couples were expecting, too. Outpost had a well-equipped hospital, complete with maternity ward.

For the first time since learning that I was going to become a father, I began to relax. Having babies isn't easy for men, we have to handle all the worrying. But now, the doctor could worry for me.

It required a week in space to teach me all I needed to know about Outpost. Then Hobart gave me a day of liberty to assimilate everything and have some fun and relaxation.

I looked up some old friends, but they were busy with school work. Finals were coming up. They looked upon me as a stranger. I had been out of the college life too long. One actually called me a stodgy conservative. I almost belted him in the mouth before remembering that these were friends. Or, at least they had been.

Had I changed?

I wandered off to my cabin with a bottle of cheer, determined to celebrate alone if that was necessary.

But I forgot all about drinking when I saw the letter packet on the tiny desk in my cabin.

With eager hands I tore it open. A letter tumbled out. A letter and a key! The letter read:

It is now time to prove your loyalty. The key will fit the lock on Magazine A, Level Three. Take what you require and use it wisely. We are counting on you. Don't fail! Your reward will be great, Earth is still a beautiful world to the wealthy!

There was no signature, not even initials. But the note was clear in its intent. How many other letters like this one had been delivered to malcontents who would like to strike back against the Foundation?

The Group was back in action, and they had a new target: Outpost.

There was no longer any time for stealth. There was too much at stake. I had no idea as to who I could trust, but of all the people on Venus Station, the man least likely to want Outpost blown up would have to be Hobart. I went to him directly and laid the letter on his desk.

He read it without speaking.

"You know of the Group?" I asked quietly.

"There have been rumors of sabotage. I suspected that something like this might be going on. There were some strange accidents during the construction of Outpost. But we were never able to get proof. Several people died after the accidents. I believe they might have known something that someone else didn't want to get around."

"Yes, they kill. But very carefully. This isn't a gang of dope heads spitting hate back at a society that doesn't approve of them. The backers of the Group have money and education. That's what makes them so efficient and dangerous. I'm not even sure at this stage who I can trust."

Hobart gazed up at me. His desk lamp made the lines on his young-old face seem deeper.

"You're not even sure that you can trust me."

"No, I think I can. After all, you designed Outpost. If you didn't love her, then there's nothing in this universe that you do love!"

A slight smile touched his features.

"You know men, anyway, Teale. You seem to have risen above your childhood in the ghettos. Smyth had

warned me about you before I had you brought up. He said you were a troublemaker."

Now it was my turn to smile.

"I am a troublemaker. The only thing that has changed about me is who I *want* to make trouble *for*. And I think you know who that is. I have a wife, and she's expecting a child. I don't want anything to happen to either one of them, or their home. And that's Venus. The planet's not much, but it's all we have."

Hobart nodded almost absently. He touched a button on his intercom.

"Nancy, I want to see Frank. If he's not in his office, get him at his cabin ....Yes, right away. Make sure he knows it's an emergency."

Then he looked up at me again.

"You'd better get down to Level Three and pick up your explosives. I think someone will be watching your movements to make sure that you do as you were instructed. Let them believe that you're still on their side. That way they won't make other plans, plans we may not find out about in time.

"Are you game?"

"You know it. Who's this Frank?"

"Frank's one of the staff, very trustworthy. Recently, he's been busy coordinating the arrival of a Doctor Pitz who has some geologic work planned for the surface of Venus which sounds interesting. He's also been something of a foil for this mysterious Group of yours...our foil, that is. You see, the Group has been moving secretly and quite effectively for some months on the Station, and we are trying to determine their real aims. Personally, I do not see them as a great danger. That's probably not much reassurance for you. But I hope you'll trust us."

He the took a small transceiver from the top drawer of his desk.

"This has been set to a precise operating frequency. It's scrambled and jam-proof. Use it to get in touch with me, but only when it's absolutely necessary. Don't cry 'wolf,' that will be bad for everyone."

He stood up and held out his hand.

"It's been a pleasure having you up here. You're a capable student. I hope you're just as capable a spy."

I shook hands and accepted the transceiver. Then he walked me to the door and showed me into the hall. It was all very smooth. Maybe too smooth. I waited outside the sealed door for a few minutes, acting casual, stalling for time.

Then I heard someone coming. I ducked into an empty office across the hall and placed myself carefully behind the thin wall.

There was a gentle rap on Hobart's door panel. I heard it open.

"Ah, Frank. Come in. We have a bad problem...." I heard Hobart begin. But the door shut before I could hear the rest. Just the same, I had seen who Frank was. The portly little figure was very familiar. It should have been...it was Smyth.

I went directly to my cabin after that and packed up. When the next shuttle left for the clouds, I was on it.

God, what the hell were we going to do? And who was there to trust? I had been wrong so many times that I had begun to doubt my own judgment. One thing I was sure of, though. We were going to stick with Skystation One just as long as possible. It might be small and cramped, but it was secure. I could always get a doctor down from Venus Station for Irene. Maybe I could even slip one down on a permanent basis in exchange for a tech. Irene could make up a pretense of needing his knowledge in her engineering effort.

But whatever we did, Irene was not going to be killed like Beth had been.

They'd have to take me first.

When I got back, I found that the 'farm' had been expanded. The greenery extended in a belt far below the Skystation. It could be seen from a distance as the shuttle came in on its approach.

I was up forward in the bow with the pilot, watching the screens.

"You're part of this operation, aren't you, Teale? Just what the heck are you people doing? I've never seen anything like that before."

"It's just a garden, Captain." I gave him a grin despite the troubles hammering in the back of my mind. "Just a lot of seaweed hanging from inflated balloons. We grow it to make the place seem more homey."

"Homey? Hell, that's a nightmare out there."

The pilot was unimpressed.

"You should have seen the neighborhood before we moved in, Captain. You'd have liked it even less."

Irene and Forsyth met me in the airlock.

Irene was just starting to show her motherhood.

Forsyth looked older.

"Where's Callaghan?"

"Out in the squid with the techs sowing another crop." She gave me a quick peck on the cheek as soon as I had my helmet off. "I really wasn't expecting you to ask about him right off the bat, darling. You have been gone for awhile. Didn't you miss me?"

"Madly." I kissed her soundly to keep her feeling happy and wanted, and then turned to Forsyth.

"Are you still inspecting everything that comes aboard?"

"As much as we can. If the containers are sealed, we X-ray them. Haven't found anything, yet. Should we stop?"

"No way. If anything, I want you to become more stringent. Nothing is to get out of this lock until you or Callaghan has passed it as safe." I banged on the thick walls. "This is good and solid. It will contain all but a really big explosion."

Irene's happiness vanished.

"Not more threats? The Group, again?"

"Yeah, they're still with us. And I used to think life was rough back on Earth in the ghetto."

We went up to the galley. I was hungry. It had been a long flight, and my departure was such that I hadn't found an opportunity to pack any

food, or even have dinner.

Irene didn't hang around. Forsyth did. He watched me eat like a father confessor waiting for a sin to pop out of my mouth.

His constant staring made me nervous. "I've got news for you," I said abruptly. "The Foundation has accepted your design and principle for VACU. They're working on their own version at Venus Station. They've called the device the Forsyth Converter. You're famous."

"Notorious, anyway." He moved to the counter and poured himself a mug of hot liquid. "It took them long enough. I've got a fleet of seven converters out in the air, now. They're all functioning. No storm losses."

"You're a wonder."

Forsyth shrugged. "The hard work is over. Now all we have to do is start producing the converters in the numbers that are needed. Are they willing to do that up at the Station?"

"They're cautious," I said around a mouthful of sandwich.

"Hell, that lot has always been cautious. They were probably cautious being born."

He sipped at the mug and drew back with burned lips.

"Too hot," he complained. "This stuff is always too hot. What's the new Skystation like?"

"It's gorgeous. Like a jewel in the sky. But the Group is out to get her. Sent me a note. I was supposed to grab some explosives and smuggle them on board."

Forsyth forgot about his cocoa.

"What did you do?" he asked.

"I ran. Blew my cover and everything. Made a big mess."

Forsyth looked at me uncertainly, as if waiting for me to admit that I was kidding.

I couldn't stand his eyes.

"I'm serious," I shouted at him. "I was worried about Irene. We are supposed to move into the big Station sometime soon. That's the one I was supposed to blow up. So I went to see Hobart, the head designer on the project. He got me all cozy and told me to keep in touch, that everything was under control. Even gave me this."

I fished out the communicator and laid it on the tabletop.

Forsyth picked it up and examined it gingerly.

"It's not a bomb, I checked. It's just what he said it was, a transceiver with a pre-tuned crystal. You can send and receive on one channel and one channel only. It has its own built-in scrambler too."

Forsyth switched it on and listened for a while. The tiny speaker emitted a few pops of static, but nothing else.

He laid the communicator down. His eyes caught mine and held them.

"What makes you feel Hobart is a member of the Group?"

"He called Smyth in right after I left. It was like an underling being summoned to confer with a boss. Yet, Smyth ranks Hobart. Everything smelled. God, Forsyth, they know. They know that we know. And you realize how they've handled that problem in the past?"

"People have disappeared."

"Yeah, and I have this rotten feeling that it's our turn."

Forsyth sighed heavily.

"Remember when I first met you down in the mine? You were down in one of the lower galleries. I thought about beaning you with a rock." I laughed suddenly. "Maybe I should have. I would have stayed..."

"And died with Beth," the old man finished for me.

"You didn't have to say that."

"No, not really." He was playing with the communicator again, turning it over and over in his worn hands.

"You've grown up a lot in that time, though. Are you really so sorry that you followed me up out of the darkness?"

I frowned.

"This hasn't got a damned thing to do with the Group."

"Hasn't it? I think maybe at that point in your life you were very much like the members of the Group. After all, it isn't social status, or education that makes a criminal, it's attitude. Anyone can be a murderer, all it takes is the will to kill. If you want to fight these people, put yourself back into that wild, vengeful creature that you used to be. See with Roger Teale's eyes and maybe we can second-guess what the Group's next action will be."

"It would only be a guess."

"Maybe. But a guess is better than nothing. Don't let your fear for Irene's safety tie you up in a knot. You have to keep thinking and fighting."

I finished the sandwich and stood up. Forsyth started to hand the communicator to me.

"No. You keep it. They know I'm against them, now. Maybe there's a clue in that device. Try to ferret it out. When Callaghan gets back, have him meet me in my cabin. I'm going to sleep now."

Forsyth nodded. I could see that his mind was already on the challenge that the communicator presented. At least that gave me a little hope. Forsyth was a good man. I *knew* that I could trust him. We all could.

Callaghan came into the cabin four hours later, waking me up. But I was glad. My dreams had all been bad.

"I heard that we have trouble," he said out front.

"You heard right."

I sat up, rubbed the sleep crust from my eyes, and stretched.

"How was the sowing flight?"

"They seem to be getting easier. Maybe I'm learning about Venus. There's a surprising amount of life out there. Irene's working a miracle."

"I think it's her maternal nature that's doing it. She seems to fancy herself as another Mother Earth."

Callaghan chuckled softly.

"Mother Venus is more like it. Come out with me, I'll show you all the newest sights."

"Not yet." I stood up and slid into some almost-fresh coveralls. "Venus Station wants us to move into the new Skystation. They call it Outpost, but officially its Cytherea Station. Some of the bigwigs have large plans for it.

But the Group just wants it blown up, or maybe they're going to take it over during the confusion an explosion would make. I just don't know. But the place is so big we'll never be able to keep it secure. The Group will have free run of the Station. They could plant their bombs anywhere they want to. For that reason I don't think any of us should move. Not until we can find some authority to clamp down on this terrorist outfit. I made a bad mistake and let Hobart know about my letter. I was supposed to be one of the bombers. I went to him because he designed Outpost, and because I felt sure that I wasn't the only member of the Group who had received an assignment. At first the man seemed genuine. But now I don't know. The first thing he did after I left was get in touch with Smyth. And I trust that little turkey just about as far as I could kick him. He may not be the brains behind the Group, but he's certainly one of their fingers."

Callaghan shrugged helplessly.

"But what can we do?"

"How are we fixed for supplies?"

"Six months of consumables. That's according to specs."

"And no surprises in the hold?"

"You mean like bombs? No, nothing. We examine everything before we stow it. We're clean."

"Okay. Then we sit tight and wave off all further contact with Venus Station. Tell them that we have a dangerous sport loose, Irene can make something up that sounds convincing. If we can't keep the Group off our back, maybe we can scare them off."

"And that will give us time to perfect a weapon against them."

I grinned, but I didn't feel nearly as confident as I wished I could.

"Now you're thinking my way."

15

Actually, it wasn't all that bad being 'marooned.'

After we waved off the first two shuttles and explained the situation, the rest quit coming. Since we monitored all transmissions from Venus Station, we weren't cut off from news, and soon we heard that Outpost was being manned. Things went smoothly, at first. Then we heard about the explosion that blew open the cargo hold and dropped half a year of supplies into the abyss. Outpost was not structurally damaged, but repairs would take time. Meanwhile, she was vulnerable to storms because her hull had been breached.

Two weeks later there was another explosion, this time in the weather station control room.

"It's only a matter of time before they 'sink' the whole place," one of the techs, a boy named Jimmy, told us during supper. "Harper is taking bets on how long the thing stays up. Do any of you want to buy in?"

I put down my fork slowly and stared at the kid. I don't think that he even realized that he was playing games with people's lives. He was just having fun.

"Tell Harper for me, Jim, that unless he closes down his game and turns back the money that I'm going

to break his face." I grinned sweetly at the kid. "Do we understand each other?"

"Sure, Captain Teale. Sure."

The kid went back to eating. He didn't look over at me any more. Later, I learned that my reputation had hit a new low among the technicians. I hadn't been so unpopular since I had 'dumped' Dennis out the airlock.

But the comment served its purpose. The kids were more human after that. It's easy to take life for granted, much harder to respect it. That you learn through experience, I guess.

Venus was well on the other side of the sun from Earth when the weather became rough. A series of hurricanes formed within the uppermost cloud deck in response to solar radiation. There were a lot of sunspots cropping up that year and they were playing hell with our atmospherics, pushing the ionopause right down to the top of Venus' sensible atmosphere.

Wind began to tear at the artificial trellis. The gusts were too much for the motors, they couldn't keep pace with the Station, there was just too much foliage hanging off the slats, too much area for the wind to grab.

Finally, Jim and I went over in the squid and removed the homing computer. As we cast off, the trellis was already sailing into the distance. It soon vanished into a cloud maze.

We never saw it again.

For a while the aerial jungles stayed close. But they too were being separated from us by the wind. And one morning we looked outside to find ourselves alone in the clouds. Just a few bubble algae remained to remind us that once we had lived in the center of an airborne forest.

As the month progressed, the storm grew worse. We could no longer risk going outside in the squid, we would be unable to fight our way back to the lock. So we were stuck inside.

I wondered how Outpost was making out in its damaged condition. Surely no one would risk exploding another bomb when they would be certain to go down with the wreck. Or did the Group have some genuine fanatics in their membership?

Irene was definitely pregnant by then, and showing it well. Callaghan had managed to locate a medical tape on prenatal care and childbirth and was boning up on it with one of the technicians who had once wanted to be a doctor before he had washed out of med school.

Neither one bothered to give me any training, they told me that I was too nervous to be any help.

Perhaps they were right.

I spent all my time up in the weather station with Forsyth.

There was a computer-generated chart of the weather bands plotted on a wall screen. We showed up as a bright orange pip about midway down the flank of the planet. The Skystation never moved from this position, instead, the weather passed around and through us. It was like being a rock in a stream. Only now the stream

was wild with spring runoff.

Outpost would have shown up on the chart as a blue pip except that she was on the opposite side of the planet from us, and thus invisible.

It was here that the outside cameras delivered their images. They were our eyes now that the air was so rough. No more opening the outer airlock hatch to wool-gather on cloud landscapes.

What the screens showed was a little frightening. It was mid-morning, but the sky was black and threatening. Lightning forked among the cloud masses as they spun past.

"It's rough."

"It will get rougher," Forsyth promised. "The barometer is still falling. Pass the word for everyone to get to their cabins and strap down."

The Station had already given us a couple of good lurches. Air pockets were plentiful. So were updrafts. We had given up trying to keep the Station at her operational altitude and had disabled the buoyancy computer. We were floating free, like an uncontrolled aircraft. But we wouldn't fall. The lowest level we'd possibly reach without rupturing the buoyancy tanks would be somewhere midway through the last cloud deck. Heat from the surface would quickly drive us up again before we could come to grief.

So we should have been safe.

But someone forgot to tell Venus.

It was around midnight of the third day that we ran into trouble. The air was very rough. Most of us were staying in our cabins constantly, venturing out only when absolutely necessary. Meals had been forsaken. The technicians were so seasick that the mere thought of food would have driven them to the head.

Forsyth had moved a mattress into the weather room. He couldn't do anything about the weather, but at least he could watch it from there.

I was dividing my time between the weather room, and our cabin. Irene was holding up gamely, but she was in no condition to endure much rough treatment. I left Callaghan with her whenever I could. His endless good humor was better for her than my nervous jitters.

I never realized before just how maddening it can be not to be able to control a dangerous situation. We were at the mercy of the elements. We didn't know from hour to hour if we would be alive at the finish of a day.

I was on my way up to see Forsyth when the Station reared up on its side and threw me against the bulkhead. All over the Station I could hear things falling and smashing. I was stunned for a few minutes. Long enough for the Station to flop over on its side and roll me across the deck and down the hall, where I fetched up against a closed door.

Praying for Irene's safety, I struggled up the hall to the weather room.

Forsyth had jammed himself between two secure consoles so that he wouldn't be tossed around. A white-faced technician was huddled near his knees. Everything that had been on the tables was now strewn all across the deck.

On the chart, the red pip of the Station was mired on the south portion of a vast cyclonic disturbance.

Forsyth grinned over at me.

I just stared in horror at the chart.

"Look on the bright side, Roger," Forsyth was croaking in a voice close to madness. "You don't have to worry about the Group in weather like this. Their bombs are just toys compared to the violence that Venus can muster against us."

But I wasn't listening to him. My eyes were still on the weather chart. Creeping around the disk of the planet was a blue pip.

Outpost! She was being carried along in the same storm.

16

The wind had risen to such a pitch that we could hear it whining and roaring outside the insulated bulkheads. We were pitching and rolling in the storm like a rudderless life craft.

Somehow, I managed to cross the weather room and strap myself down before the radio.

"CYTHEREA STATION, THIS IS SKYSTATION ONE. CAN YOU HEAR US? OVER."

A snarl of sunspot static burst from the speaker when I switched to receive mode. The noise hissed and welled like an angry cat. I kept trying though. All the way through the remainder of that violent night and into the first light of morning. I quit then. There was no hope of communicating with the sun full overhead. Venus was being struck with all the force of the solar storms on her daylit face.

We were cut off.

Helplessly, we watched as Outpost slipped past us, only a few miles distant, and whirled off into the storm again, outward bound to the opposite rim of the storm wheel. We might circle each other like this for months, until the heat energy of the cyclone dissipated.

"They couldn't have rescued us, Roger," Forsyth shouted over to me through the noise. "They may be worse off. If the wind catches in her torn hull, if they haven't repaired the breach by now, the storm will tear her to pieces."

"That's what I wanted to find out . . . her condition."

"Try later." Forsyth crouched down lower between the consoles and applied a piece of his shirt to the tech's forehead. A lurch of the Station had smashed him against something sharp and laid his face open.

The storm got no worse as the hours passed, but it didn't slack off, either. The Skystation began to develop worrisome noises. It groaned deep in its structure as though it were in pain. The decks and bulkheads creaked and squealed. And the outer portside buoyancy tank lost pressure, causing fire suppression sprays to drench the galley and connecting corridors with foul-smelling retardant.

We could only cling to the walls and equipment and listen. But after a while, even the slowest of the technicians realized what was happening.

The Skystation was breaking up.

One good downdraft would split us in one or more pieces. The pieces would

float for a time. Then they would fall once the storm had its way with them.

Not a cheery prospect.

I almost went mad with anguish every time I thought of Irene huddled in her cabin . . . waiting.

I tried the radio again. The blue pip of Outpost was swinging around toward us, again. Because the other Skystation was larger, she was carried more swiftly through the storm. She was riding close to the eye, where the windrace was spinning twice as swiftly as it was on the fringes of the storm. There was windsheer on the outer rim, for the cyclone was smashing its way through a jetstream forced to flow around the point of disturbance.

From Venus Station the view would have been fascinating.

Down here, deep within it, everything was hell.

Despite all efforts we had not tamed Venus. She was proving that to us.

I turned the gain all the way up on the radio. The static almost blasted us out of the room. The speaker cone might blow out. But in a moment of nearquiet, words came:

"POPP. . . BAZZZ. . . ONE . . . THISSPUTT . . . THERPOPPP . . . STA . . ."

We had made contact!

I tried again, repeating every word three times in succession. I asked their condition.

The answer came back badly garbled, but after several repetitions the message became clear. The storm was shaking them up, but the Station was holding together.

"CAN YOU TAKE US ABOARD?" I demanded, dreading the answer.

"SNARLL . . . CAN . . . POPPTRY . . . HAVE . . . SNARRLL . . . YOU . . . SQUID?"

The squids. We would have to risk the crossing in them. It seemed impossible. But a sudden clang and a rasp of tearing metal from below told me that we would have to try something.

I shouted for Forsyth's attention.

"Run this through the computer . . . have it work out a course from this Station to Outpost using the squids. Identify the tack angle, airspeed needed for the crossing, and the moment of departure. Hurry, man. We're running out of time."

More breaking up noises reinforced the need for evacuation.

I staggered to the Master Control board and broke the plastic seal over a switch that the designers had hopes would never need to be thrown. I slammed it into its contacts. Immediately a klaxon started to wail and a toneless voice began:

"PREPARE TO ABANDON STATION . . . FIRST WARNING . . . PREPARE TO ABANDON STATION . . . GATHER ALL IMPORTANT DOCUMENTS AND MATERIALS FOR IMMINENT EVACUATION . . ."

The horn continued its nerve twisting wailing as I struggled below to the hold where the squids were kept.

I found Callaghan there before me.

"What's up?"

"We're falling apart. Going to have to try to reach Outpost when she swings past again. Will the squids hold together in a blow like the one outside?"

Callaghan rubbed his chin, where a week-old patch of whiskers had begun to sprout. The rough weather had made shaving impossible for all of us.

"They might. The frame is flexible. It would bend before it breaks. The real question is whether or not we could make any headway against the storm."

"I've got Forsyth running a program through the computer. He'll give us an answer, soon. But no matter what the computer says, we can't stay here."

"I agree."

A strut broke free of its supports and fell in an arc across the hold, smashing deafeningly into the opposite bulkhead. A moment later it toppled to the deck with another crash.

We began pulling the deflated squids to their launching racks.

Another strut fell, narrowly missing Callaghan's head.

Two techs ran into the hold. One slipped and fell to his knees. His buddy shouted a warning as a piece of sheet plastic sailed past him and struck a gondola with a loud bang.

"Here, you two. Drag these things onto the launching ramps and inflate the gondolas." I waved at them furiously.

"Callaghan, take over. I'll see about Irene."

"Okay. She's in the biology lab."

The news shook me.

"What the hell for?"

"She said she wanted to save some germ plasm. God only knows what that is. But I couldn't talk her out of it. She said she would meet us here in a few minutes."

"Damn it. Well, her few minutes are up. Have everyone suited by the time I get back with her."

"Right."

The corridor swayed under my feet as I ran along it. At first it was like dashing uphill. Then the deck lurched and I was sliding. I shot through an open hatch and caught hold of a ladder, saving myself from a fall into the second level of the Station.

"Roger, is that you?"

"Yes. Why aren't you at the airlock?" I shouted at her. "We're evacuating the Station."

"I know. That's why I have to save this. They're important."

"So's the child you're carrying. Not to mention yourself."

I struggled into the lab. Irene was strapping a tray of flasks into a pressurized culture transporter about the size of a handbag.

"Leave that, damn it. We don't have time to play games."

"This isn't a game," she snapped back, her face an angry red. "My work is in here. Help me get it to the hold."

There was no reasoning with her. I seized the case in one hand and her arm with the other. Together we started down the canted passage.

The Station was like a doomed ship. She was singing her death song with every groan and screech of tortured framing. From the angle of tilt, I guessed that we had lost another buoyancy tank on the port side. If another one went, we would be hanging on our beam end, and we wouldn't be able to

launch the squids no matter what.

A few feet from the open hatch of the hold we came upon Henderson, one of the technicians. He was dead. A piece of the overhead had fallen on him and broken his neck.

Callaghan met me in the hatchway. I pushed Irene at him.

"Get her into a suit! Where's Forsyth?"

"Still not here. All but one of the techs are accounted for. Where's Henderson?"

I pointed behind me.

Callaghan grimaced.

"Damn shame. He was a good boy."

"A good man," I corrected. "If I'm not back in five minutes get everyone into the squids and launch them. You'll just have to trust to luck."

"We won't last a day out there on short air," he protested angrily.

"You still have to try," I yelled. "Outpost will be lit up like a Christmas tree. Make for the glow. If the handlers can shoot lines around your mooring posts they can pull you in."

I left him standing in the hatch with his arm supporting Irene. She was staring at me like I was a madman.

Well, maybe I was mad. But I wasn't going to let them die. Not without a fight, anyway.

Forsyth was still in the weather room studying the big chart.

I leaned in through the door.

"Let's go."

"Not yet. The program is still working...the damn weather variables are shifting too much. We're asking it to sort through an endless amount of data."

"Does it say we can make it?"

"The program says 'maybe.' Only maybe. Have to leave within the next ten minutes. That's when Outpost will be the closest to us. It's like we were riding two orbits in the storm, and we have to claw our way inward to her. It's the tack information I'm waiting for."

Numbers were flashing across the screen. They showed no sign of finishing.

"The program's in a loop. Come on, we'll dead reckon."

Forsyth shook his head furiously.

"That would be suicide. Can't!"

"We're leaving, Forsyth. Get your gear. Now!"

Then he broke and his shoulders sagged. The numbers on the CRT screen continued to flash, painting his tired features with greenish highlights.

"I'm too old for this, Roger. Just too old, and I think my heart is going. Get to your ships. I'll radio the information to you. If you don't have it, Irene and the baby will die." He gazed at me and there was no emotion left in his face. "Go on. Leave me. Pick me up when the storm is played out."

"I can't do that, old man. You know I can't." I took a hesitant step toward him.

He reached into a pocket of his overalls and tossed something at me. I caught it automatically. It was Hobart's fancy communicator.

"I tried this. It breaks through the static better than our radio. Someone on Outpost is monitoring this frequen-

cy. They said they were going to patch you through to the radio room of the Skystation.

"Now will you leave?"

I felt like hell. But in my mind I saw Irene. And superimposed on her face was Beth's. I knew what I had to do.

"Good luck, old man."

"You'll need the luck. I'm just staying home out of the weather. Take that gadget, put it in CLEAR mode and wait for my call. When you launch, keep your bow six points off the wind. I'll refine that figure later."

There was nothing else to say, and no time for it anyway.

I waved, an inadequate gesture. Forsyth waved back.

They were waiting for me. I suited up and boarded the second squid, where Irene lay between two of the techs. They were all strapped to the decking.

I climbed forward and lowered myself into the pilot's seat.

Callaghan, in the transparent nose of the first squid, raised a gloved hand with his thumb extended.

I nodded at him.

We opened the hatch and the launchers threw us out into the dark and stormy turmoil. Lightning jabbed at us as I filled the main canopy and let the wind take her. We were off. When I looked over my shoulder the Skystation was gone, swallowed up by the clouds.

I took the lead, and Callaghan pulled in close astern, practically in our wind shadow. Six points off the wind, that was what Forsyth had said. But it was devilishly hard keeping the squid there. The storm was gusting anywhere from ten to fifty knots, and we were getting kicked around like a dog in a stable.

I pulled out Hobart's communicator and taped it to my wrist with a strip of Velcro. I flipped it to *receive* and left it there. The battery was supposed to be good for thirty-seven hours of continuous operation. I'd find out now if that were true. I didn't want to take a chance of missing Forsyth's call.

If he made one.

The wind direction indicator mounted before me was a simple device, a red arrow that pivoted around a disk marked off in compass degrees. The compass markings were a mere formality. Venus didn't have a magnetic field . . . she wasn't rotating fast enough for her core to generate one. But the polarized glass mounted above the disk did give me the location of the sun overhead, even though the clouds smeared out her glow to an even radiance. The Vikings had once used a lump of translucent rock called a sunstone to navigate when their compass was useless. Now, technology had taken a giant step backward. But the gadget worked.

By the time of day, and our course, the sun should have been off to the left.

It wasn't.

The wind shrieked and clawed at us, hammering at the panels of the gondola. Thunder rumbled massively in the distance.

Somewhere out there was Outpost. But heavy clouds were obscuring her lights. And Forsyth still hadn't called.

My head began to ache, a throbbing

dull pain. I wished I could rub the back of my neck, but the suit prevented that.

My hands yanked at the tethers and tried to bring the sun around where she should be.

Static continued to buzz on the radio.

Then it popped faintly.

"TEALESNARILL. . .FORSY. . .STEER TWENTY POINTS. . .REPEAT. . .TWENTY. . .POPPSNARLLLRASPPP. . ."

The signal faded away to nothing. I called back and tried to raise him, but there was nothing, only noise.

I brought the nose of the squid around, just a bit, until the arrow was lined up with one of the half marks just short of due north. If we kept going in this direction, and the wind didn't sheer off, Outpost would be dead ahead.

I waved at Callaghan to follow me.

After making another futile attempt to hear Forsyth, I kept my attention on the tethers and the wind.

It was dark ahead. We were crawling under the massive overhand of a towering cumulus anvil. Lightning played under the shelf, lashing at the lower deck. We were supposed to go through there? It looked like suicide from here.

The winds pulled at us eagerly, hurrying us along.

Where was Outpost?

The darkness was complete. Except for the lightning.

"CYTHEREA STATION, CAN YOU HEAR US? THIS IS SKYSTATION ONE. PLEASE REPLY."

A loud growl of static, and then:

"SKYSTATION ONE, THIS IS CYTHEREA STATION. WE READ YOU FOUR, REPEAT FOUR. WHERE ARE YOU?"

"WE HAVE ABANDONED, REPEAT ABANDONED SKYSTATION ONE AND ARE ENROUTE YOUR STATION ABOARD TWO SQUIDS. PLEASE GIVE US A HOMING SIGNAL ON THIS FREQUENCY. ALL OTHER FREQUENCIES ARE USELESS DUE TO SOLAR ACTIVITY. OVER."

It was a freak, a joke of the atmosphere. But we had found a lull in the interference. We were getting through.

Outpost acknowledged, and moments later we had our directional beam. It warbled in my ears like the sweetest music that I had ever heard.

I quit guessing about the wind and let the jib out. We shot forward into the gloom with Callaghan laboring to keep up. His own jib was billowing beside us like a scarlet flower. But we could only see it bloom when the lightning flashed.

"There's a light ahead," Irene shouted, her voice ringing in my earphones. "Look, you can see their running lights."

There was a faint blue, white and red glimmer appearing directly ahead of us. We raced on. If we had been on board a racing yacht we would have had a respectable bone in our teeth at that moment. But there wasn't any water below us, and very likely there never would be. We were running dry. But salvation was near.

A burst of sheet lightning rippled across the underside of the cloudbank overhead and the landscape lit up wild and blue.

Abruptly, we could see Outpost. She

was even more beautiful in reality than she had been as a model. I sucked in my breath and stared as the tremendous double arc of her hull swept toward us. A hatch was yawning open on one of the three shallow hemispheres that studded her underside. White light was flooding out into the gloom. I could see tiny figures moving about inside the lock chamber.

Then they were firing starshells. The sky and clouds glowed with a harsh, white illumination.

I switched our running lights on and off twice.

"SKYSTATION ONE, WE SEE YOU. PULL UP BEFORE THE HATCH, BUT DO NOT DEFLATE YOUR CANOPY UNTIL WE HAVE LINES ABOARD YOU. BLINK THREE TIMES IF YOU UNDERSTAND."

It was a fast way to answer. I used the radio to cue Callaghan. He waved acknowledgment.

There was no need to wait turns, the hatch facing us was wide enough to accept four squids abreast. Lines snaked out to us, telltales glowing at their tips, and looped about our mooring posts. I could feel the winches starting to pull against the stubbornly tugging wind. Venus hadn't given us her leave to depart, yet.

But for once the battle was going our way.

"WE'VE GOT YOU, SKYSTATION ONE. POP YOUR BALLOONS AND COME INSIDE. WELCOME ABOARD CYTHEREA STATION."

17

We didn't know anybody. The faces were those of strangers. But they were glad to see us, and we were too relieved to care about introductions. We let one of the senior line handlers lead us to their Sickbay, and then down a flight of wide stairs to a stateroom. Only Irene remained behind.

The room was huge. We weren't used to such luxury.

Callaghan flopped onto one of the beds and yelled like a kid.

I sat down on one next to the door, marveled at its softness, leaned back just to get the feel of its pillows . . . and was asleep in an instant.

A hand shook my shoulder and I awoke to find Irene gazing down at me.

"You looked so peaceful I hated to disturb you. But the Administrator wants to meet with us in his office."

"Okay." I felt dead. It was difficult to push the grogginess out of my head.

I sat up.

"How do you feel?"

"I'm in top shape according to Doctor Bledsoe, the Station pediatrician. Everything is normal, considering."

"Considering what?"

"That I was shipwrecked, manhandled, and bounced around in a storm for over a week."

"Come here and sit beside me."

Her warm body squeezed in next to mine, bottomheavy, but alive. I gave her a hug, which she returned.

"Love you."

"It's mutual, I'm sure. You should see my new biology lab. It's magnificent. Hobart really did a job when he designed this palace."

She nudged me.

"Don't go dozing off again. We have a meeting."

"I'm awake. Leave me alone."

"So take a shower." She climbed to her feet and tugged at my arm. "Come on, it will wake you up."

"This place has showers?"

"It even has bathtubs. Come on and use one, you smell like a horse."

"Forgive me all to pieces," I apologized.

"But a sexy horse. Come on, strip!"

An hour later we were shown into the Administrator's office. For once, I wasn't surprised. I had been expecting something like this.

"Hello, Hobart."

He took my hand and shook it warmly. Callaghan was already seated next to the desk. He grinned at me.

"And this is your wife. I heard of the marriage. Congratulations on your impending motherhood."

Irene basked for a moment in his friendliness, then took the empty seat next to Callaghan. I stayed standing.

"Don't be formal, Roger. You're among friends."

"What about the storm?"

Hobart seated himself. He exuded confidence.

"The cyclone is fading. When the windspeed drops off a few more points I'm sending searchers out to attempt to locate Skystation One. Doctor Forsyth may still be alive. At least, that is my hope. He is a brave man. It would be a shame to lose him to the elements."

I sat down cautiously next to Irene.

She jabbed me, letting me know that she thought I was acting like a lout.

"I understand you still have my communicator," Hobart said to me.

"It helped save us."

Did he want it back, I wondered?

"Good, I'm glad I gave it to you, then. Now, there's the future to consider. I suspect that your motives were not entirely honest when you cut yourself off from the Project. But I can understand why you might have felt such an action was necessary." He glanced significantly at Irene as he said that.

I stiffened in my chair.

Callaghan rose to my defense like a true gentleman, however.

"No deception was intended. There was an accident in the biology lab. We felt the strain which escaped might be potentially dangerous. It turned out to be a false alarm. But by then the storm season was upon us and we found ourselves separated from the normal supply routine." He paused thoughtfully. "Also, we heard that there was damage aboard Outpost. Suspicious damage."

Hobart didn't seem disturbed.

"Yes, we had some bomb damage. The motives of the parties involved escapes me, fanatics, I imagine, but they have been disposed of according to the vote of the jury. We govern ourselves as a democracy here on Cytherea Station. The Foundation insisted on it when the staff and crew were selected.

"As for your worries about sabotage, Roger, the executions have finished it. We have been functioning normally for many months. You must have been mistaken in your belief that someone is dedicated to destroying the Sayre Foundation here on Venus.

"But I don't hold this against you. You warned us fairly according to the facts as you knew them."

"So give me a medal."

Irene socked me in the ribs.

"Knock it off! Hobart's trying to be nice. I've got a new lab. My research is approved and funded for the next two years. Don't go fouling it up with your bullheaded rudeness."

I swallowed my pride and forced a weak smile.

"Sorry. I guess I'm not in a very good mood today."

"You've been under a lot of pressure. You're due for a rest. Explore the Station at your leisure. I'll fix you up with a guide. Afterwards, when you're more relaxed, you can begin your new assignment. It deals with astrogeology. Your record shows that you have a degree, and surface experience. You'll need both for what we have in mind."

"We'll be in on it together," Callaghan said. "I'm to be your pilot, just like in the old days."

Well, he seemed happy enough about it.

Slowly, I began to relax.

Hobart had dinner brought in, and we talked casually for the better part of two hours. Afterwards, as we left, he held me a moment at the doorway.

"Things are going to work out, Roger. I know they will. So let your guard down. Everything is different. We now have your mysterious Group licked. They can't get to us. I think we've managed to cut their line of communication."

"Think so?" I watched his face carefully. He was so smooth, like cream. The words flowed off his tongue like honey. Could I really trust him?

"I know so!" There was just a hint of anger as an undertone in his voice this time. "Relax and enjoy yourself, damn it. We've come a long way in establishing this Station. It survived the worst storm in the recorded history of Venus. We're going to build, and keep on building. Play along. You can be part of it all."

"I'll do that, sir," I said, giving his hand a last shake. "I'll do my best."

But as I walked down the empty hall, I couldn't help peering suspiciously into the shadows.

I still had a feeling. The old street fever? Or just a case of nerves brought on as an aftereffect of the storm?

My tour of Outpost eased my worries, somewhat. My guide was a garrulous youth who obviously enjoyed his work. He showed me the works, from the sewage reprocessing center, to the hydroponic farm. Outpost was completely self-sufficient. She even manufactured her own breathing air through a closed system linked with the farm.

The biology department was outstanding. I began to understand why Irene was so happy to be here. Hobart, in his grand plan, had suspected that the future on Venus would depend on the colony being able to produce its own food. And if it could also produce a surplus for export, the Foundation would no longer have to scrape for donations. Venus would become a paying proposition.

And that was why Irene was valuable to them. Her algae were taking hold better than expected. The storm had torn up the drift farms, and scattered the crops. But the isolated plants were still reproducing and spreading. The bubble algae was becoming a frequent sight from the observation ports. Sometimes, when the sun angle was right, the clouds took on a greenish hue. The algae's numbers were in the billions, and still they grew and divided and grew again.

Irene had realized what the next step must be, and she was already on it.

She was designing buoyant animal species to take advantage of the ever-expanding population of plants.

When I first heard about what she was doing I said she was crazy. But when she showed me one of her prototypes I began to wonder if she might not be a genius. After all, there have been a lot of crazy geniuses.

But not a single one of them had yet to invent an inflated seahorse with an appetite. Irene had, and I was to be present at the unveiling. I agreed, but begged for the chance to take a shower, first. Station life was beginning to catch on with me.

Back at the cabin, I found a sealed radiogram waiting for me. It was from Earth. Dennis had joined up with my old contacts, and made himself a few other friends, as well. The message was an update on his adventures. It seemed that he had a lead on the Group, as well as a concussion and a few more bruises. Someone had been waiting for him as he disembarked from the Atlantic Coast Spaceport, someone with a grudge to settle. And it turned out to be more complicated than simple gang activity. During the investigation the federal government got involved . . . there was a matter of some illegal military hardware left behind after the attack, and now the Feds were getting curious about the Group. Dennis was sharing his information with them and they were providing protection. The investigation was proceeding. Slowly, to be sure, but proceeding just the same.

Dennis signed off wishing us luck and promising to be in touch soon.

I crumpled the paper in my hand as I finished reading it, wondering who else might have read it before it had been delivered. There were still so many unknowns. Were Hobart and Smyth pawns of the Group or simply ordinary, officious managers trying to do a job and coming off seeming cold and bloodthirsty? I just didn't know!

18

Irene brought the glass-walled environmental chamber over and placed it on a table before us. She had stopped wearing work coveralls some weeks before, and wore instead a simple, loose maternity outfit. It looked good on her. She wasn't the graceful, full-figured beauty that she had been, but the beauty was still there, and she did seem content and happy. Probably she was wearing the best kind of beauty, it doesn't wash off.

"These clones are mature," she told us. "Tests show that they meet all design specifications for the outside environment."

This was my first opportunity to see Irene's "brainchildren." I leaned close to the glass. The interior of the case was filled with a dense growth of Sprig algae. The dark green stems were dotted with floatation spheres and long, delicately fluted leaves.

At first, all I saw was the plant life.

It was Callaghan who pointed out the animal hiding in the vegetation. It was tiny, about the size of my thumb. The body was thin to the point of seeming emaciated. Bony struts crossed it, creating a supportive cage for the muscles and organs. Along its back was a delicate fin, reinforced with spines. Three pairs of lacy paddles extended from the ventral surface, all of them sprouting extensions of tissues which were remarkably similar in appearance to the algae clump to which the little beast was clinging. Camouflage spars also grew from the dorsal area, and from the back of the horselike head. Lacy tendrils dangled over the browridges. The eyes were black and piercing as the animal stared back at me.

Then the creature gave its body a twist and burrowed into the foliage. The tail, which had seemed stiff and bony, showed itself to be remarkably flexible and dexterious as, using the tail as a grasping tentacle, the little one pulled itself out of our view.

"It's quite shy," Hobart remarked.

"I thought it best to install caution in them," Irene explained. "Eventually they will have predator neighbors and I don't want them wiped out just so we can look at them whenever we wish." She tapped at the glass.

"And they feed off the algae?"

"Yes. But they also have chloroplasts in their epidermal cells. There's so much solar energy impinging on the cloudtops it seemed foolish not to give the animals, as well as the plants, the capacity to make use of it. This will mean less dependence on stored fat, and thus a lighter animal. This weight savings allowed this particular animal, the skyhorse, to dispense with floatation cells. It's light, and the membranes on its spines give it limited flying ability, allowing it to migrate between algae clumps. It's designed to spend its life clinging to, and crawling about the weed jungles feeding, mating, and raising young."

"Are they edible?" Hobart asked abruptly.

Irene gave him an unpleasant glance.

I knew that Hobart was worried about food for the colony. He would like nothing better than to find himself with vast herds of meat animals drifting in well-fed, bovine contentment about the Station. But Irene saw the skyhorses differently. Having labored over their creation as long as she had, the idea of slaughtering them was at best repugnant to her. I understood her reasoning.

These things were as much her kids as the one she carried in her own body.

"No, they're mostly skin and bone. Venusian animals, and plants as well, are not able to concentrate liquids in their bodies. They have a 'dry' metabolism. In order to survive, they

had to be designed with tiny cells, thick, impermeable exomembranes, and reduced vascular supplies. The skyhorses in the tank have less than five milliliters of blood among them. What they do have, though, is being pumped rapidly, under very high pressure.

"What this means, is that you would not find them at all tasty, even though their flesh is edible. You would need over fifty of the animals to provide you with a filling meal."

Hobart looked displeased.

"What we're seeing is just the bottom of the foodchain, isn't it?" I was priming Irene to give Hobart the answer he wanted to hear.

"Yes. Later, once these establish themselves, we will release larger animals which will be carnivores, exploiting these herbivores as a food supply. The carnivores will be true fliers, genetically similar to bats and birds. I'm also working with material to create a large bladder whale, which will migrate freely through the cloudbanks harvesting bubble algae. There's enough of that around to make such a creation feasible. I think that the whale will prove to be the first edible food crop apart from the algae, the colony will be able to exploit."

"Yes." Hobart stepped back from the tank and folded his hands behind his back. His eyes took on a dreamy, blank look as he considered this scheme. "We could establish herds of the beasts, like cattle. How large might they grow?"

Irene rooted in a desk drawer, finally bringing out a series of sketches. The pencil images showed a blimplike creature with eyes on the underside of a mouth that opened out like a vast dragnet. It had two wings as forelimbs, and a large, horizontal fluke for a tail.

"At first we're going to keep the size down to about thirty feet. This animal will have a large floatation bladder. Eventually, we will eliminate the growth restrictor and allow them to grow as large as their environment permits."

Hobart had another thought, this one disturbing.

"They won't become a danger to the Station, will they?"

Irene laughed.

"Hardly. You're looking at a creature who is mostly air. At any point in the body the skin and muscle layers will scarcely exceed three inches in thickness. The body is a giant bag."

Callaghan gave Hobart a clap on his shoulder.

"That's great. It will make the thing easier to carve up into steaks."

Hobart gave the pilot a dirty look. Then he turned his attention back to the tank of skyhorses.

"A remarkable achievement, Irene. Really remarkable. How long before you begin releasing these?"

"An experimental garden is already being prepared in the vicinity of Outpost. We'll want to keep the first releases under close observation. Once we're sure that everything is going as planned, squids will begin transplanting colonies to each of the

cloud jungles that they are able to locate. There's quite a few of them, now, you know."

"So I've heard from Venus Station. The clouds are actually turning green in some areas. Ten years ago I wouldn't have believed it possible."

Hobart tapped on the tank with his forefinger and laughed softly as the animals inside jerked and scuttled back into concealment among the dangling leaves.

"Just remarkable," he said again. "Now, there will be a meeting at 1300 today to map out our surface venture. You'll be there, of course."

I nodded, though not with a great deal of enthusiasm.

"Good!" Hobart was beaming good will, again. Maybe that was the mark of a good administrator, being able to rebuke and reward simply by words and facial expressions. Although no one really liked him, as the word around the Station went, no one hated him, either. That was something in his favor.

"Doctor Brigid Pitz will be chairing the meeting as project head. She's a well known astrogeologist, a real pro in the field. Her papers on the terminal bombardment of the Martian and Mercurial surfaces are now considered to be classic works. We are extremely lucky to have her here with us on this team."

Hobart shook hands all around, gave Irene a fatherly pat on the shoulder—an act which got him a tongue stuck in his direction as he turned to leave—and departed, leaving us ordinary folks free to pursue our work.

Callaghan and I decided to have lunch before the meeting commenced.

He was very quiet.

"You're not wild about going down to the surface, are you?"

He shook his head.

"I was there twice. Hated it both times. Death is too close for comfort down there. A man dies easy when he's scared, and when I was on the surface I was scared all the time."

I grunted agreement. It was a select club, those of us who had been down to look at Venus as she really was. You could tell a brother simply by the aged look in his eyes, and the tight little wrinkles on the face. Fear lines we called them, but no one else with any sense would have dared to. As I said, we were a proud and select club.

Lunch was a brief affair. Neither Callaghan or I seemed to have much of an appetite. Afterwards, the meeting started precisely at 1300. Doctor Pitz saw to that.

She was forty, had a severe sort of beauty which was emphasized by close-cropped red hair, and looked down on all of us from her perch like an eagle from an alpine lair.

Besides Callaghan and myself, there were seven other geologists and ten assistants assigned as staff to the project. They were the techs. But we would all be doing the dirty work on the surface. Even the good doctor.

What a team we were going to be.

Pitz didn't use the podium, she sat on the table with her long legs dan-

gling in front of us. Her only prop was a chart. She was keeping that covered with a white cloth.

I assumed that she would spring whatever was on it as a surprise later.

"I'll dispense with the preliminaries," she said up front. "I know each of you. I've studied your records. You're good, but not *that* good."

A murmur of discontent moved through the audience. I glanced over at Callaghan and saw that his smile had become fixed and wooden.

"That's right, hate me. I want you to do that. If we start liking each other Venus will probably kill us. I don't want any losses that can be avoided.

"I'm *the* expert in the field of planetesimals. I have investigated the Mare Imbrium and Mare Orientals on Luna, the Hellas and Argyre Basins on Mars, and the Caloris Basin on Mercury. On this venture, we are going to explore what will probably prove to be the most interesting and valuable of these massive impact sites, the Hades Basin of Venus."

"Never heard of it," Callaghan muttered under his breath.

Pitz's eyes swiveled around and glued themselves on Callaghan. Her hearing must have been phenomenal, perhaps it was a skill developed and perfected through years of standing before hostile audiences of conservative, male astronomers.

"This basin was identified only two years ago and lies directly across the equator of the planet, sprawled through the crumbling remains of an archaic mountain range estimated to be over a billion years old. The mountains have been worn down to hills, and the basin has been filled in by millions of years of sedimentation. Side-scan radar shows only a rocky plain with some low relief features.

"Deep-scan radar, however, signals that there just might be something interesting buried under all that dust and rubble. If this were Earth, and we were lucky, a glacier might have already scraped away this overburden and exposed the ancient landscape, just as 200 million-year-old craters have been revealed on the Canadian Shield. But Venus has no glaciers. We will have to do our own exposing using explosives and seismic sensing devices."

She uncovered the chart. I assumed it would show Venus. It didn't. Instead we were treated to a schematic view of the solar system: the solar system as it existed four billion years ago.

The orbits of the planets were the same with one major exception, a planet existed between Mars and Jupiter. It was an old theory, and not a particularly good one. I had heard it all before. The major flaw in the theory was that when the mass of all the asteroids was calculated and combined, the planet created was barely as large as the moon, and it was unlikely that a planetoid that small could have broken up through the effects of Jovian tidal fluctuations. The theory, like others launched to explain the asteroid belt, had been discarded.

I was disappointed. There were interesting features on Venus. I had

assumed that we would be going down to one of those, like the Beta caldera, a magma source the size of a small ocean, or the Great Valley, a crustal split several thousand kilometers long and 20,000 feet deep whose floor was aglow with sulphur fires and magma pools.

Pitz sensed the disappointment drifting through her audience.

"Yes, this one is old hat. You're probably wondering why I even bring it up."

She laughed and flipped the chart.

We saw Mars, Luna, Mercury, and Venus side by side. Their major impact basins were marked in red. Under each planet was a chart of impact dates. There was a remarkable match among them. The amusement began to fade.

"Yes, I can see that you are catching onto the fit. At first these figures were interpreted as an episode known as the Terminal Bombardment of the planets, a period marked by huge planetesimals with eccentric orbits which eventually brought them into dramatic contact with the larger bodies of the solar system.

"Curiously enough, when the impact sites are examined and the angles of impact plotted, there is again a remarkable match. Almost as though one were observing a single event."

She flipped back to the first chart.

"The chemical and geologic structure of the asteroids is known. Evidence suggests that they were once gathered into a single, solidified planet. But this world was destroyed in what was probably a lengthy contest of gravitational dominance with Jupiter. Jupiter won, naturally, and powerful tides tore the young planet apart. Its pieces settled down into a stable orbital perimeter eventually, but some of the debris escaped into the solar system at large. You've already seen the evidence of that.

"That's the theory. It has holes, but I believe that I may have found a plug to fit the largest.

"This rocky debris which smashed down on the other planets of the solar system provides an answer, and perhaps a rebuttal to one of the arguments against the existence of a planet in the orbital interval between Mars and Jupiter, because the additive mass of all the bodies which make up the asteroid belt does not equal a planet-sized object. In other words, what if the asteroid belt is not the ruin of a proto-planet, but merely a remnant of a ruin? Catch my drift?"

She didn't wait for a response; the question had been rhetorical, merely a dramatic pause.

"Now, it is possible to estimate the mass of a meteorite from the crater it leaves behind. It is not necessarily easy, but it is possible. I have done it for all known impact basins falling within my temporal reference. The mass resolved, when added to the cumulative mass of the asteroid belt, yields a planet slightly larger than Mercury.

"There are other problems with putting a hypothetical planet here, but they are minor. The greatest problem

lies in formulating an agency to destroy this world and spread its fragments throughout the solar system. The gravitational forces of Jupiter alone will no longer suffice. Nevertheless, I feel we should reopen the question of the origin of the asteroid belt. Evidence is there and waiting to be examined. It would be foolish to let astronomical dogma blind us to what may turn out to be a fantastic and awe-inspiring event in the dawn of our sun's existence."

Brigid stopped speaking and looked about the room, perhaps searching out incredulous expressions.

Silence waited on her next words.

She smiled. Apparently she had won the audience to her way of thinking. She started to continue the talk.

One of the geologists raised his hand to be recognized.

Impatiently, Pitz nodded at him.

"What you have told us is remarkable, if true. Are we going down to Hades to reclaim one more piece of your puzzle, a fragment of the protoplanet?"

Pitz's face broke into a smile.

"I hope not."

And there she left us hanging.

The remainder of the meeting was a description and battle plan for the expedition. Two airbusses would be required to ferry us down to the surface. The exploration would take place using seven modified Groundmovers. A radar scan had already been completed from the air. The photomaps were exact. We were expected to mine and take samples from various spots of interest. The final episode would involve drilling seven deep bores and implanting fission devices. When these were detonated, the geologic structure of the crust and mantle in the area of the Hades Basin would be revealed. From this data, Brigid Pitz would be able to either prove or discard her theory.

But the nature of that theory she was not yet ready to reveal.

Talk about it on board the Station was rampant, however. You couldn't avoid hearing about it in the dining area, wherever people gathered.

Even Irene was curious.

She pressed me for details, and when I couldn't give her any, she stalked off to the lab in a huff, leaving me alone in our cabin.

That was perfect, I had been wanting some time alone. Moving to the desk, I removed a small, plastic device, a slim wallet with a viewscreen on one side. Dennis had sent the Coder by Mail Packet from Earth. That method was much slower than radio, but more secure.

Above the screen were several alphanumeric pressure tabs. I hesitated a moment, trying to remember the code that Dennis and I had worked out before he had left, then punched in what I hoped was the right sequence. Hit the wrong key and the entire message would erase undisplayed.

Something was appearing on the screen:

Roger:

I'm risking this message because something big is in the works for

Venus. Be warned and be careful. I'm helping the government with their investigation. We have narrowed our leads to several corporations which are major sources of money for the Group. But the Group has other support apparently from private lobbies who either want the Venus mission stopped, or the project opened up to other corporations. The Sayre Foundation currently has an exclusive charter to all Venusian mineral and chemical finds. These other lobbies don't necessarily agree with the Group's methods, but as silent partners they all support its goal...the overthrow of the Sayre monopoly. The Group has many agents on Earth, and on Venus. But I haven't been able to determine if Smyth or Hobart are among them. The Group also has some politicians in their corner, so be wary, and watch what you say. A note of hope: we are close to a breakthrough.

Dennis

The message ran through one more time, and then erased itself. I leaned back in my chair and tried to think. It was hard, I was tired.

Then, around 1130 hours, there was a soft tap-tap on the cabin door.

I moved automatically to answer it, leaving the desk lamp shining. The rest of the room was dark, the desk the only island of light. My bare feet made no noise on the soft, insulated plastic that covered the decking.

"Yes?" The panel slid back on its frame.

The hallway was unusually dim. A dark shadow faced me in a hooded coverall.

"Doctor Teale?"

"Yes. What is it? Are you with the Hades project?"

"Indeed I am, and to hell with you!"

The tone of voice warned me before the words registered. But the butt of the hand laser was already moving out of concealment. The glossy muzzle of the gun jabbed at my stomach.

I jerked the panel shut, but the intruder threw his shoulder in the way and stopped it midway. The gun fired and a blue-white beam scorched through my coveralls. Heat seared my skin. I screamed as the cloth burst into smoldering flames and ate at my flesh.

Panic gave me new strength. I hammered at the stranger's head with my fist. My hands smashed at his face and the hood slid back. For an instant I saw a beefy face and angry blue eyes. Then something dark flashed across my vision and stars burst in my skull.

I fell senseless to the deck.

"I think he's coming around."

The voice was familiar. I opened my eyes and saw Callaghan, his jovial nature muted somewhat, staring down at me. His hair was messed and he had on a pair of striped pajama bottoms which looked as out of place on his stocky body as ears on a mug. There was a smear of lipstick on his neck, I noted. Apparently my bad

luck had busted up something pretty interesting.

"Let's get him down to sickbay."

I turned my head to see who was speaking and was instantly sorry. There was a lump over my left ear the size of an apple. It throbbed like it was going to explode.

"Take it easy," Callaghan urged. "Who bashed you, friend?"

"Never saw him before. But he's ugly, with blue eyes."

Callaghan laughed.

"So am I. Haven't you got anything better for us?"

Just then, another attendant came up with a wheeled stretcher.

"The talk can wait," he snapped. "We're taking this man below. The rest of you wait for security."

And so they hustled me off like a sack of potatoes.

I didn't see anyone but two docs and a nurse for four hours. Then they let Irene in for a few minutes.

She blubbered over me for a while, and then chewed me out for nearly getting myself killed.

I apologized meekly, and that brought the tears back.

When she was finished feeling sorry for me, I asked to see Callaghan.

He had apparently been waiting for some time. The door burst open almost before Irene was through it. He pulled a chair up beside the bed.

"You were lucky, buddy. They meant to get you. Their boy was an amateur, though, and that saved you. He should have shot you right off instead of making a speech. Security found him down one level heading for one of the shuttle holds. The gun was still hot from being fired. He resisted and the guards burned him."

"He's dead?"

Callaghan nodded.

"Damn it. Now we're as much in the dark as ever." I took a deep breath. "It would have been nice to find out why he was out to kill me. Whose idea was it to shoot to kill?"

"The guard's. Your potential assassin almost burned his left hand off at the wrist. There wasn't time to fool around. The guard liked living as much as you do."

"Okay." I felt suddenly contrite. "Sorry. Shot my mouth off out of turn."

Callaghan grinned and hit my shoulder. "The doctors say your skull is still whole and that they'll release you to Irene's care sometime tomorrow. The burn is superficial. You'll be good as new by the time the expedition is ready to make its descent."

I sighed.

"I was afraid you'd say that. Oh, well, why should you get to hog all the glory? Buddies have to stick together, you know."

My eyes wandered about the tiny sickbay.

"Now if we only knew why."

Callaghan shrugged and stood up.

"Easy. The Group wants you dead. They gave you time to get relaxed, let your guard down, then they acted."

"I'm sick of hearing about them. Sick of Hobart, too. It would be different if we could fight them, but

they're invisible, just out there, waiting, like the hand of death. If only Irene were somewhere safe."

"Where's safe in this world? I don't think there are any safe places. And if there were, human beings wouldn't live there. It's just not their nature."

"Your nature, maybe. Myself, I'd like a cozy fire and a warm cottage."

"That hit on the head *did* affect you," Callaghan accused. "I'd better get out of here or you'll contaminate me with that kind of crazy talk."

"I bet your wife and children don't think it's crazy."

He flushed. I'd never seen him do that before.

"Just leave them out of it, hear? That's another problem."

He departed like a spooked hound and left me staring at a blank door feeling puzzled and sore.

I wasn't allowed to sleep. Cracked heads are dangerous that way. Instead, I reviewed geology texts and papers on Venus.

Venus was an anomaly in several ways:

A. Her atmosphere was way too dense. She had enough air for two planets, maybe even three.

B. She hardly rotated at all, only one revolution per 243 Earth days. And her motion was backwards in relation to the other worlds making up the solar system, or retrograde.

C. Her surface was flat, the tallest feature being no more than two or three miles above the mean elevation.

D. She was completely without surface water, yet there was almost no water in the cloud decks, either. H_2O was formed as a natural process of volcanism. In 4 billion years of volcanic activity some water must have formed. Where was it?

I passed the day in reflection and study. It got boring quick.

I was on the verge of revolting and fleeing the sickbay on my own when Hobart and Callaghan both burst in on me. Callaghan was uneasy and tense. He looked tired. Hobart was in worse condition. His attitude resembled a starving mortician.

Pushing myself up in the bed, I steeled myself for the bad news that was bound to come.

Hobart opened.

"We have located Forsyth. He is alive, but very weak. The search teams found Skystation One drifting aimlessly near the limit of the lower cloud deck. It was a near thing."

That was good news.

Why were they still so glum?

"You're hiding something. Let me have it," I demanded.

Hobart glanced at Callaghan.

"I'll do it. I've known him longer."

Hobart nodded, suddenly relieved. He backed toward the door.

"Hades Project needs my attention. I thought you would appreciate hearing about your friend. Well, goodbye."

The door clicked shut and Callaghan and I were alone.

"It's Irene, isn't it?"

The old second sight was acting up.

"You shouldn't worry. These things happen. I've been through two births, myself. They're never the same. And sometimes there are complications. Irene is eight months along..."

"Where is she?"

"Hobart is having her transferred up to Venus Station. The facilities are better up there. And the lower gravity will make her more comfortable."

"I want to see her!"

"You shouldn't, she's under sedation. She wouldn't recognize you, anyway. Just lay back and don't worry."

"How can I not worry about my wife when she's in trouble? Wake up, man."

I threw back the thin sheet and slid off the bed onto the floor.

"It was the Group, wasn't it? How did it happen?"

"She fell." Callaghan had his hands on my shoulders, forcing me back into the bed.

"They're going to try to save the baby."

"I want to see her, damn it!"

"You're going to stay in this room, read your damn papers, and get prepared for your job. That's the way Irene would want it, and that's what you should do. There's nothing you can help with. You'll only be in the way."

I looked at him and saw that he wasn't going to give in. Maybe another time I would have decked him. But now, I was just too weak. The bed came up and caught me. I rolled over and stared at the wall.

Beth's image was gazing back at me, wispy and thin, a ghost of a memory.

"Get out of here, Callaghan!"

"She's going to be all right."

"I said, get out!"

After a moment, he left.

There was nothing else to say.

The sun was shining through the big window at the end of the room and making golden bars of brightness on the massive desk. The old man who sat at the desk, however, was in shadow.

The secretary showed the two well-dressed businessmen to chairs ranked before the desk and quietly withdrew.

The smaller of the two visitors soon proved to be the spokesman. When the formalities of introductions and small talk were dispensed with he got right to the point of their visit.

"The modified equipment which you have ordered is prepared to your specifications and ready for shipment. Needless to say, our company is aware that a standard disclaimer of use clause in our contract would be out of place. But we would like some reassurance as to the purpose that you intend to use our products for."

The shadowed face moved into the light. The features were old and lined, but still powerful. It was a face used to command...and obedience.

"I understand your company's concern, Mr. Barker. We intend your goods for scientific research on the surface of an uninhabited world. I

trust that sets your mind at ease."

The other man smiled. "It does. Some of us were worried that your organization might have something rash planned. We must naturally be careful about our company's reputation." He hesitated. "Is the plan maturing as expected?"

The old man's face tightened.

The other businessman, up to now silent, broke in.

"Bill, there's no reason to doubt his word. And he doesn't like being questioned. We're going to win, and no one has any greater motivation for that than Dick Cussler."

The smaller man glanced uncomfortably to a corner of the desk where a photo of two young men side by side reposed in what was evidently a place of honor.

"Yes," Cussler agreed. "There is something that the Sayre Foundation will be unable to give back. But they will pay for their carelessness."

The smaller man stood and held out his hand. The meeting was over.

"We want no more lives lost. No more!"

The old man smiled faintly.

"I'm not a monster, merely a businessman. And we're both engaged in the same business for the same profits. I hope you gentlemen will remember that when the time comes for the payoff."

"Indeed," the smaller man said with a careless snort.

Later, as they were going down the long, plushly carpeted hallway to the elevator, he spoke to his companion.

"He scares me sometimes."

"Relax, Bill. Cussler's no madman. He dotes on the memory of his dead sons a bit too much, but he knows how to do a job and get it done. Play along with his lead and you'll get those contracts on Venus. It won't be much longer."

"It better not be. The annual stockholders' meeting is coming up soon and Fitzsimmons wants something firm to present."

The elevator door hissed open at their approach, and then they both were gone.

Back in the office, the old man was talking to his secretary.

"Yes, put me through to Senator Briggs. It's time we had a hearing before the Congress. We've got our big guns, now. But when we make our play the government will swoop down on us like hawks. We're going to need a voice before the populace. If Briggs balks remind him of his last vacation in Bermuda. It shouldn't take much more than that. He had a good time. A very good time!

"And after you get Briggs on the line, call up Andre. We'll need the shipment schedules for the Jersey Spaceport. The traffic to Venus is going to be getting heavy now that she's coming out from beyond the sun. We're going to have to make a substitution for some of the goods routed for Outpost and it will be a lot easier if Andre and his crew can get the work done on the docks before the equipment is loaded into billets and stowed

deep." He motioned her to leave.

The girl nodded, closed her pad and departed, her short skirt swishing about her knees.

The old man leaned back in his chair, folding his arms behind his head. The chair springs squeaked faintly as he rocked slowly. His eyes fell on the photo on his desktop.

"I couldn't stop you from going to work for the enemy, for taking up with their crazy dreams of making Venus a fit place for man, but by the brass gates of hell I will make them pay for being careless with your lives. Before, the competition was only business, but now it's more than that. Let the fools have their mines, I'm going to ruin Sayre and show them up before the whole system as a pack of arrogant fools . . . so help me I will!"

His fist slammed down on the desk and the photo rocked on its frame and fell over with a clatter.

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The sky was black, the ground a brownish red. The sun was eerily visible as a dark orange sliver wavering just above the horizon. It was a freak sight, one observed maybe three times during a year, and it served to make the broad depression laid out before us even more unearthly.

The Groundmover was drawn up on the brink of the immense crater, its cameras directed down into the pit. The rock face leading down to the floor was heaved up into hummocks of pillow lava, ridged and fissured in chaotic fashion. It was a dead landscape.

The floor of the pit was a little more interesting. Portions of it made a raised plain. Here, the stone was colored a dull red that glowed slightly. That color was reflected off the bottoms of the clouds scudding past overhead.

The plain was heavily eroded, probably from subsurface rock currents and the collapse of portions of weakened crust. In the deepest ravines fumeroles sputtered and boiled, coughing white-hot spatters of stone out onto their throats, where it slowly cooled from redheat to less visible black. Smokes drifted across the floor of the pit in streamers, rising nearly vertical until the subwind of the lowest cloud deck bent them over at a right angle and carried the fumes away to the east.

The air itself shimmered with heat, and with the terrible pressures exerted at this depth.

When one of the fumeroles erupted, the rumble of the emerging rock fluids was like the heavy booming of a bass drum being played invisibly in the wings of the arena. The bulkheads of the Groundmover shuddered sympathetically with the thunder. I could feel it with my fist pressed to the thick insulation, as though the entire vehicle was forming a vast tympanum.

Buscema, my technician, was trembling. He hadn't taken his eyes off the screens since he had driven the big machine out of the hold of the airbus, following in the treadmarks of the other six vehicles which had preceded us into this hellish wasteland.

It was his first trip down to the surface. I felt a certain sympathy for him. My hand moved out of its own accord and touched his shoulder.

"We'll be out of here in sixteen hours. Until then, just be careful and smart and we'll make it without any trouble."

"You've been down here before."

"Yep. Didn't like it then anymore than you do now."

I settled the tiny earphone and mike arrangement more firmly on my head and hit the transmit switch:

"DIG LEADER. THIS IS CRAWLER SEVEN. WE ARE ON THE SURFACE AND FULLY OPERATIONAL. YOUR ORDERS, PLEASE."

The voice of Brigid Pitz came back at once, perhaps a little less arrogant, but still very much in authority.

"FOLLOW THE PROGRAM, SEVEN. CHECK IN WHEN YOU HAVE REACHED YOUR OBJECTIVE. DIG LEADER OUT."

"Follow the program, the lady says."

Below, strapped into the cramped driver's slot, Buscema chuckled. Well, at least he still had his sense of humor. A man needed that in hell.

Where was the program?

I pushed the papers about on the clipboard that was hanging near my head. Yes, there, I scanned the objectives and time table one more time.

1500 Dig Team exits respective airbus and proceeds directly to preassigned locations (see assignment sheets).

1600–2400 Individual components of Dig Team will investigate assigned sites, taking mineral samples with exterior grapples, photographing terrain, and completing radioactive and chemical studies.

0100 Dig Team will commence drilling bore holes into rim of Basin formation. Units One and Three will excavate bore holes in approximate center of pit.

0700 Bores to be completed. Fission devices inserted and detonation timers activated.

0800 Dig Team withdraws to landing area, deploying seismic monitors at preselected intervals (see assignment sheets).

1000 Embark respective airbusses with samples transferred to sealed containers.

1200 Depart Venusian surface.

0800 Prearranged detonation of fission devices commences. Monitoring of seismic echoes to be accomplished on board Cytherea Station and Venus Station (orbiting Platform).

1100 Dig recapitulation and evaluation.

It all looked so easy on paper.

I turned ahead to the assignment sheet. Our dig location was under the rim of the north flank of the Basin, approximately seven hundred yards distant. We would have to descend the slope and then make a sharp turn to the left to reach it. And, if we were to keep to the schedule, we'd have to hurry.

"Drive on, James." I clipped the assignment sheet in front of Buscema.

"There lies our destination. Don't

spare the horses or the Dragon Lady in charge of this joyride will have our asses nailed to her bulkhead for conversation pieces. Move it!"

The slope was an easy gradient. The rock was firm, and the treads only slipped a little as the Groundmover growled downwards.

The bottom of the pit was hard rock. But here the stone was cut with narrow ravines parallel to our course. Most the Groundmover could straddle. But some required selecting detours. We were forced to climb the wall of the Basin twice, avoiding deep canyons, their bottoms filled with drifting mist. And once, we had to meander far out onto the Basin floor, trying to pick our way around a deep pit. The crust had fallen away into a lava tube. The walls of the pit were splashed with scarlet, and the magma churning below made a continuous roaring sound, like an ancient Saturn Five booster taking off over and over again.

Smokes obscured vision at intervals.

Buscema drove with his feet thrusting continuously at the brakes, sliding us about on the rock surface by brute force. Some boulders had to be shoved out of the way. They toppled off into eroded slashes reluctantly. Sometimes they shattered when they hit, their materials already softened by the terrible heat.

We were almost to the location circled on the photomap when the Groundmover dipped its nose and the stern rose high into the air. The treads clashed against soft stone. The engine began to race, and Buscema tried half-heartedly to stifle a frightened scream.

With a curse, I leaped across the cabin and yanked down on the ballast transfer switch. There was a gurgling rumble as a fortune in liquid mercury was pumped rapidly into empty stern tanks.

The Groundmover thumped back onto the rock, level again.

Buscema backed cautiously, at the same time swiveling the cameras down.

On the screens, an image of fractured crust with a dull grey liquid surging under it met our eyes.

"Metal pool," I choked. "Back around and get closer to the Basin wall. The crust will be thicker there."

Buscema clashed the gears. The big machine moved left, but slowly.

"What was it?"

The boy's voice was very faint. There was sweat running in greasy rivers across his face. His forehead was beaded solid.

He was stinking with fear.

But he was doing his job.

I clapped him on the back again. No words were necessary. I could see him relax a little.

"Lead melts out of the rocks and runs along the ground where it can, collecting in low spots, just like water would do at home. When it pools, the surface combines with the acids in the air and forms a crust. Dust drifts over it. The result is a trap that can swallow up a Groundmover, if you're not careful. I'm a lucky man . . . you were driving only as fast as you trusted the ground. Where did you learn that?"

"Your friend, Callaghan, gave a talk

before we left, and I listened closely."

"Good . . . watch it!" The Groundmover was tipping again. But Buscema gunned the engine and we slid across the narrow fault and gained solid rock. We roared up a dusty incline glowing with reflected heat and came to a stop before a fault which cut the Basin wall and twisted far out into the floor of the pit. At its deepest point, smoke was boiling out of the fracture, twisting in a narrow streamer high into the quivering air before being smeared flat by the underwind.

"We're here," Buscema breathed.

"Helluva spot for a picnic, isn't it?"

The kid didn't laugh. Well, it hadn't been much of a joke.

I spun about on the cushion and unlimbered the grabs. The controls fitted over my hands and fingers like metal gloves. When I moved, the grabs followed exactly, except with many times the strength and lifting power.

"Open the bin, kid. I'm going to pick up some rocks."

I worked my way down the opposite face of the fracture, tearing samples out of the layered material and placing them in numbered recesses within the bin. I made a photo of each selection before I removed it, and then called out the number of its storage recess to Buscema. He logged it and waited for the next.

"Get this thing a little closer . . . I'm going deep for this one."

The Groundmover grated forward, overbalanced slightly, then held firm. I thrust the grab as far down into the crevice as it would go and latched onto a curiously pale protrusion of stone. It was an inclusion in a wall of what was probably anorthositic rock.

The lump resisted. I threw more power to the retractile arms. The electric motors began to whine in protest.

"Kick us backwards a hair, kid."

The Groundmover jerked and reared.

"Here she comes . . . God, that's really a lump. I'll have to break it up before it will fit in the bin . . ."

We went on like that for several hours, scratching around in the area, collecting and logging whatever looked interesting. There was a lot. The bin was full long before our collection period was played out.

I reported in and asked permission to begin the bore.

Pitz said to go ahead, and then paused in her transmission.

"BY THE WAY, TEALE. VENUS STATION CALLED DOWN WITH A MESSAGE. YOU'RE A FATHER . . . IT'S A BOY, SIX POUNDS, FOUR OUNCES. BIRTH WAS PREMATURE, BUT MOTHER AND CHILD ARE DOING FINE. CONGRATULATIONS."

For a moment I was stunned. The words didn't seem to mean anything. Then I let out a whoop. Buscema yanked on the klaxon and the shriek echoed through the tiny cabin.

"Nice going old man. Your son's a Venusian, one of the first."

But Pitz wasn't through.

"DON'T LET MY GOOD NEWS MAKE YOU CARELESS, TEALE. THIS IS STILL HADES. DON'T GO MAKING YOUR WIFE A WIDOW. DIG LEADER, OUT."

"Boy, what a grouch," Buscema complained.

"Yeah, but she's right. We can still get very dead if we foul up. Extend the camera boom out over the crevice."

The scene on one of the scanners tilted and pivoted down.

Darkness covered the glass.

"Turn up the sensitivity."

The darkness turned silvery; rock ledges began to show, then a flat bench, the bottom of the ravine. Smokes eddied along it.

"Think you can drop the bore down that crack and get it digging? We can save some time, maybe put it down an extra hundred feet. The Dragon Lady will like that."

Buscema was doubtful.

"Let me try," was all he would say.

But it worked. The bore chugged away, and a mound of pulverized rock began to grow beside us as the till was carried up the shaft casing, across a conveyor, and deposited next to the Groundmover in such a manner that we wouldn't be buried as the pile grew.

And grow it would. We were going down six hundred feet.

We took a lunch break and let the operation take care of itself.

Afterwards, I called Callaghan. He was in Crawler Three, out in the center of the Basin.

"HOW'S THE VIEW, BUDDY?"

"BLEAK, VERY BLEAK. CAN'T SEE HALF THE TIME BECAUSE OF GROUND FOG. WE'RE AHEAD OF SCHEDULE, THOUGH. OUR BORE IS DOWN TO THE FOUR HUNDRED-FOOT LEVEL. DON'T KNOW IF WE'LL BE ABLE TO GET MUCH DEEPER . . . WE'RE STARTING TO SUCK MAGMA. I'M AFRAID WE'LL LOSE THE BIT, BUT THE BOSS LADY SAYS TO KEEP PUSHING."

"SHE WOULD."

"SAY, CONGRATULATIONS. I HEARD ABOUT IRENE. YOU OWE ME A CIGAR."

"THAT'S A BARBARIC CUSTOM."

"SO I'M A BARBARIAN. YOU'RE IN MY DEBT, REMEMBER."

"THERE'S JUST NO TALKING TO YOU, CHUMP. THIS IS CRAWLER SEVEN, OUT."

On the bore control board a red light began to flash.

"Oh, oh, we're out to our limit. I'd better start pulling the pipe. Rack it as I bring the sections clear of the shaft."

Buscema quickly put down his barely touched sandwich and began monitoring the outside cameras. His hands danced over the controls. By 0530 we were finished.

"Okay, let's fish out 'baby' and lower her down."

Buscema opened the cargo bay of the Groundmover. I thrust the grapplers inside, warily remembering that we had 20 kilotons lurking there.

The black, insulated casing slid out slowly and came to a stop against the holding rack. I snapped on the lifting bolt and gave the shear swivel one last check. It clicked free, and then locked tight each time I sent the signal. I turned the bomb. A plastic coated metal tag rolled up into view, scuffed and smeary, but still readable.

Under the radioactive materials warning, and the harsh black and yellow design was the part number and the legend: SHOCK WAVE GENERATOR-FISSION TYPE-20 KILOTONS. The area around the tag was beginning to bubble in a peculiar way, as if the glue were

reacting with the atmosphere. That was unlikely since Pitz had explained in great detail how these devices had been custom designed for use on Venus. Surely the manufacturer wouldn't have fouled up a simple thing like a glue specification?

I rolled the bomb again, opened the inspection plate and set the timer. 0800, final event time. I cleared my actions with Dig Control, got the go-ahead to ARM the device, and used the micromanipulator to set and lock the activator switch.

The cover plate went back into place with an unheard snap.

"Okay, kid. Haul away."

The bomb swung out over the yawning crevice.

"Lower away. Stop playing out on my signal."

We waited as the bomb swayed down into the depths. The mouth of the shaft rose up to meet it.

"Stop! Wait until it stops swinging."

Gradually the device slowed in its oscillations.

"Give me six inches."

The nose of the bomb struck the lip of the shaft and hesitated there, leaning slightly to one side. It pivoted about the point of contact . . . then it dropped inside.

"Lower away, we're in. Use the automatics, we've a deep mama to plumb here."

Thirty minutes later we were done. The bomb was seated in its final resting place, a cap of fast-setting sealant had been poured around it, and the rest of the shaft filled in with packed down till. We had primed our geologic cannon and tamped the shot with wadding.

Now it was time to run like hell.

The others were on their way back, as well. The dig was going better than expected. Maybe the grim surroundings had given everyone a certain urgency, a longing to finish up and get up where the air was lighter and fresher.

One by one the crawlers reported in. Pitz sent them scurrying toward the waiting airbusses. She was still on Station. Her first shaft had filled with magma and turned into a baby volcano, drenching the Groundmover with molten rock. They had been forced to move to another location and drill again. Callaghan, having planted his device and sealed it, was moving toward her to assist.

We were almost back to the airbus when her call came through, her device was seated. She was filling the shaft. Callaghan was returning at once.

On the heels of that transmission came another. It was Robinson, another of the geologists. He had been drilling in Crawler Two. They had encountered dense strata and had been slowed greatly. Now his panicky voice flooded all the circuits.

"STOP THE OPERATION! THERE'S BEEN A TERRIBLE MISTAKE."

Pitz was on the net at once demanding what was going on.

"WE WERE ABOUT TO LOWER OUR DEVICE WHEN MY MANIPULATOR STRUCK THE CASING. THE IDENTIFICATION TAG WAS KNOCKED OFF. THESE AREN'T THE DEVICES THAT WE ORDERED FROM NUCLEONICS CORPORATION. SOMEONE

GLUED NEW TAGS OVER THOSE WHICH THE MANUFACTURER PUT IN PLACE. THE YIELDS ARE WAY OVER OUR SAFETY FACTOR. THESE ARE 20-MEGATON FUSION DEVICES, NOT THE 20-KILOTON FISSION BOMBS THAT YOU SPECIFIED. DO YOU REALIZE WHAT WILL HAPPEN WHEN THESE THINGS DETONATE?"

There was a long period of silence. But it was too late to go back, too late to yank the devices.

"PLANT YOUR DEVICE, CRAWLER TWO, AND RETURN TO THE AIRBUS. THERE'S NOTHING WE CAN DO NOW. I'LL NOTIFY CYTHEREA STATION."

"BUT THE EXPLOSION WILL . . ." Robinson was cut off by a sharp buzz of interference.

"I SAID COMPLETE YOUR EXPERIMENT. ONE MORE BOMB WON'T MAKE ANY DIFFERENCE, NOW. BUT THE ADDED SHEERING FORCE MAY PRODUCE SOME INTERESTING REACTIONS IN THE CRUST. AS FOR THE REST OF YOU, GET READY TO GO HOME. YOU WILL BYPASS THE PLANNED RENDEZVOUS WITH CYTHEREA STATION AND GO DIRECTLY TO VENUS STATION. I WANT AN ACKNOWLEDGMENT FROM YOU PEOPLE ON THE AIRBUSSES."

One by one the surprised pilots checked in.

We heard her talking to the Skystation after that, arguing with Hobart, demanding that he evacuate and take his people out of the atmosphere on every available craft.

Hobart protested that such a thing would take days.

Pitz told him that he had no choice. Finally, the administrator agreed.

We had our airbus in sight, by then. Buscema sent the Groundmover up the ramp and into her bay where the automatics locked her down firm.

An hour later Crawler Two rumbled in through the hatch. She was the last of our brood. The pilot sealed the hold and started pump-out procedures. When the air was good, we climbed gratefully out of the cramped machines and headed for the main cabin.

There were still two crawlers out, the pilot advised us.

Callaghan's and that of Pitz, the Dig Leader.

She was in trouble . . . big trouble. Her tech had driven their Groundmover into a lead pool. They were in too far to back out and the big machine was slowly being sucked down through the crust.

Callaghan had come up behind them and had seized hold of the rear of the mired crawler, but the weight of the sinking machine was dragging both of them down into the bubbling swamp of molten metal.

There were yells coming over the radio net. One of the bridge scanners was linked into the control room of the doomed Groundmover. Pitz was struggling with the young technician. He was out of his head, screaming and crying about not wanting to die. There was a flash of bright metal, then a loud 'pop.'

There was instant quiet.

"My God," one of the geologists to my right muttered in a shocked voice. "She's shot him to death."

A woman's disheveled face floated out of focus across the screen.

"I WANT TO TALK WITH ROBINSON. CLIFF, ARE YOU THERE?"

The gray haired man who had commented earlier moved forward and took the mike the pilot offered to him.

"THIS IS ROBINSON, BRIGID. WHAT CAN WE DO?"

"NOTHING. WE'RE BOTH DEAD, NOW. BUT KEEP THE PROJECT ALIVE, CLIFF. I'VE SEEN THE ROCK SAMPLES, TESTED SOME OF THEM IN A ROUGH WAY. THE THEORY IS CORRECT! LET THEM KNOW, CLIFF. NOW GET THE HELL OUT OF HERE. THERE'S NO TIME FOR MAUDLIN EMOTION, ALL HELL IS GOING TO BREAK LOOSE WHEN THE BOMBS LET GO. THAT GOES FOR YOU TOO, CALLAGHAN. THANKS FOR TRYING. YOU'RE A LOVELY MAN, A REAL GENTLEMAN, BUT I'VE BEEN A BITCH ALL MY LIFE AND I INTEND TO DIE LIKE ONE. BUG OFF!"

There was no acknowledgment from Callaghan.

Six minutes later the radio and video link with Crawler One faded out into noisy, multicolored snow.

Robinson's shoulder slumped. Two of the techs escorted him back to his seat and helped strap him down.

The pilot stayed in close communication with his partner in the other airbus. Suddenly he raised his right hand for attention.

"Callaghan's just driven into the hold . . . they're getting ready to lift off. Strap down, all of you. We're going to blast in ten seconds."

For the next two hours we clawed our way up through the clouds, up into the clean emptiness of space, where the stars shown bright and hard. There was no way to dock with Venus Station, though. Her vicinity was filled with ships of all sizes. A vast ferry operation had been set into motion. There were over three hundred people to pull off Cytherea Station and one trip by six airbusses wouldn't do it. Every shuttle and airworthy freighter had been called into action. It reminded me of a modern Dunkirk.

All the activity finished up barely in time. Suddenly, right on schedule, someone punched a hole in the side of Venus and she vomited her white-hot guts three miles into the black sky. The featureless cloudbank overhead bellied out in a vast blister, then broke open as a brown flood of debris and dust was pumped into the upper atmosphere.

It was the dense atmosphere that made the explosion so fierce. The shockwave was like a giant hammer. It swept around and around the planet in the equatorial belt, staining the clouds in that area a dirty brown.

An automatic camera had been left running on board Cytherea Station. In the last moments it showed a dark mass like the overbalancing crest of a tidal wave advancing out of the east. The wind was already building to a gale. Then the screen went blank.

No trace of Cytherea Station was ever found, not in the air, and not on the surface. Venus had swallowed up the wreck completely.

Among the survivors of the Station and the staff of the Foundation the feeling expressed by most was an all-pervading gloom.

20

Dennis ducked low under the dripping branch and crouched there, breathing heavily as the copter swooped overhead, completely hidden by the cloud canopy. It was near dusk, and the misting rain had begun to develop into a legitimate rainstorm. Droplets were beginning to hammer on the leaves around him, splattering into cold spray.

As the copter turned out across the acres of deserted lawn and headed for the distant manor house Dennis drew close to the WBI man who was sharing the woody cover with him. Months ago his fight against the mysterious Group had been a private affair. Now, though, with some lucky breaks, and the massive attack against the Venus colony, he found himself with the support of the Terrestrial government. It was a comforting feeling, damp and miserable as he was.

The manor house was no longer dark, now. Lights had blinked on in the upper stories, and a dog had challenged the darkness with a yelping bay of suspicion.

The agent spoke softly into his radio. It muttered back in words too blurred for Dennis to understand. The other man stood abruptly.

"Come on. They've breached the fence and knocked out the surveillance systems. Move fast and low, and keep behind me. This place may have some unpleasant surprises."

Dennis was happy to comply.

Later, as he related the story of the raid to us over the Direct Beam from Earth, he admitted to the anxiety of the moment, of the fear that bit at him each time his feet slipped on the wet grass and threatened to spill him to the ground.

The agent moved swiftly in concert with the main force sweeping across the grassy opens toward the manor house. There was no cover for the first hundred yards. That was planned, Dennis realized as they came up on the first tangle of ground-hugging trees and discovered the laser needler staring blindly back the way they had come, inert and dead, its automatic sensors jammed.

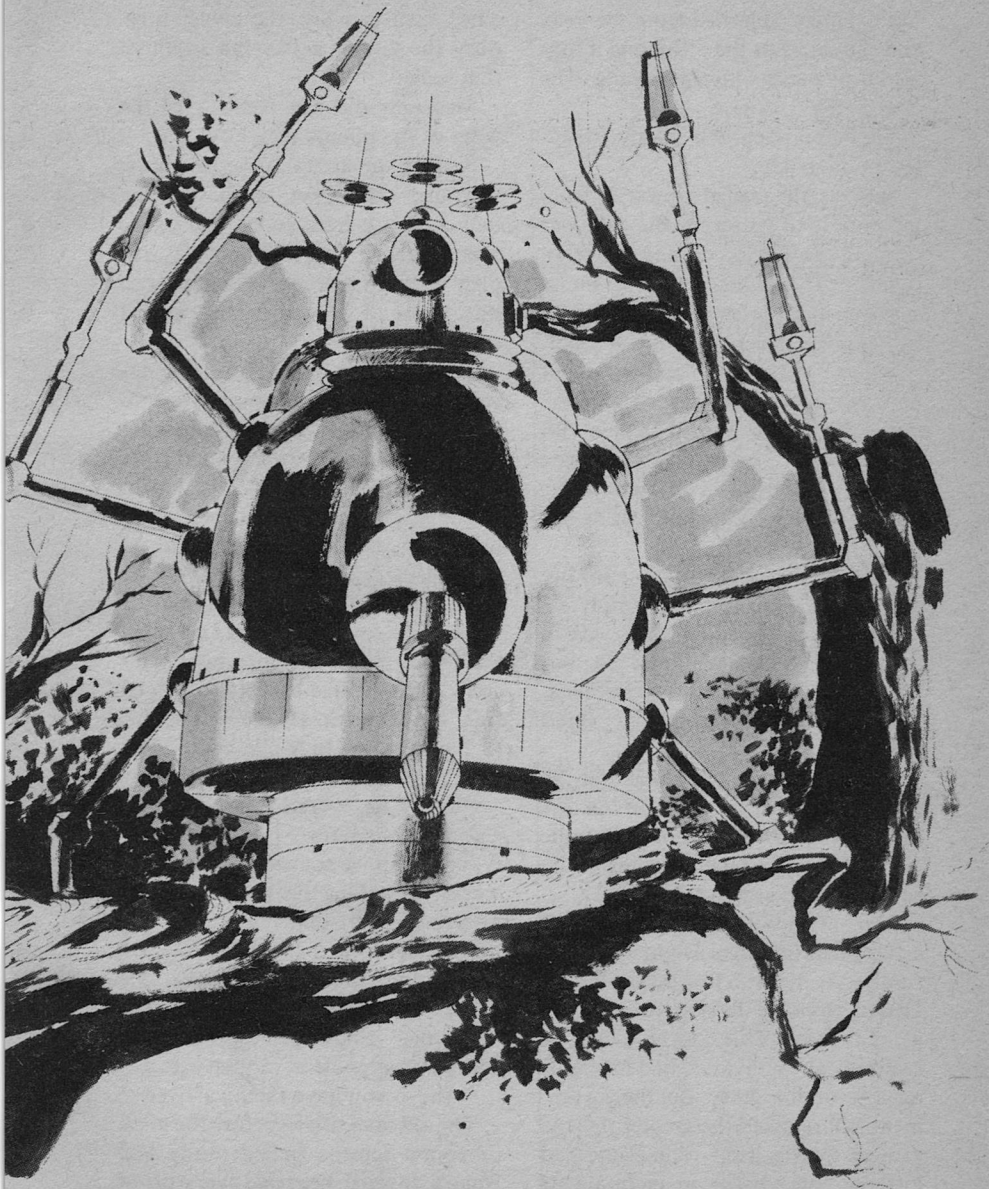
The agent turned to Dennis and grinned, patting the buzzing satchel he wore strapped to his belt.

"Just pray the battery holds out until we get inside the house," he hissed.

Beyond the trees was more open lawn, and then a cluster of staggered bushes whose leafy summits rose higher than a man. As they passed the first a glittering shape rose up to confront them. Harsh light bit at the grass in a solid beam. It swept over the tip of the agent's boot, adding the smell of charred leather to the stink of overheated earth and crisped vegetation.

"Down!" the agent shouted, and fired even as he was throwing himself aside. The blue glimmer of his hand laser struck up at an insectile metal head. The light beam glanced across protruding vision cells, destroying them, and the robot went into defensive mode, stabbing out blindly with its torch.

Dennis rose to his knees and fired.



Molten metal splashed from the head and shoulders of the robot and it toppled backwards with a dull clang to lie inert in the darkness.

They approached it warily, weapons at the ready.

Smoke still trailed upwards from the muzzle of its torch. But rain was running down its domed chest in rivulets. The lights from the house sparkled in countless droplets of water beading the deactivated metal giant.

"Good work, kid. You burned out its brain pan in one shot. That took guts." The agent studied Dennis with a critical air. "I wouldn't have been surprised if you had lit out running the minute this big Ugly came rearing out of the bush at us."

"I've done too much running already," Dennis told him simply.

The agent accepted that with a shrug. He knew men, and he also knew when to mind his own business.

Besides, they were falling behind the advance.

The first group was already at the front door. They had shot out the porch lights when a burst of hostile fire had answered their reading of the summons and search warrants.

The big double doors caved in with a flash and thunderous puff of white smoke. As they ran toward the house, Dennis observed the side entries suffer a similar fate. This was no game, he realized. The individual had his rights against forcible entry. But the government still retained the greater right to protect society itself. The estate had lost the court battle to maintain its aloof silence. Now, the owner must obey the law or suffer the wrath of that society.

Meekness did not seem to be the wont of the inhabitants, however.

Slowly, the attack force fought its way into the upper reaches of the manor. It was hard going. Resistance was stubborn and determined. Men died on both sides as lasers stabbed out through growing curtains of smoke.

Then, as if in answer to some unspoken signal, the defense began to crumble. Weapons were tossed out into hallways and figures began moving into the open, their hands raised high.

The assault team began moving the prisoners outside just in case there were further pockets of resistance.

But the defenders had given up ...completely. To Dennis, knowing the Group as he did, that just didn't seem right. He had expected a bloody fight to the death. He mentioned this to the agent as they climbed a final staircase to an armored penthouse.

"Yes," he agreed, "it's strange. Either the main force has fled to safety, or they have something else in the works, something that they feel makes a surrender here immaterial."

The big door melted into sagging shreds of metal under the attack of the agent's weapon and they entered the penthouse gingerly, stepping over still-glowing pools of molten metal.

"Ah, so you have finally arrived."

The old man sitting before the bank of comm screens smiled thinly and waved toward several overstuffed

chairs lined up behind his position.

"You're Cussler?" the agent demanded. "Richard P. Cussler?"

"Yes, yes, the same. And you're here to accept my surrender. Well, you shall have it. But before we go into the tedious details of handcuffs and all that sort of official restraint . . . come sit and watch. We have yet to play our last card, you see, the World Congress is hearing a statement from our group on the International Podium. I ask that you listen . . . ."

The sound on the comm sets came up as Dennis moved to where he could see. But he did not sit down.

The agent moved to a corner of the room and took up a watchful station. The danger was not over yet.

The scene on three of the big screens was the International Audience Hall of the World Congress. The other screens were dark.

The speech was already in progress. The speaker was a woman in her early forties. Her words were greeted with small bursts of applause, and, occasionally, catcalls. The majority of the vast audience visible in the hall was maintaining a quiet, seemingly disinterested silence.

". . . and as I have shown, the cost of this incredible project in lives and dollars has already proved to be unacceptably high. And the recent surface explosion which destroyed Cytherea Station, and all other life established on Venus, proves that the Sayre Foundation's unilateral attempt to subjugate this planet for its own private use has been a failure. The history of this organization has been one of individual suffering, lack of respect for human dignity, and a singular lack of efficiency. Why the accident rate alone has exceeded any known human venture in terms of dollars and lives thrown away.

"I ask you, the elected members of the World Congress, to reconsider the charter of this project. A project whose usable benefits will not appear to our children, nor even our grandchildren. And possibly not to any children at all. Venus is a killer planet which can never be tamed or be put to any conceivable use. The Sayre Foundation has painted a false picture of its goals solely for its own enrichment, so that it alone could reap the mineral wealth of the planet's surface."

The woman bowed her head.

"The lives lost already can never be brought back. But I ask that you prevent other young men and women from being sacrificed. You can do this by revoking the Sayre Foundation charter of operation. I hope that in your hearts you will find your way clear to do this. Thank you."

There was a moment of silence. Then a rising thunder of applause.

A dry voice inserted itself over the applause.

"You have just heard Margaret Hitching of the Cussler Corporation expressing an opinion on whether or not the Sayre Foundation charter of operation shall be renewed. Speaking next shall be an agent of the Sayre Foundation, Dr. Franklin Smyth."

Cussler reached to shut off the

screens without looking at the others.

"Leave them be," Dennis ordered.

"But we've heard everything that's worth hearing," Cussler protested. He smiled again. "Surely you don't believe the propaganda that the Sayre Foundation puts out for the masses?"

The announcer was continuing:

"Dr. Smyth's message has been taped because of direct transmission difficulties. Dr. Smyth is unable to return to Earth because of the recent disaster on Venus. He is continuing to direct recovery operations on Venus Station, the orbital base of the Sayre Foundation."

Smyth's face appeared on the screens, blurred and grainy, speckled by occasional bursts of interference.

"Allow me to first thank the many representatives of this august body who have forwarded condolences on our great loss. The thoughts are appreciated greatly.

"And now, to the heart of this message I must go at once, for there are some out there among you who have said that we have failed in our attempt to salvage Venus for humanity. We have had a great setback. But it has not been Venus which has defeated us, but rather a far more dangerous enemy. Time and again, as humanity has struggled to improve its station, to wrest knowledge from its surroundings and invest it in both technology and society, it has been forced to struggle against institutionalized ignorance and individual self-interest. The faceless mob must fear knowledge with a terrible instinct, for each time we try to progress, the mob, springing either from the halls of our campuses, or from poverty-stained streets, gathers to pull us down. To date, we do not know who exactly has presided over our defeat, but we have tried to fight. I myself did my best to appear to be a pawn so that they might contact me and thus give themselves away. But our enemies were too cautious for that, too sly. They are fools, but educated fools, and that is the most dangerous kind.

"Ms. Hitching has spoken to you of deaths. We have had them. God knows we tried to prevent them, but even God cannot prevent murder. He can only advise against it..."

The screens went blank abruptly.

Cussler was rigid in his chair.

"The only murder was the murder of my sons," he snapped. "Mere boys taken in by your Foundation's scheme of riches. You wanted Venus for yourself, to rule it like some petty kingdom. But now the World Congress will have their vote, and you may get a surprise. Your mighty technology is not everything. Maybe you can shape cells and genes to suit your whims, and build cities out of sterile plastic and cold metal, but there is a greater shaping that can be wielded, and that is the shaping of a human mind. The Congress will be voting soon. You can stop me, but how can you stop the government of the Earth? We have taken away your means. You have nothing left to work with on Venus and the Congress will realize that when they vote. The Sayre

Foundation has become a gang of penniless beggars and they will cast you out.

"Perhaps I am a little mad, my years, and the loss of my sons weigh heavily on me, but there are others who have joined with me and my goals who are not mad. They want the funds that would go to Venus to be directed elsewhere, and I don't think you can stop them. Not now."

Dennis expected the old man to laugh then, or cry, or something. But he merely stared at them and waited.

After a while the guards came to take him from the room.

The news that the World Congress had voted to modify the Sayre Foundation operations contract did not really come as a surprise to anyone. Although the government had recognized that Cussler and his organization had operated outside the law and brought the directors of the Group to trial, it was too late for us, the damage had been done. Now the Foundation was faced with a quandry: should it attempt to rebuild, or simply abandon the entire Venus operation and write off the venture as a colossal loss? Whatever the choice, Venus was an open world now. The Sayre Foundation had lost its exclusive option on the natural resources.

While the guiding minds of the Foundation pondered its decision in closed session, the rest of us assembled in small groups to talk. We felt like refugees, homeless and alone.

The gloom was contagious, but nonproductive. I had had enough of it, and so I looked up Robinson, one of the geologists who had been in on the exploration of Hades Basin. There were some questions I wanted to ask him, the foremost: what the hell had we been doing down there?

When I found him he gave me a glassy stare, and began to protest that he was too busy. But he stopped before he finished and gave me a sad grin. None of us were busy, anymore. Finally, he led me over to one of the observation ports where we could look out into space, and see the planet below us. Venus wore a dark girdle of cloud across her equator, now.

Robinson looked out silently for a while. "Brigid thought of that planet as her own personal treasure house. Inside its mantle is a fragment of matter created light-years distant from our sun."

"The proto-planet she spoke of at the lecture?"

"No," Robinson was smiling again. "That was just a little lie she invented to protect her secret until she could publish the results of her investigation, something that began years ago while she was still in college. She was working to generate a computer model of the process which yielded our solar system using data that extended far beyond the condensation of the sun and its planets. She began with the supernova that actually triggered this event."

"I wasn't aware that there was anything of the sort involved," I said. Then regretted my words. Robinson

looked as though he were about to spring into a full-blown, college credit lecture. For some people, unrestrained broadcasting of fact and opinion is one way of casting off depression. Robinson fit the mold.

"You aren't alone," he agreed. "The idea was simply theory in the Seventies. But evidence for it began to collect: star formation in a nebular feature in the constellation Canis Major; ejecta from a supernova producing concentrations of young, bright stars. The telling piece of evidence came when the same deep space infrared radiation data that showed the 'Big Bang' also produced a trace of a still expanding radiation shell of an ancient, but nearby stellar explosion.

"Unfortunately, when Brigid ran her program, the solar system it produced was not the one we know today. First, there was no Pluto...Neptune was the outermost planet. Secondly, Venus was very nearly Earthlike; she lacked her great mantle of poisonous clouds. At first, Brigid assumed the program was at fault and rechecked it. But that was a false lead, the program was performing as designed. That left only the data. Somehow, even though she had included every byte of information gleaned over the centuries about our solar system, she had missed some important facts.

"Then it hit her. If the change in Venus had not occurred due to solar influences, then it must have been caused by an extra-solar event. To test the idea she wrote a second program and began generating novas to examine the results of such explosions. It produced some interesting new data, namely, that planets were sometimes ejected into deep space when their stars underwent major disruptions. It was at this point that Brigid began checking out the great impact basins scattered throughout the planets of our solar system.

"Imagine the spectacle her program revealed. A star explodes, its inner planets are scoured and stripped of their crusts by sheets of stellar flame. In a scant amount of time they become little more than giant clinkers. The wavefront of the explosion and the weakening of the star's gravity due to its abrupt loss of mass must have imparted an outward velocity to them and their moons and they were shoved away, to leave their dying star behind. In front of them, the fires of the nova are fading. Behind, their sun glows more brightly than it has ever shone before. But eventually, it too fades, and shrinks to a pinprick of light.

"The wanderers leave their star in all directions, just as the radiation shell had done before. But their speeds are much below light speed. One of the dead clinkers is what was once the giant moon of the second planet of the unnamed star. It glides silently through deep space, its mantle outgassing and building a shell of frozen gasses over its burned mountains and valleys. Other gasses are collected from space itself due to the effects of gravity. Slowly, the object builds. Its surface is no longer black, but silvery."

"This has all got to be taking millions of years," I broke in to protest. In spite of myself, the image the geologist was painting had seized my imagination.

Robinson nodded. "Maybe as much as a billion years. When the wanderer first began its journey there was only the blackness of a nebula lying ahead of it. But before it could reach the nebula the radiation front of the supernova had begun to impact the diffuse gasses and concentrate them into a star and its accompanying planets. By the time the wanderer reached our solar system the planets had cooled and developed their first crust. The Venus of that time, as Brigid saw her, was reasonably normal. Her rotation and atmospheric pressure matched that of the Earth. Given two billion years and lots of volcanic activity she would have bled out enough water vapor to form oceans. Possibly life would have appeared. But that was not to be. The odds were against it, but it happened. The wanderer entered our solar system, went into orbit about the sun, and eventually struck Venus. At the moment of meeting there was a single colossal blast which mingled the atmospheres of the two worlds and smothered all hope of Venus ever having life naturally. The clouds generated by that explosive meeting never lifted, while the shock stopped the rotation of Venus and actually sent her spinning slowly backwards."

I looked out the port at the planet. "Perhaps that explains the exotic gasses like Argon 36 that the early probes detected down there. The wanderer would have traveled through the remnants of the protosolar dust cloud on its approach. When it struck, the layers of atmospheric ice vaporized. In effect, Venus has the atmospheres of two worlds, not merely one."

"Yes." Robinson was beginning to look tired. "Maybe someday we will have the opportunity to go down and see if something has remained of the wanderer."

A bell began ringing loudly through the intercomm system. "WILL MISTER ROGER TEALE PLEASE REPORT TO THE STATION HOSPITAL," the annunciator said. It was repeated several times.

"You'd better be off," Robinson told me. "We've been talking about ancient history. But you still have a present, and a future. Don't ignore that for the past."

I gave him a quick handshake and ran off.

The passageways were packed with people. The Station was overcrowded with refugees. It seemed like hours had passed by the time I fought my way to the proper level. A doctor met me at the hospital door. With a secret grin he led me to a small room and left me there. The interior was dark except for what light flooded in through a porthole. Venus was swimming beyond, pale and grim, her equator an angry color.

"Well, so you finally remembered that you have a wife and son."

Abruptly my arms were full of

warm, lonesome female. I was being kissed very seriously.

"I thought for a while that I'd never speak to you, but that's the woman in me speaking." She let go of me and pulled me over to the bed.

"Isn't he beautiful?"

He was, even in the dimness. He gurgled a bit as I picked him up and held him awkwardly in my arms.

"Don't look so uncomfortable. He won't break. Take him over by the port."

He was better in the light.

"You do good work," I told her.

She gave me a squeeze. "You're not bad yourself."

My eyes wandered from my son to Venus.

"She nearly took you from me. We misnamed that world. She's no goddess of love. Her name should have been Baal. She's never been more than a furnace, one into which we throw lives."

Irene didn't say anything.

"All of your work, my work, Hobart's dream, everything is gone."

"Not all. I spoke with Forsyth in his room before they brought you to me. Hobart has sent down automated probes. Some of the algae jungles have survived. A lot of the bubble algae was cooked, but the areas near the poles stayed cool. We sowed Venus with life. She hasn't been able to destroy it. Time will build a complete ecology in the clouds, and then we will go down to enjoy it. You see, the explosion did have one good result. Hades Basin is now one vast, active volcano. Thermal activity is breaking out all over the surface because of crustal fractures induced by the explosion. Hobart reports that the amount of gaseous water vapor in the atmosphere has doubled in less than twenty-four hours. I find a reason for hope in that."

She took the baby from my arms and held it before the port.

"When a child is born the first thing it gets is a good rap on the butt to start it breathing. We gave that girl down there a long overdue slap, and I think she's waking up. The Forsyth Convertor, and the natural processes of algae in the atmosphere are going to break down that massive envelope of gas. It will take thousands of years, but in the meantime we have made our world in the sky. The Foundation isn't going to pull out just because it lost Cytherea Station. They'll try again. We lost some battles, but the war will be won."

I was watching the baby. He was holding his small, pudgy arms out to the glass, trying to touch the woolly, gray sphere that was Venus. The little fluff brain actually thought that the planet was in his grasp.

Well, maybe it was.

No, we couldn't give up. We *had* caused the planet to wake. We had to make sure that she grew up right.

She had done things all her way for too long. Now it was our turn to have a say.

I wondered what those 'words' might turn out to be as the clouded face turned slowly beneath us. ■

The Reference Library

SPIDER ROBINSON

The Number of the Beast—, Robert A. Heinlein, New English Library, 556 pp., price unknown
Expanded Universe, Robert A. Heinlein, Ace, pages & price unknown
Beyond the Blue Event Horizon, Frederik Pohl, Del Rey, 336 pp., $9.95
The Ringworld Engineers, Larry Niven, Holt, Rinehart & Winston, pages and price unknown
Tales of Neverÿon, Samuel R. Delany, Bantam, 265 pp., $2.25
Crompton Divided, Robert Sheckley, Bantam, 183 pp., $1.95
Vectors, Charles Sheffield, Ace, 423 pp., $2.25
New Worlds, Wernher Von Braun & Frederick L. Ordway, Anchor/Doubleday, 284 pp., $24.95
Roadmarks, Roger Zelazny, Del Rey, 186 pp., $8.95
Slapstick, Kurt Vonnegut, Jr., Delta, 243 pp., $3.95

ALL STAR GAME

Yes, friends, we're in fast company this month. Just look at that line-up! I don't know about you, but a good half of my SF pantheon is represented in this month's column.

Before I became a book reviewer, I almost never read book review columns. The exceptions were (Ted Sturgeon's, because I read *everything* Ted writes, and) the columns that covered at least one book by an author I *already* respected. In such cases I always read the entire column, not just the item in which I was interested, because this helped me get an idea of how the reviewer's mind worked and of how relevant his or her opinions were to my own. If it happened that the reviewer seemed to me a custard-head, I still wanted to know what he or she thought about the book I was interested in—I simply employed noise-filters and image-enhancers to get a true fix.

Once suckered into this racket, I bore my own habit in mind and made a point of trying to get at least one Big Name author into every stick. I have been known to hold a column two weeks past deadline, hoping desperately that one of the gods would rouse him or herself and come forth. Often they did and sometimes they didn't, but I think it's safe to say that I have never before taken typewriter on lap to write a column with such confident assurance that I have your attention.

Without further ado, then, let us take a deep breath, part the jungle bush with the muzzle of our blunderbuss ("blunderbuss," by the way, might make a good nickname for the Space Shuttle) and take a bead on this month's all star game.

Robert A. Heinlein's title for his newest novel is "**The Number of the Beast—.**" Unfortunately, the publishers apparently have a neurotic fear of quotation marks in titles (God might sue for plagiarism?) and so it will appear as *The Number of the Beast*. You may not care. I do.

But by any other name it is an astonishing piece of work. I think it is certain to be the most controversial novel Heinlein has ever published.

I have an enormous load of adjectives here, and my arms are starting to cramp. Let me set them all down and then we can talk, okay?

Adjectives *I* would apply to this book include: breathtaking, groundbreaking, mind-expanding, provocative, dense, broad, daring, startling, exuberant, informative, unconventional, opinionated, mystifying, gleeful, ornery, imaginative, grand, majestic, and deeply, genuinely moving.

Now the other armload. Here are some of the adjectives that the critics (and possibly one or two of the other book reviewers) are going to affix to the book, as sure as God made little green parking tickets: opaque, self-indulgent, preposterous, rambling, turgid, unstructured, baffling, boring, infuriating, arrogant, pretentious and dull.

So how are you to know which armload applies to you? If you know me at all you know I am a Heinlein fanatic. If you've been paying attention the last few years, you know that virtually all the critics are anti-Heinlein fanatics these days. How, then, do you evaluate the storm of controversy which will certainly attend the publication of this book?

Well, it's like this: with *The Number of the Beast*—, Robert Heinlein has convened a stupendous Grand Ball and Jamboree for all his good and true friends. If you do not count yourself among that number, this book is not addressed to you—in which case you should read it because it will annoy the living hell out of you.

Near the beginning of the book, I began keeping a list of classes of people that Heinlein's characters went out of their way to insult, offend or otherwise outrage. My arm got tired, but a partial list includes: lawyers, architects, philosophers, theologians, teachers of education, students of education, female chauvinists, male chauvinists, pacifists, "environmentalists," Russians, authoritarians, rugged individuals, knee-jerk liberals, knee-jerk conservatives, teachers of creative writing, and critics. (That's within the first hundred pages.)

Apply this test: are you one of the small but noisy minority who savagely disliked *I Will Fear No Evil* and *Time Enough For Love*? Are you angered when, after more than forty books, Heinlein fails to offer you what you thought you had a right to expect, forever (action-adventure, full of incident and complication, any educational content utterly painlessly inserted)? Do you find ideas less exciting than battle scenes, and are you threatened by ideas which conflict with your own? Specifically, do you have a knee-jerk negative response to any of the following words: military, discipline, duty, liberty?

If any of those is a yes, you are likely to dislike this book so intensely that in the end you'll be glad you read it (much as I "enjoyed" reading *The Female Man*). If, like me, you enjoyed *Time Enough For Love* immensely, this book will be an indescribable treat.

(I can think of one class of people who ought to avoid *TNotB*—, at least for the moment: if you are the hypothetical new convert to SF and have never read any Heinlein, this is not the place to start.)

Those of you who *do* count yourselves as true friends of RAH are strongly urged *not* to read the other reviews and critiques of *TNotB*— until you have finished the book. Like small children despoiling that which they cannot themselves enjoy, the critics will almost certainly insist on spoiling all the splendid surprises for you—and there are surprises here almost beyond belief. I am very glad that I was allowed to read the book in complete ignorance of what was coming next, and I hope you are as fortunate: it'll blow you out of your socks.

Oh, all right, it's possible that some of you have missed the two excerpts ran in *Omni* last year—I can recap that much (those two excerpts, by the way, were the first 140 pages out of a total of 556—except that those 140 pages were cut by twenty percent for magazine publication). Four highly brilliant, educated and eccentric people find themselves in possession of the secret of travel to all of the alternate universes, whose number is the Number of the Beast—here correctly translated, for the first time in thousands of years, as $(6^6)^6$. Almost at once the four are attacked by homicidal aliens who, disguised as humans, have thoroughly infiltrated the Earth. The four narrowly escape by changing universes. Two of them, by the way, happen for perfectly good reasons to be named John Carter and Dejah Thoris.

That's about as far as the *Omni* excerpt took you. I believe I will permit myself one small teaser in addition—those of you who don't want to know, skip the next paragraph.

The intrepid four begin searching universes, more or less at random, in search of an Earth that is not alien-infested and that has advanced obstetrics (both women, you will recall, are pregnant). And rather early on, they find themselves in a universe which is, unmistakably and for sure, the Land of Oz....

What Heinlein has achieved here is nothing less than a rigorous mathematical basis for solipsism, for the pure fun of it. Imagine something rather like "All You Zombies—" (another partial-quotation title, come to think), but at novel length. This book has things in common with a Klein bottle, a Moebius band, a tesseract, and an Escher cataract—*I* think it's the ultimate Hat Trick. It makes Phil Dick seem linear.

My only problem is, I can't *imagine* what on God's Earth Heinlein can possibly do for an encore. But then I've had that problem at least a dozen times with Heinlein, and he's always managed. I'll be interested to see his *next* book, already in progress.

You will find it worthwhile to spring for the New English Library hardcover edition of *The Number of the Beast—*, as the Fawcett trade paperback is billed as "slightly shorter," a term similar to "a little bit pregnant."

There is a second Robert Heinlein book on the horizon, and I would hate to be put in a situation where I could have one or the other but not both.

Back in 1965 Ace Books published an excellent collection, *The Worlds of Robert A. Heinlein*. It contained three previously uncollected stories ("Searchlight," "Free Men," "Solution Unsatisfactory"), two inexplicably omitted from the paperback version of *The Man Who Sold the Moon* ("Blowups Happen" and Heinlein's first story,

"Life-Line"), and "Pandora's Box," a series of predictions for the year 2000, originally published in 1950 and updated for book publication in 1965.

Here it is fifteen years later, and *The Worlds of* has become **Expanded Universe: More Worlds of Robert A. Heinlein.**

How expanded? How *many* more worlds? I'm computing here from a manuscript-xerox sent to me by Ace editor Jim Baen, a total and uniform retype job. The material included in the '65 version totals 251 manuscript pages, roughly 77,500 words. Additional material in the new 1980 version totals 406 more pages, about 125,000 more words. Call it a 160 percent increase in size, for a total of approximately 202,500 words.

Expanded universe indeed!

Now: of this new material, only about 17,500 words (3 stories) is science fiction, and none of that is what I'd call major Heinlein. A little over 23,000 words is non-SF fiction: a murder mystery, a parable about bravery, a politics tale and a story about a girl on a diet.(!) The remaining 84,000-plus words are fact and opinion: essays, articles, polemics and one and a half speeches. These turn out to be some of the most interesting and provocative stuff in the book. The whole thing is sandwiched with introductions, afterwords, updates and epigrammatic fillers, and in spots it gets as close as Robert Heinlein is ever likely to come to writing his memoirs (not all that close, really).

For instance. We have a series of three essays written shortly after Hiroshima, arguing that the only alternative to a World State with absolute control of atomic weapons is atomic holocaust. (Thirty-five years later, I invite you to show me the flaw, if any, in his logic.) We have a polemic on the necessity of nuclear-weapons-testing called "Who Are the Heirs of Patrick Henry?" which Heinlein says "brought down on me the strongest and most emotional adverse criticism I have ever experienced—and not to my surprise." (Immediately after the flap died down, he began *Starship Troopers*. Here, by the way, Heinlein takes a couple of pages to demolish every criticism I've ever heard of that book.) We have two quite lengthy articles, about 14,000 words, concerning Robert and Virginia Heinlein's 1960 trip through the Soviet Union—I believe it will raise your eyebrows. We have the second half of the speech Heinlein delivered at the 1973 James Forrestal Memorial Lecture at the U.S. Naval Academy, the section dealing with "The Pragmatics of Patriotism" (again, I'd be interested to see if any who disagree with him can actually refute him). We have a reprint of Heinlein's *Encyclopaedia Britannica* article on Paul Dirac, with new commentary, which explains among other things why Dirac is a peer of Newton and Einstein; why antimatter technology will drastically change the world (not necessarily for the better) in your lifetime—as Dirac predicted in 1928; and how we have learned in the last year that gravity is *not* a constant but *a variable decreasing with time*—as Dirac predicted in 1937.

Finally we have two scenarios for the future, the first pessimistic and the second optimistic. I suspect that the former will educate you no matter how depressed you already were, and that the second will startle the *hell* out of you.

Along the way Heinlein pauses briefly for such tidbits as: a straight-faced suggestion that the elective franchise in the U.S. be limited to females only (and perhaps to women with children only, since only they have a demonstrable stake in the future); a mathematical proof that *with existing knowledge* Mars is approximately as far from here in terms of travel time as Plymouth Rock was to the passengers of the *Mayflower* (an Earth-*Pluto* trip, on the other hand, equates with a China clipper voyage from Boston); a spirited defense of "Doc" Smith's fiction (incidentally, have you noticed that the editor of this illustrious publication is in fact a Doctor whose name translates as "Smith"? Heinlein's joke, not mine); and a flat claim that Heinlein originated the concept of the water bed and directly inspired the first manufacturer thereof (although he has never slept in one).

Did I mention the part where Heinlein proves from direct personal observation that the official population figure for Moscow in 1960 was inflated by more than a factor of 6? (I get a figure of 6.66 . . . repeating. Would it be too grotesque a pun to think of that as "The Number of the Beast"?)

I think *Expanded Universe* may well tie with *The Number of the Beast*— as the most provocative and controversial Heinlein book ever published. I cannot recommend it highly enough, to his admirers and detractors alike. (I can't *wait* to hear what Alexei Panshin will have to say about these two books!)

The next two books are sequels, and as with *TNotB*— they are not the best places to start reading the author in question. Ordinarily I count this a flaw—and I *do* wish publishers would *label* such books to keep the unwary from buying unwisely. But in both of the following cases I find it hard to believe that anyone interested in purchasing them could really have missed their prequels—as with Heinlein, these men have genuinely achieved such stature that they can assume you know them.

First in line, for example, is Fred Pohl's sequel to *Gateway,* a book which won just about every award SF has to offer. The sequel has an abominably bad title—**Beyond the Blue Event Horizon**—and that is absolutely the only bad thing about it. I think it's the most satisfying sequel I've ever read, and if it fails to repeat *Gateway's* Triple Crown, it will only be because all the biggies have come out of hiding at once this year, splitting the ballot.

Herein we learn the answers to most of the riddles and mysteries left unsolved at the conclusion of *Gateway* — and as it so often turns out in real life, the solutions are—*in retrospect*—almost horrifyingly simple. Robinet Broadhead finally comes to terms with his guilt and anguish, finally achieves happiness with his wife, S Ya, and incidentally becomes the wealthiest human in history. Mankind learns how to safely and effectively operate the Heechee ships. We finally get to meet the Heechee, and even more startling, we get a few glimpses of *the beings who mystify the hell out of the Heechee.* And in the end we learn the *purpose* of the Big Bang itself!

It should be mentioned that *BtBEV* does not resemble *Gateway* a whole lot. The latter was a first-person narrative which alternated between present and flashback and had sidebars all over the place; the sequel has no sidebars or flashbacks, but does have several dif-

ferent viewpoint characters, most of them third person. We don't even meet Sigfrid Von Shrink until quite near the end of the book. I would say there's *more* dramatic tension in this book than in its prequel, whose drama was mostly internal.

Certainly very few books have ever held my attention in such an iron grip right up until the last paragraph, built so irresistably to such a satisfying *series* of blockbuster punch lines, left me so breathless with admiration, achieved such truly cosmic scope. Heinlein's novel will be the most controversial of the year; Pohl's will be the most widely liked, the most universally praised. Although Fred himself formulated Pohl's Law, which says that nothing is so good that someone somewhere won't hate it, it is hard to imagine why anyone would hate this book.

And I don't see any reason why it couldn't have a sequel of its own.

Only slightly less recommended is **The Ringworld Engineers,** Larry Niven's long-awaited sequel to his award-winning *Ringworld.*

Louis Wu, gnawed by guilt over the death of Halrloprillallar (for which he feels responsible), has become a wirehead. He is kidnapped by a puppeteer—*not* Nessus (who never appears in this book) but Nessus's mate, The Hindmost. (To Larry's credit, not once in this book does Louis say, "The devil take The Hindmost.") Or rather, The ex-Hindmost: he has been deposed from office. In order to win back his power, he wishes to go to the Ringworld and steal the secret of transmutation used to construct it. To this end he enslaves Louis and Speaker-To-Animals—who now, by the way, is known as Chmeee.

But the three soon learn that they face a grim deadline: the Ringworld has lost orbital plane stability. It is off center, and will contact its sun within one year and five months.

From there things get complex and interesting. We meet Teela Brown again—except that I guarantee you won't recognize her. We do *not* meet the Ringworld engineers, exactly, but we do learn who they were, and that they are still around. We watch Louis Wu battle to work out his guilt and kick current addiction—only to be faced with a decision whose consequences would make Adolph Hitler turn pale and sweaty.

"Problems": 1) This book more nearly resembles Heinlein's than Pohl's, in that in order to appreciate it fully you need to be already familiar with, not just a previous book, but the bulk of the author's previous output. When I finished *TRE,* I cleared my calendar for a week, sat down and reread every word of the Known Space cycle from scratch, then reread *TRE.* It was worth the effort, and left me staggered by the breadth and scope of Larry's vision. 2) This book does not allow yet another sequel—it *demands* one. At its conclusion, Louis is still stranded on the Ringworld.

I don't really mind either of these. I think Larry is one of a very small handful of writers with a sufficiently devoted following to allow him to get away with 1). And 2) is no real problem either: I think *TRE* has (perhaps just) enough sense of resolution to stand on its own.

If you count yourself as a true friend of Larry Niven, race right out and get this one. But it might be a good idea to reread the Known Space

cycle first if you don't have it all fixed in your memory. (Sorry, I can't tell you which specific books—that would give the game away.)

Next—and at last—a book which stands all by itself. Whoops! No, it doesn't either. To really properly appreciate and evaluate Samuel R. Delany's new sword and sorcery novel, **Tales of Neverÿon,** you need not necessarily be familiar with any of *Delany's* previous work (although I think it would help)—but you *should* be familiar with the Culhar' Fragment, one of the oldest narrative texts in existence, which according to Delany "clearly predates Homer and most probably Gilgamesh—conceivably by as much as four thousand years."

Otherwise, for instance, you won't even realize what a clever pun the title is, let alone fully grasp what comes after it. If you aren't fully conversant with the Culhar', most of the book will likely seem clever, absorbing, delightfully inventive and beautifully written—but in the end rather aimless and pointless. It will seem to just sort of...stop, without having *gotten* anywhere specific, and you might find that a bit disappointing. It will come across as more a collection of related short stories than a unified whole building to a climax and resolution, and leave you a bit mystified.

Fortunately, Delany with his characteristic perversity places at the very end of the book a 26-page appendix, allegedly written in 1981 by "S.L. Kermit," which makes it possible for the first time to understand what you have just finished reading, and to appreciate just what a clever fellow Chip Delany is. What he has achieved is a modern retelling of the Culhar' Myth, constructed by selecting from the many possible alternate translations of this incomplete text those which most please Delany, and then expanding on them. (By the way, I am no scholar of antique literature—for all of me, the whole Culhar' Fragment could be as much of a hoax as the "date" and "author" of the appendix.)

An example, speaking of Delany's characteristic perversity: there apparently exists in the Culhar' a phrase which has been alternately translated as 1) "the love of the small outlander for the big slave from Culhare" 2) "the love of the small barbarian slave for the tall man from Culhare" 3) "the love of the tall slave from Culhare for the small barbarian" or 4) "the small love of the barbarian and the tall man for slavery" (and Delany admits earlier that there's no way to determine gender in this translation—it could be that the "man" is a "woman"). Do any of you who have read *Dhalgren* or *The Tides of Lust* need to be told Delany interprets this phrase to mean a tall man and a small barbarian are turned on exclusively by homophile sexual enslavement?

On the whole I'd have to call this the most accessible Delany book in quite a while. Although it has as much S&M as *Dhalgren* (possibly less—I didn't finish *Dhalgren),* the S&M is not as *gross,* as suffused with the smell of stale sweat, piss, dirty leather and old semen. Radical feminists will be delighted by the plethora of macho Amazons, by the hilarious digression on *rult*-envy, and by the turnabout feminist retelling of Genesis—although those nonfanatics who might care to read a *nonsexist* creation myth will have to look somewhere else.

None of the characters in this book are as dull and unlikable as the protagonist of *Triton,* and some of them are enormously endearing. The background world, while it is never plausible for more than a few moments, is perhaps the most colorful, rich and inventive that Delany has ever created. And finally, as should go without saying for any Delany book, sentence by sentence the prose is gorgeous.

I have the feeling that a jest so brilliantly clever that it must be explained to 99 + percent of its readers in a 26-page afterword is a poor jest. Nonetheless, give this a try.

Finally, by God, a book you can pick up and read all by, of and for itself. Its only problem, in fact (and it's a minor problem), is that it is perhaps *best* read that way.

Crompton Divided (published a couple of years ago in England as *The Alchemical Marriage of Alastair Crompton)* is accurately described by its cover blurb as "The long-awaited new novel by one of science fiction's best-loved writers." In the 50's and 60's Robert Sheckley was one of the most important and significant—and prolific—writers in the field. Then he moved to Ibiza and I stopped seeing his byline. I don't have dates, but the Contento Index lists only *fifteen* Sheckley stories in the last ten years. A few years back he published a novel called *Options.* It was a very good book, and saleswise it lay there.

And then in the past year Sheckley staged one of the most triumphant comebacks in SF history. By now most of his novels and story collections are available in new paperback editions (almost all from Ace), he has become the fiction editor for *Omni,* and *Crompton Divided* is here before me.

It is new Sheckley and it is the pure quill. In his infancy Alastair Crompton is found to be so hopelessly schizophrenic that it is judged best to separate out these three personality fragments and install each in a different body. The two clones, Loomis and Stack, are sent to opposite ends of the galaxy so that the three will never reunite. In his adulthood Crompton realizes himself incomplete, inadequate, and conceives a desperate plan to reintegrate himself with Loomis and Stack, even though he has been told that the inevitable result will be insanity.

Insanity does indeed result, immediately and throughout. Nobody does wacky satire better than Sheckley, and I'm confident that by the time you finish *Crompton Divided* his genius for pretzel logic will have turned your brains to prune yogurt. The book is quintessential Sheck, sardonic and witty and zany.

And that is its only small problem. You will probably enjoy it just a bit more if you have not already read *Mindswap* and *Options* and *Citizen In Space.* It is those books shuffled and redealt. The book has all the classic Sheckley black humor preoccupations—insanity, inadequacy, despair, absurdity, paradox, obsession, lust, venality, humiliation, the frailty of logic, the futility of all effort, the folly of trying to maintain ethics and morals in a changing universe—and as usual it stops short of any real resolution, relying on brilliant sleight-of-hand for an ending. (Perhaps that's the trouble with black humor: the logical resolution is to flush your head down the toilet.)

There's nothing at all *wrong* with

giving the customers more of the same; they frequently insist on it. If you've never read any Sheckley, this is as good a place as any to start—and everybody ought to have read a good deal of Sheckley. If you already have . . . well, here is some more and it's up to specs.

As Doc Schmidt will surely tell you, a hard-science short story is a hard thing to find these days. Most of the past masters have retired or started concentrating on novels; few of the newcomers to this difficult subgenre are masters (yet). With so *many* startling scientific breakthroughs these days, maybe it's getting harder to *fit* a startling premise into a short story that has any characterization at all.

But Charles Sheffield, the only non-Big Name in this month's column, does rather well. Characterization is not his strong suit, but he is no worse at it than Dr. Asimov, and certainly better than, say, James Hogan. And Sheffield's scientific speculations are fascinating indeed, informed and plausible and imaginative. (Sheffield is the president of the American Astronautical Society.) **Vectors** is his first short story collection, culled from several magazines. It offers a representative sampling of his short fiction, from the first things he ever wrote to the latest, and it is interesting to watch his developing mastery of his craft. The earliest stories are interesting but pat, derivative; as they go along they get more thoughtful, a bit more profound. (I'm speaking of the order in which they were written, not their order of appearance in this book. How you tell the difference is from Sheffield's frequent afterwords, in which he discusses SF writing as a profession, and displays a strikingly accurate awareness of his own strengths and weaknesses.) He can be genuinely funny when he wants to be, can be suspenseful when he wants to be, and if he never quite manages to transcend the form in which he is working (as Varley, for instance, so often does), yet he is invariably competent. He reminds me of the early Asimov or Clarke, and if he does not achieve the massive popularity of those two men, it will be because the SF field itself has changed. This kind of SF is not my own personal pipe of tea these days (though it was in days gone by), and Sheffield would probably make the SF-Should-Be-Capital-L-Literature types foam at the mouth. But I respect what he does and suspect the average Analog reader will enjoy it even more than I did. Don't miss Sheffield's excellent science fact article on how to build a beanstalk.

Speaking of science fact, make a tall effort to find **New Worlds,** the last major literary effort of the late Wernher Von Braun. Written with his friend and colleague Frederick L. Ordway, *New Worlds* is an exemplary textbook on the solar system. It places the system in the context of the cosmos as we now (think we) understand it, and incorporates all the new discoveries of recent years—cutting off, unfortunately, just before the Voyager data started coming back. It is fact-packed and eminently readable, its charts and diagrams can actually be interpreted, and its photo illustrations, both in b&w and good-to-superb color, are plentiful and gorgeous. At twenty-five bucks this coffee table-sized hardcover is seriously underpriced, and no resident or tour-

ist of the solar system should be without it. If you know someone who can't seem to understand what the space program is *for,* don't give up and tell them about the economic benefits—lend them this.

We'll return to Big Name Fictioneers just long enough to leave you with two disappointments and one I-Shoulda-Known-Better.

I have not one serious criticism to make of Roger Zelazny's new novel, **Roadmarks.** Regrettably, I can't think of anything to praise *Roadmarks* either.

It's embarrassing. I read the Del Rey galley proofs when they arrived, and rather enjoyed it. Then a couple of months later the hardcover itself arrived, reminding me that I wanted to include it in this column. Only I couldn't remember a God damned thing about it. So I reread it, more attentively, and once again rather enjoyed it. Then in the middle of this column Christmas descended and everything went on hold. Here it is two weeks later and once again I can't remember a God damned thing about *Roadmarks.*

Well now, that's not strictly true. There's this guy named Red driving a truck down the Road of Time (why, I never figured out). Somebody wants to kill him, and some stuff happens. That's about all I retain. I remember that it gave me a reasonably good time on two separate occasions, but I can't recall how.

What can I say? It'll probably kill an afternoon—but *Doorways in the Sand* did that more inventively, and I thought even that was second-rate Zelazny.

As I said earlier, I shoulda known better. But I was talking at a party about that business of gravity turning out not to be a constant—which as far as I knew was up-to-the-minute hot news—and somebody said, "Oh yeah, Kurt Vonnegut talked about that stuff in his last book."

So I borrowed a copy of **Slapstick** and took a chance.

Kurt Vonnegut wouldn't know gravity if it came up and bit him on the ass. His conception of it is childish and he knows it and is proud of it. He has completed the collapse into self-indulgence, self-parady and self-abuse which has been entertaining him so much over the last ten years, degenerating to the point where a half-baked short story's worth of idea seems to him enough to justify an overpriced novel, consciously padded with twitches and mannerisms. (His latest punctuating fart is "Hi ho." It ends half the paragraphs in the book. Early on the narrator says he will go back over the manuscript and cross out all the Hi-hos. I wish to God he had followed through. But then the book would have been so much shorter that even Vonnegut's publishers would have lacked the plums to charge four hard-earned bucks for it.)

It is worth mentioning that this travesty, whose total idea content (and not a bad idea, by the way) could be exhaustively described in half a page, is covered with hosannas of praise from the most respected critics in the land. SF writers take note. This is what happens when you go for literary acclaim and the plaudits of the intelligentsia. It is pitiful to recall that once this poor sad son of a bitch knew how to write. And why. ■

Brass Tacks

Dear Stan:

In his book review column in the February issue, Spider Robinson has given us an exhaustive analysis of the merits and faults of a number of books. However, when it came to reaction of my *Retief Unbound* (not my title), he dismisses it as a mediocre novel. I am quite certain that he is aware of the difference between a story collection and a novel, so the only explanation of this curious lapse appears to be that he did not read it. I consider the offering of comments, good, bad or indifferent, on a book one has not read to be unfair, unwise and uncalled for.

Outside of that, it was a good issue.

KEITH LAUMER

P.S. Your question: "Who is responsible for quality control of a civilization?" is a good one. And the answer is: *We* are! Only the public's tolerance of shoddy goods, slovenly service and insolent waiters allows them to exist. When I'm spending my money, I insist on getting what I want. Pork chops exactly ½ inch thick, for example, and Porterhouse steaks 1½ inches thick, for another example. And when the meat-cutter guesstimates them with an error of 50 percent, I tell him to try again, which outrages him: "What am I supposed to do with these?" I then make an impractical suggestion. But I get what I came for, not just whatever this bird finds it easy to offer me.

Dear Stanley:

So, John Gribbin wants to dump seven trillion tons of carbon dioxide into the ocean. How about if we also dump a few hundred billion tons of artificial sweetener and flavoring into the ocean? Add a straw, and we'd have the biggest soda pop in the universe! Of course, it would be a little salty....

Wouldn't a better method of avoiding a CO_2 buildup in the atmosphere be to build greenhouses in everyone's backyard? As Gribbin pointed out, the most significant factor affecting atmospheric CO_2 levels has actually been the loss of seven percent of the world's biomass through deforestation. Since little photosynthesis takes place during winter months in the northern latitudes of continents, the oxygen produced by plants in greenhouses would be pure bonus, and might help to offset the loss of all that biomass. We would also have more climate-immune food, if we grew vegetables in the greenhouses.

What could be more fitting than using green houses to avert the "hothouse effect?"

RONALD R. LAMBERT

Dear Stan:

International law allows sovereign states complete freedom to engage in any activity that is not expressly prohibited by law. Today the U.S. has a perfect right to exploit space resources for profit. The moon treaty does not give the U.S. new rights, it only limits existing U.S. rights to use space resources for scientific purposes and takes away the U.S.'s existing right to exploit such resources for profit. It

should be stressed that the moon treaty does not create even a single new right beyond those the U.S. already enjoys under existing international law. Far from being a fair balance between the needs of free enterprise and the less developed countries, the moon treaty is a dangerous and unnecessary abandonment of the basic legal rights free enterprise will need to work effectively in space. The moon treaty introduces substantial uncertainty and risk for private sector investment in space ventures that would exploit space resources for profit.

Space industrialization requires the establishment of realistic laws. To determine what law will be appropriate in space, it is necessary to examine why humanity is expanding into this new environment. Three principal forces—the academic, military, and commercial—interact to impel humanity into space. With the exception of communications, and possibly remote sensing in the near future, U.S. involvement in space is entirely academic or military. Present space law, including the moon treaty, has been forged almost entirely out of high academic ideals in *advance* of any practical commercial reality. True space law, if it allows free enterprise to operate at all, will evolve to meet the needs of practical commercial ventures. In this author's opinion, practical business space law would, if not preempted, evolve shortly after space-based exploitation of basic resources and energy begins to yield substantial profits. History teaches that the transition between academic and practical legal regimes can be gradual or traumatic, but that such transitions inevitably occur.

Ominously, the world now spends far more for military purposes in space than for academic studies. Apparently the only remaining substantial possibility for free enterprise nonmilitary development of space requires large scale commercial development of basic natural resources, i.e. raw materials and energy from space. Only basic raw materials and energy from space can return a profit commensurate with the capital expense and risk that will be required to start up space industry. Only large scale development of these basic space resources can provide sufficient economies of scale to permit development of space as an industrial frontier by free enterprise capitalism.

Such large capital investments cannot be made by free enterprise without clear legal guidelines that allow commercial operations to exploit space resources for profit. Free enterprise institutions simply cannot make significant investments in space while they are under the threat of lawsuits over the meaning of treaty terms or ex post facto appropriation of their investments by a nebulous future international regime.

Finally, it is clear beyond reasonable doubt that the U.S.S.R. and its supporters in COPUOS have and are executing a careful and deliberate program intended to limit the entry of free enterprise into space. Since the U.S.S.R.'s introduction of the draft Treaty on Principles in 1962, the Soviet Union and its allies have fought constant delaying actions to chill free enterprise investment in space as a new industrial environment. It is an unfortunate commentary on the will and vision of the United States and

other world nations that the U.S.S.R.'s program has been so successful.

ART DULA

This letter is obviously relevant to the topic of Jerry Pournelle's January Alternate View, "The Moon Belongs to Everyone." It is also the concluding portion of Art Dula's article, "Free Enterprise and the Proposed Moon Treaty," in the Winter 1979 issue of the Houston Journal of International Law. This article goes into the treaty and its implications in much more detail than space allows us to do in Analog, but Analog readers seriously interested in this issue might do well to look it up.

Dear Mr. Schmidt,

I have just finished reading the December issue of Analog, and while I do not usually feel motivated to pick up my pen and offer comments, this time I do.

The reason for the motivation is Mr. Clifford Simak's novel *The Visitors.* I was very disappointed with Mr. Simak because he did not, in my mind, end the story. Oh, it has an ending, the world will have to pull together to solve the problems that the visitors create, but that is an unsatisfactory ending. Nowhere does Mr. Simak answer the questions of where the visitors came from, what they are, why they landed totally in the U.S., how long are they staying and can we ever communicate with them, to name just a few of the unanswered questions.

No one wants all the questions which a good novel raises to be answered outright, much of the fun in reading is the act of discovering the hidden or implied answers in a novel. But these are not just minor questions which Mr. Simak has left unanswered—they are a major part of the story line.

The reason for this letter is to encourage those readers who had similar reactions to write to Mr. Simak to ask him to write a sequel. Mr. Simak is reluctant to write sequels and I would normally agree with him, but this novel is too fascinating a concept to be left hanging the way it is.

I have written to Mr. Simak about the novel and I urge my fellow readers to do likewise. You might say that this would be a "grass roots" movement from the readers to the author. Send your letter to Clifford D. Simak c/o this magazine. I believe that Mr. Simak would respond if enough people inquired about a sequel, certainly we can make the attempt.

JAMES WRIGHT

216 South Prospect St.
Burlington, Vermont

Dear Mr. Schmidt:

Simak is certainly not slipping. Not only was *The Visitors* an excellent story but the ending was sheer genius. Ole Spider might claim it was telegraphing a sequel but Simak doesn't run to sequels. (Actually unlike Spider, I didn't think *Inherit the Stars* did that, and the "successor story" wasn't exactly a sequel.)

CLIFTON AMSBURY

768 Amador Street
Richmond, CA.

These letters are typical: what some readers like very much, others don't like at all. Usually when nobody hates a piece, nobody loves it either. Anyway, we'll be glad to forward any letters addressed to Mr. Simak or any of our writers.

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D.J., Wichita Falls, Texas...

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MicroGame 1...

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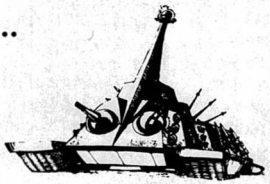

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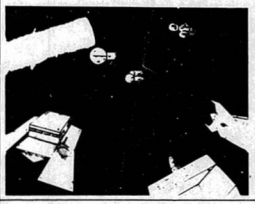
MicroGame 13...

HOLY WAR



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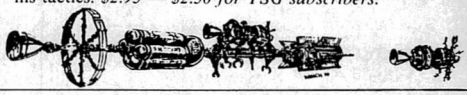

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